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ABSTRACTS

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2017 SYMPOSIA

SYM1

HEALTH COMMUNICATION FOR NON-CIGARETTE TOBACCO PRODUCTS

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While health communication approaches for cigarette smoking have been widely studied across the globe, less research has addressed communicating the risk of using non-cigarette tobacco products. However, with the rising prevalence of non-cigarette product use, including e-cigarettes, cigars, waterpipes and smokeless tobacco, research on how best to communicate the risks of using these products is urgently needed. This symposium will describe four studies aimed at developing health communication messages for non-cigarette tobacco products. First, Dr. Erin Sutfin will present formative and evaluation data on a health communication campaign for waterpipe tobacco and cigarillos aimed at adolescents and young adults. Next, Dr. Tesfa Alexander will describe the campaign development process, including formative data, for the first national smokeless tobacco prevention campaign, targeting the most vulnerable population for smokeless tobacco use – rural, white male youth. Dr. Angeline Sangalang will then present data on the identification of belief statements about e-cigarettes to support the development of a media campaign aimed at adolescents. Next, Dr. Scott Weaver will report on process and evaluation data from the development of public health e-cigarette messages aimed at different segments of adult smokers defined by sociodemographics, worldviews, and e-cigarette use. Finally, the discussant, Dr. Seth Noar, will provide a summary of the emerging science base on health communication for non-cigarette tobacco products and will make suggestions for future research directions in this area.

JUSTIFICATION: This symposium will provide an overview of data and theory-driven approaches to communicating the risks of using non-cigarette tobacco products.

FUNDING: Research reported in the symposium abstracts was supported by grant numbers P50CA180907, P50CA179546 from the National Cancer Institute and FDA Center for Tobacco Products and grant number P50DA036128 from the NIH/NIDA and FDA Center for Tobacco Products. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the Food and Drug Administration.

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SYM1A

DEVELOPING A POINT-OF-SALE HEALTH COMMUNICATION CAMPAIGN FOR CIGARILLOS AND WATERPIPE TOBACCO

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BACKGROUND: Waterpipe tobacco (WT) and cigarillo use continue to rise among adolescents and young adults in the U.S., despite decreases in cigarette smoking. Moreover, adolescents and young adults erroneously believe using these products is safer than smoking cigarettes. **METHODS:** We conducted three phases of research with adolescents and young adults ages 13-25 (N=5,573) to develop a point-of-sale campaign to discourage use of WT and cigarillos. First, we determined the most salient message theme, utilizing focus groups and a national phone survey. Second, we determined the most effective campaign executions, utilizing focus groups. Third, a message testing phase was used to choose particular campaign messages, utilizing a national online study. **RESULTS:** Participants found constituent-themed messages compelling. Constituent information was novel, rated as worrisome, and when combined with other products the constituents were found in (e.g., arsenic in pesticides), thought to be “gross”. Based on these formative results, we developed a campaign where each message: (1) identified a tobacco product, a constituent in the smoke, and a common product (e.g., pesticides, gasoline); (2) included an image of the common product to elicit an emotional response; and (3) used a sarcastic tone, which appeals to individual in the target age group. We developed 8 messages for WT and 9 for cigarillos. Testing

indicated that perceived effectiveness ratings were similar across messages, ranging from 4.28-4.44 on a 5-point scale. Messages were rated highly on perceived attributes (makes tobacco product seem gross, less attractive, unhealthy), ranging from 4.27-4.44 on a 5-point scale. Messages were attention-grabbing (4.01-4.34), easy to understand (4.04-4.42) and displayed high visual-verbal redundancy (4.03-4.38). Using these data we selected two messages for each tobacco product for use in the upcoming point-of-sale trial. **CONCLUSIONS:** This series of studies resulted in messages rated highly on several relevant dimensions. The next phase of this research will be to test these messages in a point-of-sale cluster randomized trial to assess their real world impact.

FUNDING: Research reported in this abstract was supported by grant number P50CA180907 from the National Cancer Institute and FDA Center for Tobacco Products (CTP). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the Food and Drug Administration.

CORRESPONDING AUTHOR: Erin Sutfin, PhD, Wake Forest School of Medicine, NC, USA

SYM1B

THE FIRST NATIONAL SMOKELESS TOBACCO PREVENTION CAMPAIGN: PRESENTATION OF FORMATIVE RESEARCH LEADING TO DEVELOP HEALTH MESSAGING

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BACKGROUND: In 2016, FDA's Center for Tobacco Products (CTP) launched the first national campaign to prevent smokeless tobacco (SLT) use. The campaign targets the most vulnerable population for SLT use – rural, white male youth. In support of these efforts, researchers and campaign strategists collaborated to conduct formative and secondary research with the target population to inform the development of advertisements. **METHODS:** The CTP campaign development process utilizes qualitative research methodologies to identify salient message themes and promising creative concepts which are developed into rough cut ads and evaluated quantitatively. Strategic messaging concepts, tested in focus groups with 106 participants in four states, were developed into creative concepts that were tested in additional focus groups with 146 participants in five states. Finally, the creative concepts were produced as commercials and copy-tested using a randomized design with 760 youth across the country. All participants were white males age 12 – 17 year olds who live in rural areas. **RESULTS:** Rural, white male youth come from tight-knit communities where they are exposed to smokeless tobacco through peers and older male role models. “Dipping” seems attractive because it enhances their sense of belonging. They lack awareness of the dangers of smokeless tobacco, but are receptive to straightforward facts delivered by authentic messengers about the consequences of SLT use. Copy-testing resulted in all ads receiving Perceived Effectiveness scores ranging from 3.77 to 4.0, demonstrating the potential for positive changes in attitudes, beliefs, and ultimately behaviors among the target audience. All ads had promising message comprehension results – unaided write-in comments demonstrate 87-91% of youth understood messages; 95 – 97% of youth indicated that there was nothing confusing or unclear about the ads. The majority of participants reported that the ads made them feel understood (53-61%) and that the ads were trustworthy (75 – 91%). Individual ads leverage different emotions to convey the SLT prevention message and emotional reactions among ad viewing participants were also measured during copy testing. No indications were found that the ads would result in unintended consequences. **CONCLUSIONS:** These findings resulted in research-based messages about the dangers of SLT use that will be delivered in relevant and attention-grabbing ways. Next steps include a national evaluation to assess campaign effectiveness.

FUNDING: No funding

CORRESPONDING AUTHOR: Tesfa Alexander, PhD, FDA Center for Tobacco Products, USA



SYM1C

IDENTIFYING PROMISING CAMPAIGN THEMES FOR A MASS MEDIA CAMPAIGN TO PREVENT YOUTH INITIATION OF VAPING AND E-CIGARETTE USE

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BACKGROUND: Very few mass media campaigns have tackled vaping and e-cigarette use prevention. As a new tobacco product, little is known about the beliefs associated with youth intentions to try e-cigarettes. We collected candidate beliefs from multiple sources to ensure our list was comprehensive. We then surveyed the beliefs among U.S. 13-17 year olds and ranked them using the Hornik and Woolf (1999) approach. The approach is grounded in standard behavior change theories (e.g., Fishbein & Ajzen, 2011) and leads to relative rankings for specific beliefs and belief themes to support media campaign development. **Method:** In Phase 1, we aggregated potential candidate belief statements (N = 563) through a multi-method approach: an extensive search of published and unpublished literature, gathering measures from several tobacco control researchers, online elicitation surveys from a national sample of 13-17 year olds (n = 176), and unsupervised topic modeling of media texts (n = 4,441 texts from Associated Press, major U.S. newspapers, broadcast television/radio transcripts, and websites between April 2014 – November 2015). Based on prevalence of the beliefs within and across sources, a final list of 118 beliefs within 24 themes was created. In Phase 2, we measured this final set of beliefs and intentions to use e-cigarettes over the next year in an online survey of 1,000 U.S. 13-17 year olds. The H&W approach uses cross-tabulations to examine percentage to gain for each belief, a measure of both the strength of association between the belief and having no intention to use e-cigarettes, and the size of the population not endorsing the belief. **RESULTS:** Campaign themes will be ranked from highest to lowest on average percentage to gain in order to highlight promising and unpromising themes. We will present rankings for all the belief themes. **CONCLUSIONS:** Our study aggregates beliefs from several sources to create a comprehensive list of promising themes for future e-cigarette campaign development. Leveraging multiple sources for belief generation is especially important for new products. The H&W method additionally provides an empirical approach to aid in theme selection.

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SYM1D

DEVELOPING AND EVALUATING HEALTH COMMUNICATION MESSAGES ABOUT ENDS FOR CURRENT SMOKERS

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Many smokers are uncertain about the risks/benefits of ENDS use and report that this uncertainty concerns them. Existing uncertainty of their population and individual benefits and harms within the scientific community, along with their evolving and varied nature, has complicated public health efforts to develop risk messages for ENDS. This presentation will focus on the development of public health messages about the potential risks and benefits of ENDS for adult, current smokers. Drawing upon data from the 2015 Tobacco Products and Risk Perceptions and Consumer Styles surveys, we identified and profiled three audience segments of current smokers defined by their sociodemographic characteristics, worldviews, ENDS use, and health attitudes and behaviors: Hipsters (younger, regular ENDS use, some college), Reluctant Smokers (25-45 y, lower education, smoker regret), and Old Freedom Smokers (45-65 y, working class, individualistic). Audience profiles developed for each segment guided the creation of nine tailored messages about ENDS use and smoking designed to encourage and inform decision making about using ENDS and encourage smoking cessation. Six focus groups of adult current smokers (n = 60; two groups per audience segment) conducted in Chicago and Atlanta were used to obtain target audience reactions to the messages. All participants wanted more information to support ENDS as effective for cessation and wanted more information about potentially harmful ingredients in ENDS. Hipsters preferred messages that were complimentary and were sensitive

to messages that seemed authoritative or childish. Messages that emphasized short-term use of ENDS for quitting and quitting all nicotine resonated with Reluctant Smokers, who tended to think ENDS were as dangerous as cigarettes and ineffective for quitting. They disliked statements that induced guilt over smoking. Old Freedom Smokers knew little about ENDS and were not motivated to seek information about them. They preferred gain-framed messages focused on the harms of smoking and which emphasized their sense of agency and increased their self efficacy to quit. Implications for risk message development around ENDS use will be discussed.

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CORRESPONDING AUTHOR: Scott Weaver, PhD, Georgia State University, GA, USA

SYM2

EXPLORING MARIJUANA AND TOBACCO CO-USE: A PROBLEMATIC RELATIONSHIP THAT CAN NO LONGER BE IGNORED

Erica Peters, PhD, Battelle Public Health Center for Tobacco Research, MD, USA; Lucy Popova, PhD, Georgia State University, USA; Rachel Rabin, PhD, Icahn School of Medicine at Mount Sinai, NY, USA; Dustin Lee, PhD, Johns Hopkins University, MD, USA; Rachel Barry, MA, University of Edinburgh, United Kingdom

The co-use of tobacco (TOB) and marijuana (MJ) is a common practice worldwide and carries with it substantial public health burden, especially given the changing legal status and public perception of MJ. Unlike rates of TOB use, MJ use and the reduced perception of harm have been steadily increasing, despite its illegality in most jurisdictions. Of additional concern, TOB use rates remain high in MJ users. The relationship between TOB and MJ in terms of mechanisms of co-use, substitution, cessation, outcomes, and policy changes remains under-studied and not well understood. In this symposium, an international panel of five investigators from three countries will present emerging research on the dynamics of co-use. First, given the dearth of detailed knowledge on the epidemiology of co-use via combustibles, Dr. Peters will present data from the US on the prevalence and patterns of co-use obtained through a novel online survey. Second, young adults are an important group to target for harm reduction, and Dr. Popova will present findings from a qualitative study conducted in Colorado assessing the perceived harm of TOB, MJ and electronic vaporizers as delivery systems among this population. Third, little is known regarding how quitting one substance affects use of the other, especially among high-risk groups with health disparities. Dr. George will present on TOB use patterns during MJ abstinence in a Canadian sample of patients with schizophrenia versus non-psychiatric controls. Fourth, although TOB use is common in treatment-seeking MJ users, the study of dual treatment is rare. Dr. Lee will present on a US-based RCT of an intervention that targets both MJ and TOB use. Fifth, given the changing regulatory landscape of the retail MJ market, Ms. Barry will present a comparative analysis of MJ regulatory systems in the US and Uruguay through the lens of tobacco control. Finally, Dr. Richter will discuss the over-arching themes addressed by the speakers, as well as the larger implications of this work for research, clinical practice, and policy guidance. This symposium presents late-breaking research on policies and practices that are changing the tobacco control landscape. It will identify research priorities to protect and improve public health as MJ use continues to increase.

JUSTIFICATION: This timely symposium dedicated to tobacco and marijuana co-use will present emerging research from the field, specifically on combusted product use, perceptions of harm, substitution, cessation, and marijuana regulatory frameworks. This symposium will be useful for tobacco researchers, treatment specialists, and health policy analysts as marijuana use continues to increase.

FUNDING: Peters: Supported by Internal Research and Development funds from Battelle Memorial Institute. Popova: This work was supported by the National Cancer Institute of the National Institutes of Health (U01 CA154240 and K99CA187460). Additional funding was provided by the City University of New York (CUNY), John Jay College of Criminal Justice Funded Faculty Incentive Program. Rabin & George: Supported in part by a Canadian Institutes of Health Research (CIHR) Doctoral Award to RAR, and a CIHR Operating Grant (MOP#115145) to TPG. Lee: Supported by National Institute on Drug Abuse R01 DA032243, T32 DA037202. Barry: This study was funded by a Graduate School Studentship from the School of Social and Political Science, University of Edinburgh.



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SYM2A

COMBUSTED PRODUCT USE AMONG A SAMPLE OF US ADULTS WHO CO-USE TOBACCO AND MARIJUANA

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Co-use of tobacco and marijuana could lead to compounded health effects if tobacco and marijuana are smoked. The current study characterized combusted tobacco and marijuana product use by 105 adult current daily cigarette smokers who used marijuana ≥ 20 of the past 30 days. Participants recruited through Mechanical Turk, an online crowdsourcing service by Amazon.com, completed a confidential survey of use of tobacco products [cigarette, cigar, pipe, hookah] and marijuana products (pipe, joint, bong, blunt, spliff). Participants (mean age=32 yrs) were mostly Caucasian (76%) and female (53%) with at least a high school education (99%). On average, participants smoked 11.3 cigarettes/day and used marijuana on 27 of the past 30 days. Almost half of co-users (46%) reported currently smoking more than 1 combusted tobacco product: 29 smoked 2 combusted products, 13 smoked 3 combusted products, and 6 smoked 4 combusted products. After cigarettes, cigar was the most common combusted tobacco product (36%). Ninety percent of co-users reported that smoking was their primary mode of using marijuana. The most common combusted marijuana product was pipe (70%). The majority of participants (75%, $n=79$) reported currently smoking more than 1 combusted marijuana product: 34 participants smoked 2 combusted products, 29 smoked 3 combusted products, and 16 smoked ≥ 4 combusted products. Use of multiple combusted tobacco products was not related to use of multiple combusted marijuana products ($X^2(1)=0.003$, $p=.96$). Use of e-cigarettes as a tobacco product was reported by 56% of participants. Use of e-cigarettes to vaporize marijuana was reported by 42%; only 6% reported vaporizing as their primary mode of marijuana use. In conclusion, among an online convenience sample of US adults who co-use tobacco and marijuana, use of multiple combusted products was common. Data on the extent of combusted tobacco and marijuana product use in nationally-representative samples are needed to predict the long-term health effects of co-use of tobacco and marijuana.

FUNDING: Supported by Internal Research and Development funds from Battelle Memorial Institute.

CORRESPONDING AUTHOR: Erica Peters, PhD, Battelle Public Health Center for Tobacco Research, MD, USA

SYM2B

DIMENSIONS OF PERCEIVED HARM OF TOBACCO, MARIJUANA, AND ELECTRONIC VAPORIZERS AMONG YOUNG ADULTS IN COLORADO: A QUALITATIVE STUDY

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AIMS: Evaluate how young adults perceive harms of marijuana, how marijuana harms compare to the harms of tobacco products, and how those perceptions might be shaped by the recent legalization of retail marijuana in Colorado. DESIGN: Semi-structured qualitative interviews. Setting: Denver, Colorado, USA. Participants: Thirty-two young adults (18-26 years old) who used tobacco/marijuana/vaporizers. MEASUREMENTS: Semi-structured interviews addressed perceived harm of various tobacco and marijuana products and personal experiences with these products. Respondents sorted pictures of products based on perceived harms and discussed their rationale. FINDINGS: Young adults evaluated harms primarily using five dimensions: (1) Combustion – smoking was considered more harmful than consuming non-combustible products (e.g. e-cigarettes, vaporizers, and edibles); (2) Potency – edibles and marijuana concentrates were perceived as more dangerous than smoking marijuana flower because of the potential to receive too high a dose of THC (tetrahydrocannabinol); (3) Chemicals – products containing chemical additives were more harmful than “pure” or “natural” plant products (marijuana flower); (4) Addiction – participants recognized physiological addiction to nicotine, but primarily talked about psychological or lifestyle dependence on marijuana; (5) Source of knowledge – personal experiences, warning labels, campaigns, the media, and opinions of product retailers and medical prac-

tioners affected perceptions of harm. CONCLUSIONS: To resonate with young adults, education campaigns need to address combustion, potency of concentrate-derived products, and chemicals present in the organic material of tobacco and marijuana, regardless of whether they are “natural” or not. Descriptors such as “natural” and “organic” should be prohibited in the promotion or packaging of all tobacco and marijuana products.

FUNDING: This work was supported by the National Cancer Institute of the National Institutes of Health (U01 CA154240 and K99CA187460). Additional funding was provided by the City University of New York (CUNY), John Jay College of Criminal Justice Funded Faculty Incentive Program.

CORRESPONDING AUTHOR: Lucy Popova, PhD, Georgia State University, USA

SYM2C

EXPLORING PATTERNS OF TOBACCO AND CANNABIS CO-USE IN PATIENTS WITH SCHIZOPHRENIA VERSUS CONTROLS: THE EFFECTS OF CANNABIS ABSTINENCE

Rachel Rabin¹, Tony George^{*2}, ¹Icahn School of Medicine at Mount Sinai, NY, USA, ²University of Toronto

BACKGROUND: Tobacco and cannabis co-use occur at high rates in schizophrenia, but mechanisms for this co-morbidity have not been carefully studied. Cross-sectional data demonstrated that cannabis dependent patients smoke significantly fewer cigarettes per day (CPD) compared to former cannabis dependent and never dependent patients (current 5 CPD). Tobacco use and clinical symptoms were assessed weekly (TLFB, MWC, MCQ). Abstinence was facilitated by weekly contacts and contingency management, confirmed by 2x/week cannabinoid urinalysis. RESULTS: Forty-two percent of patients and 55% of controls achieved endpoint abstinence, biochemically verified by Day 28 urinary THC-COOH $<20\text{ng/mL}$. There was a significant change in CPD in patients [$F(2,37, 68)=3.25$, $p=0.04$], however, the Time x Abstinence Status interaction was not significant. In controls, there was no significant change in CPD over time; [$F(4, 72)=0.51$, $p=0.73$]. Interestingly, in patients, peak CPD was observed at Day 7, which coincided with peak cannabis withdrawal symptoms. By Day 28, tobacco use returned to baseline levels. Moreover, at baseline, patients demonstrated significant positive relationships between CPD and cannabis craving ($r=0.71$, $p<0.01$) and withdrawal symptoms ($r=0.50$, $p=0.03$); significant correlations were absent in controls. CONCLUSIONS: Our data suggests that elevated tobacco use in schizophrenia versus non-psychiatric controls with cannabis abstinence appears to be a time-limited phenomenon that corresponds to cannabis withdrawal severity. Implications for the treatment of co-occurring cannabis and tobacco use in patients with and without schizophrenia will be discussed.

FUNDING: Supported in part by a Canadian Institutes of Health Research (CIHR) Doctoral Award to RAR, and a CIHR Operating Grant (MOP#115145) to TPG.

CORRESPONDING AUTHOR: Rachel Rabin, PhD, Icahn School of Medicine at Mount Sinai, NY, USA

SYM2D

A RANDOMIZED CONTROLLED TRIAL TARGETING TOBACCO USE DURING TREATMENT FOR CANNABIS USE DISORDER

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BACKGROUND: Individuals seeking treatment for cannabis use disorders (CUD) frequently report concurrent tobacco use, and tobacco use is predictive of poor outcomes during treatment for CUD. Interventions targeting tobacco during treatment for other substances decrease tobacco use and do not impact outcomes for the other substance, but this approach has not been tested in those seeking treatment for CUD who use tobacco. This ongoing initial controlled trial compared two strategies for intervening on tobacco (concurrent vs. sequential) in this clinical population. METHOD: Participants (current N: 65 out of 67 enrolled in the trial) meeting diagnostic criteria for CUD and reporting regular tobacco use with some interest in quitting in the next six months (i.e. ≥ 2 on a 5-point scale) all received a 12-week treatment for CUD that included computer-assisted delivery of motivational enhancement therapy, cognitive-behavioral therapy, and abstinence-based contingency management. Participants were randomized to receive an optional

tobacco intervention either concurrent (CT) with CUD treatment or following (FT) treatment completion. The tobacco intervention comprised a computerized behavioral treatment tailored for tobacco and cannabis users and nicotine-replacement therapy (NRT). Cannabis abstinence and tobacco quit attempts were biologically verified during clinic visits. RESULTS: Cannabis abstinence rates and self-reported percent days of cannabis use were similar across groups at end of treatment. More participants in the CT group made a tobacco quit attempt (52% vs. 38%) during treatment, but tobacco abstinence rates and reductions in cigarettes per day were similar across groups at end of treatment. More participants in the CT engaged in the tobacco intervention; 55% vs. 22% completed > one tobacco computer module and 36% vs 13% initiated NRT. SUMMARY: Preliminary findings demonstrate that targeting tobacco concurrently with treatment for CUD increases tobacco quit attempts and engagement in the intervention without adversely impacting cannabis outcomes, supporting the feasibility and efficacy of targeting tobacco during treatment for CUD.

FUNDING: Supported by National Institute on Drug Abuse R01 DA032243, T32 DA037202.

CORRESPONDING AUTHOR: Dustin Lee, PhD, Johns Hopkins University, MD, USA

SYM2E

ASSESSING REGULATORY SYSTEMS FOR RETAIL MARIJUANA WITHIN A TOBACCO CONTROL FRAMEWORK: EVIDENCE FROM URUGUAY AND THE UNITED STATES

Rachel Barry*, University of Edinburgh, United Kingdom

BACKGROUND: Worldwide moves to legalize marijuana due to social justice, economic, and public safety concerns are quickly spreading. Uruguay, an international leader in tobacco control, became the first country to legalize the sale and distribution of marijuana, and sought to apply its WHO Framework Convention on Tobacco Control policies to marijuana regulations. In response to political campaigns to legalize retail sales, by 2016, four US states had enacted citizen initiatives to implement pro-commercial regulatory frameworks, often modeling policies on those enacted for the US alcohol market. Similar legislative reforms in the Americas will be considered and likely approved in 2016 and 2017. METHODS: A comparative case study was conducted to evaluate marijuana regulatory frameworks in Uruguay and in four US states. Laws and regulations developed between 2012 and 2016 were analyzed using the peer reviewed literature on regulatory frameworks for marijuana, corporate strategies to oppose public health measures, and international best practices from tobacco and alcohol control. Information for this study was obtained from observation and interview notes, initiative campaigns, legislative hearings, government documents, and newspaper articles. FINDINGS: Between 2012 and 2016, marijuana regulatory frameworks were developed in Uruguay and in four US states. Best practices from tobacco and alcohol control were used in Uruguay, with the central policy goal to advance the health of the general population. Uruguay's law includes a government monopoly over production and distribution, and a prohibition on marketing and company sponsorships. In contrast, the four US states adopted regulatory frameworks using US alcohol industry voluntary standards for warning labels and marketing restrictions, levied nominal marijuana taxes, and permitted youth appealing marijuana products, or crafted their own regulations without the support of evidence-based research to minimize use. CONCLUSIONS: Because marijuana is illegal in most jurisdictions, governments worldwide considering legalization can learn from the experiences in Uruguay and the US to shape regulations that prioritize public health over profits.

FUNDING: This study was funded by a Graduate School Studentship from the School of Social and Political Science, University of Edinburgh.

CORRESPONDING AUTHOR: Rachel Barry, MA, University of Edinburgh, United Kingdom

SYM3

IN MEMORY OF ATHINA MARKOU: A LEGACY OF TRANSLATIONAL SCIENCE ON NICOTINE WITHDRAWAL AND REWARD

Andre Der-Avakian, PhD, University of California, San Diego, CA, USA; Jason Oliver, PhD, Duke University, USA; Adam Leventhal, PhD, University of Southern California, CA, USA; Michele Pergadia, PhD, Florida Atlantic University, FL, USA

This symposium is sponsored by the SRNT Basic Science Network.

Dr. Athina Markou was the Vice-Chair for Basic Science Research in the Department of Psychiatry at the University of California, San Diego, a preeminent scholar on the neurobiology of addictive disorders and an invaluable collaborator, colleague, mentor and friend to tobacco researchers around the world. She was an early champion of translational science and made countless contributions to the area up until her passing on May 18, 2016. Her work examining the effects of nicotine withdrawal on reward systems has had a profound impact across diverse fields, ranging from molecular neuroscience to public health. This symposium will honor her memory through a series of talks on this subject, given by junior and established researchers who have been heavily inspired by her work in this area. Dr. Der-Avakian will discuss recent work examining the differential effects of ketamine on nicotine withdrawal- and stress-induced brain reward deficits in rats. Dr. Oliver will present findings from a human laboratory study examining the effects of nicotine withdrawal on reinforcement learning in a complex decision-making task. Dr. Leventhal will review recent human laboratory and clinical research demonstrating that trait anhedonia predicts greater sensitivity to the effects of tobacco abstinence, and will present new data from a human laboratory study characterizing the magnitude and quality of abstinence-induced deficits in reward among African American smokers. Dr. Pergadia will present findings from a large, population-based study examining how patterns of tobacco use and nicotine withdrawal symptoms differ as a function of comorbid depression. Lastly, Dr. Donny will provide a summary of the presented work, place it in the context of Dr. Markou's contributions to the field, and discuss future directions for the forward and reverse-translation of these findings into laboratories, clinics and policy rooms to ensure the greatest scientific impact and ultimately improve population health.

JUSTIFICATION: This symposium will provide insight into the neural and behavioral underpinnings of nicotine withdrawal, describe promising and novel clinical strategies for reversing these effects and understand the implications and manifestations of withdrawal within a broader epidemiological/population health framework.

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SYM3A

EFFECTS OF KETAMINE ON NICOTINE WITHDRAWAL- AND STRESS-INDUCED DEFICITS IN BRAIN REWARD FUNCTION IN RATS

Andre Der-Avakian*, University of California, San Diego, CA, USA

Anhedonia, or loss of pleasure, is characterized by disturbances in the brain's reward circuitry and is triggered by stress, and by withdrawal from chronic psychostimulant drug use, including nicotine. The NMDA receptor antagonist ketamine has rapid antidepressant effects in some patients with treatment-resistant depression. However, little is known about the effectiveness of ketamine in treating anhedonia. We assessed the antidepressant efficacy and putative anti-anhedonia effects of ketamine in rodent procedures modeling nicotine withdrawal- and stress-induced anhedonia. The antidepressant efficacy of ketamine (10 mg/kg, ip) was first assessed in adult, male Wistar rats using the forced swim test (FST). Brain reward function was then assessed in separate groups of rats using a discrete-trial current-intensity intracranial self-stimulation (ICSS) procedure. Rats were then either exposed to chronic (7 days) nicotine (6.3 mg/kg/day, base, sc) or repeated (21 days) social defeat. During withdrawal from nicotine or after termination of social defeat, a single dose of ketamine (10 mg/kg, ip) was administered



prior to assessment of brain reward thresholds. Ketamine decreased immobility and increased swimming without affecting climbing in the FST. In the ICSS tests, ketamine reversed acute nicotine withdrawal-induced elevations in reward thresholds, but did not reverse stress-induced reward threshold elevations. The decrease in immobility in the FST after ketamine corresponds with the antidepressant efficacy of ketamine in patients with depression. However, the differences in effectiveness of ketamine to reverse nicotine- or stress-induced reward threshold elevations suggests that this medication may only be partially effective in treating anhedonia, a core symptom of depression.

FUNDING: NIH Grant R01 MH106865

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SYM3B

MOVING BEYOND IMMEDIATE REWARD: DOES NICOTINE WITHDRAWAL IMPACT REINFORCEMENT LEARNING?

Jason Oliver^{*1}, Nicolette Sullivan¹, Merideth Addicott¹, Francis McClellon¹, David Evans², Thomas Brandon², David Drobos², ¹Duke University, USA, ²Moffitt Cancer Center

A burgeoning literature suggests that reward processing deficits play a key role in the development and maintenance of drug dependence. These deficits are theorized to impede the valuation of alternative rewards, thereby disrupting natural feedback learning processes that might otherwise lead to the establishment of healthier alternative behaviors. Nicotine deprivation has been shown to induce such deficits in reward processing. Yet there remains little understanding as to how these deficits shape behavior. The present study examines the effects of nicotine deprivation on reinforcement learning in a sample of heavy smokers (N = 48). Participants completed two counterbalanced laboratory sessions following overnight smoking/nicotine abstinence. At one session, participants were satiated by smoking nicotine cigarettes (0.6 mg yield), and at the other session, the withdrawal state was maintained by smoking very low nicotine content cigarettes (0.05 mg yield). At each session participants performed a task that involved learning to make optimal selections between pairs of stimuli based on probabilistic feedback. This learning phase was followed by testing on novel stimulus pairs, enabling characterization of the degree to which participants choose frequently rewarded stimuli (approach learning) versus avoid infrequently rewarded stimuli (avoidance learning). Findings indicated that nicotine deprivation disrupted learning phase acquisition equally across all stimulus pairs ($p = .039$). However, participants also responded significantly faster during deprivation ($p = .001$). This was especially evident during choice switches in response to negative feedback ($p = .018$), with some evidence that participants in withdrawal were also more likely to make this type of switch ($p = .062$). During testing, individuals with high nicotine dependence showed a robust bias towards approach learning when satiated, but this bias was eliminated during deprivation ($p = .003$). Overall, findings suggest that nicotine deprivation disrupts feedback learning, that this disruption may result from impulsive responses to negative feedback, and can ultimately produce impairments in approach behavior.

FUNDING: American Heart Association Grant 13PRE14660076, as well as grants from the Association for Psychological Science, American Psychology Association, American Psychological Foundation and the Society for Psychophysiological Research.

CORRESPONDING AUTHOR: Jason Oliver, PhD, Duke University, USA

SYM3C

CLINICAL MANIFESTATIONS OF ANHEDONIA IN TOBACCO WITHDRAWAL

Adam Leventhal^{*}, University of Southern California, CA, USA

Preclinical investigations of anhedonia in nicotine withdrawal goes as far back as twenty years ago with the seminal work of Markou and colleagues. Human research on this topic has emerged more recently and has not yet comprehensively characterized the various subjective clinical manifestations of anhedonia that may present in tobacco withdrawal. This human laboratory study characterized the magnitude and quality of clinical manifestations of anhedonia caused by acute tobacco abstinence. Smokers (N=429; ≥ 10 cig/day, 40% female, 92% African American, M age = 49) attended two counterbalanced lab visits: (a) one after 16-hr smoking abstinence; and (b) one after ad lib smoking. At both visits, participants

completed self-report measures of anhedonia assessing reward domains that were general (i.e., responses averaged across pleasurable interests, hobbies, social interactions, sensory stimuli) and specific (i.e., response to sex and response to food). For each reward domain, both consummatory (i.e., diminished pleasure) and anticipatory (i.e., diminished interest/desire) anhedonic responses were assessed. Abstinence (vs. ad lib smoking) significantly increased several clinical manifestations of anhedonia, including: (a) consummatory anhedonia directed toward domain-general rewards (Cohen's $d = 0.29$, $p < .0001$), (b) consummatory anhedonia directed to sexual reward (-0.12 , $p = .02$), and (c) anticipatory anhedonia directed toward sexual reward (-0.11 , $p = .03$). Abstinence did not significantly impact anhedonia responses to food reward. Associations between abstinence-induced changes in anhedonia and other symptoms of withdrawal (e.g., negative affect, positive affect, urge, hunger, concentration problems) were not systematic and suggested non-redundancy of anhedonia with other withdrawal symptoms. Anhedonia during tobacco withdrawal may be multifaceted and non-redundant with other symptoms of withdrawal. Forward and back translation of research on the various manifestations of anhedonia in tobacco withdrawal may advance basic science and clinical strategies to ameliorate withdrawal and improve smoking cessation outcomes.

FUNDING: National Institute on Drug Abuse Grants R01-DA026831 and American Cancer Society Grant RSG-13-163-01

CORRESPONDING AUTHOR: Adam Leventhal, PhD, University of Southern California, CA, USA

SYM3D

DEPRESSION AND NICOTINE WITHDRAWAL AT THE POPULATION LEVEL

Michele Pergadia^{*1}, John Newcomer¹, David Gilbert², ¹Florida Atlantic University, FL, USA, ²Southern Illinois University, Carbondale

Animal models developed in the laboratory of Dr. Athina Markou pioneered new translational approaches to the study of negative affective states, such as depression and nicotine withdrawal, and inspired more refined assessments/validation of the human experience. Human laboratory models alongside such animal models have continued to highlight the significant impact of this research. Evaluation of the relationship between depression and nicotine withdrawal using population level epidemiologic studies can further inform our understanding of the clinical significance of problems in this area. In the current study, weighted analyses aimed to examine relationship between history of depression (DEPHX), tobacco use, and lifetime rates of DSM-V tobacco withdrawal symptoms in a nationally representative sample of US adults (N=979), including N=449 lifetime ever combustible or electronic cigarette users (NICUSER), who answered related questions in a survey administered through GfK's KnowledgePanel. Weighted logistic regression analyses (controlling for age and gender) found that DEPHX was associated with 2.3 times increased odds (ratio (OR); 95% Confidence Interval (CI): 1.5-3.5) of being a NICUSER. Regarding risks of nicotine withdrawal symptoms among NICUSER(s), models that additionally controlled for frequency of cigarette use found that DEPHX was particularly associated with increased odds of concentration problems (OR=2.4; 95% CI:1.3-4.5) and depressed mood (OR=2.2; 95% CI:1.1-4.1) after quitting or cutting down on cigarette use. RESULTS highlight the persistent comorbidity between depression, tobacco use, and nicotine withdrawal in a population-based sample of combustible and electronic cigarette users. These findings exemplify the on-going relevance of Dr. Markou's scientific contributions to the field of nicotine dependence. As tobacco use behavior evolves, including the present day epidemic increase in electronic cigarette use, strong translational models are critically needed to better understand clinical problems associated with nicotine use.

FUNDING: Florida Atlantic University start-up funds to M.L.P.; D.G.G and M.L.P also receive funding from NIH: DA036032 and M.L.P from NSF: ACI-1541330.

CORRESPONDING AUTHOR: Michele Pergadia, PhD, Florida Atlantic University, FL, USA

SYM4

EXPLORING DIMENSIONS OF FLAVORS: TOXICITY, PREFERENCE, AND USE

Allison Hoffman, PhD, Food and Drug Administration, MD, USA; Maciej Goniewicz, PhD, PharmD, Roswell Park Cancer Institute, USA; Sven-Eric Jordt, PhD, Duke University, NC, USA; Andrea Villanti, PhD, MPH, The Schroeder Institute for Tobacco Research and Policy Studies, DC, USA

Although characterizing flavors other than menthol and tobacco are banned in U.S. marketed cigarettes, other tobacco products including smokeless tobacco, cigars, and electronic nicotine delivery systems (ENDS) are currently available in a variety of flavors such as fruit, candy, and spice. When evaluating the impact of flavors in tobacco products, multiple dimensions such as toxicological effects, preference and appeal, and use should be considered. This symposium will address these various dimensions across a variety of tobacco products. Dr. Hoffman from the Center for Tobacco Products will present a summary of a literature review of 59 published studies regarding flavor preferences among youth and adults with relevancy to tobacco products that found, in general, sweet preference in children and adolescents were higher than in adults. Dr. Jordt from Duke Medical University representing the Yale Tobacco Center of Regulatory Science (TCORS) will present findings from a study of sweetener content of US smokeless tobacco, dissolvables, and electronic cigarettes compared with confectionary products such as soda, gum, and hard candy with implications for appeal and use. Dr. Goniewicz from Roswell Park Cancer Institute will present findings from a study regarding potential impact of flavorings in electronic nicotine delivery systems (ENDS) on aerosol toxicity. Dr. Villanti from the Schroeder Institute for Tobacco Research and Policy Studies at Truth Initiative will explore the prospective relationship between reporting that one's first tobacco product was flavored and subsequent tobacco use using the first two waves of the longitudinal Population Assessment of Tobacco and Health (PATH) Study. Discussion will focus on implications of flavors across all tobacco products.

JUSTIFICATION: Discussion will focus on the implications of flavors across all tobacco product and potential future tobacco product regulation.

FUNDING: FDA Center for Tobacco Products

CORRESPONDING AUTHOR: Cathy Backinger, PhD, MPH, Food and Drug Administration, Silver Spring, MD, USA

SYM4A

A REVIEW OF AGE-RELATED DIFFERENCES IN FLAVOR PREFERENCES

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OBJECTIVE: A review of the literature investigating age-related differences in flavor/taste preferences was conducted to identify how children, adolescents, and adults of different ages differ in their preferences for flavors that are or could be used in tobacco products. **METHODS:** PubMed, EMBASE, Web of Science, and PsycINFO were searched, resulting in retrieval of 474 articles published between 1931 and August 2015. Of those, 59 articles were determined to be relevant. **RESULTS:** Findings were grouped by taste (sweet, salty, sour, bitter, umami, and fat) and smell (fruit/herbal/spices, tobacco and coffee, and other odors) and compared across ages (children, adolescents, adults). "Sweet" was generally preferred by all ages, with children and adolescents showing higher sweet preference as compared to adults. Children also preferred salty more than adults. Examples of preferred food-related tastes and odors for young people included cherry, candy, strawberry, orange, apple, and cinnamon. Adults liked spearmint and clove odors more than children. Currently, flavors like these are used to flavor tobacco products like cigars, electronic cigarettes, hookah (waterpipe), and smokeless tobacco products. **CONCLUSIONS:** Although generally liked by all people, sweet and salty flavors appear to be preferred by younger people, with sweet being highly preferred by children. Age-related changes in bitter, sour, umami and fat taste were not clear and more research would be useful.

FUNDING: Food and Drug Administration

CORRESPONDING AUTHOR: Allison Hoffman, PhD, Food and Drug Administration, MD, USA

SYM4B

INHALATION TOXICITY OF FLAVORINGS IN ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS)

Maciej Goniewicz*, Roswell Park Cancer Institute, USA

BACKGROUND: Little is known about the health effects of flavored electronic nicotine delivery system (ENDS) aerosol when inhaled. The popular flavors among ENDS users include traditional flavors like tobacco or menthol, and non-traditional flavors like a fruit (e.g., cherry, berry, apple), sweet (e.g., chocolate, vanilla, desserts, candies), or a beverage (e.g., coffee, alcoholic drinks, soda). The extent to which flavorings impact ENDS safety and potential toxicity is currently not well-defined. **METHODS:** Various types of ENDS devices or a tank system prefilled with liquids of different flavors were tested. A convenience sample of commercial fluids with flavor names of tobacco, piña colada, menthol, coffee and strawberry were used. Flavoring chemicals were identified using gas chromatography/mass spectrometry. H292 human bronchial epithelial cells were directly exposed to 55 puffs of freshly-generated ENDS aerosol, tobacco smoke, or air (controls) using an air-liquid interface system and the Health Canada intense smoking protocol. The following in vitro toxicological effects were assessed: 1) cell viability, 2) metabolic activity and 3) release of inflammatory mediators (cytokines). **RESULTS:** In GC/MS screening tests, we were able to tentatively identify several flavoring chemicals present in different products, including menthol, limonene and benzyl alcohol. Exposure to flavored ENDS aerosol resulted in decreased metabolic activity and cell viability and increased release of IL-1 β , IL-6, IL-10, CXCL1, CXCL2 and CXCL10 compared to air controls. Cell viability and metabolic activity were more adversely affected by conventional cigarettes than most tested ENDS products. Flavorings significantly affected toxicity of ENDS aerosol, with a strawberry-flavored product being the most cytotoxic. **CONCLUSIONS:** Our data suggest that ingredients in ENDS products, including flavors, may induce inhalation toxicity. Therefore, ENDS users should use the products with caution until more comprehensive studies are performed. Our data indicate that ENDS users may reduce the potential harm from inhaling flavored products by selecting flavors of lower toxicity profile.

FUNDING: The study was supported by the National Institute on Drug Abuse of the National Institutes of Health under Award Number R01DA037446, the National Cancer Institute under Award Number P30 CA016056, and the Roswell Park Alliance Foundation. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

CORRESPONDING AUTHOR: Maciej Goniewicz, PhD, PharmD, Roswell Park Cancer Institute, USA

SYM4C

ANALYSIS AND BEHAVIORAL EFFECTS OF HIGH-INTENSITY SWEETENERS IN ALTERNATIVE TOBACCO PRODUCTS

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Sweeteners in tobacco products may influence use initiation and reinforcement, with special appeal to adolescents. Recent analytical studies of smokeless tobacco products (snuff, snus, dissolvables) detected flavorants identical to those added to confectionary products such as candy and chewing gum. However, these studies did not determine the levels of added sweeteners. The objective of the present study was to quantify added sweeteners in snus, moist snuff, dissolvable products and electronic cigarette liquids and to investigate whether the ability to experience sweet taste determines use uptake. The sweetener content of US-sourced smokeless tobacco, electronic cigarette liquid and confectionary product samples was analyzed by liquid chromatography-electrospray ionization - mass spectrometry (LC-ESI-MS). Extracts of a snus product containing the sweetener sucralose were presented to wild-type mice and mice deficient in the sweet taste receptor, Tas1R2, using a single bottle paradigm. All examined smokeless products contained synthetic high intensity sweeteners, with snus and dissolvables exceeding levels in confectionary products (as much as 25-fold). Sweetener content was dependent on product category. All snus samples contained sucralose and most also aspartame, but no saccharin. In contrast, all moist snuff samples contained saccharin. The dissolvable sample contained sucralose and sorbitol. Ethyl maltol was the most common sweet-associated component in electronic cigarette liquids. Naïve mice deficient in the Tas1R2 sweet receptor gene consumed less sucralose-containing snus extract than wild-type mice, demonstrating that sweetness is a key determinant of product use initiation. The very high sweetener concentrations in smokeless tobacco products may be necessary for the consum-



er to tolerate the otherwise aversive flavors of tobacco ingredients. Regulation of sweetener levels in smokeless tobacco products may be an effective measure to modify product attractiveness, initiation and use patterns.

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CORRESPONDING AUTHOR: Sven-Eric Jordt, PhD, Duke University, NC, USA

SYM4D

ARE YOUTH AND YOUNG ADULTS WHO FIRST TRY A FLAVORED TOBACCO PRODUCT MORE LIKELY TO CONTINUE USING TOBACCO? FINDINGS FROM THE PATH STUDY

Andrea Villanti*, The Schroeder Institute for Tobacco Research and Policy Studies, DC, USA

BACKGROUND: Many tobacco products are marketed with characterizing flavors which appear to be attractive to youth. Analyses of cross-sectional data from the Population Assessment of Tobacco and Health (PATH) Study previously reported a positive correlation between reporting that one's first tobacco product was flavored and current tobacco use. The present study uses longitudinal PATH Study data to determine whether there is a prospective relationship between reporting that one's first tobacco product was flavored at Wave 1 and current tobacco use at Wave 2. The study will also provide descriptive data on flavor types used across tobacco products. **METHODS:** This study utilized longitudinal data from Wave 1 (2013-2014) and Wave 2 (2014-2015) of the PATH Study. This includes 40,547 U.S. adults and youth ages 12 years and older who responded to both the Wave 1 and Wave 2 interviews. Main outcome measures were current use of any tobacco product in Wave 2. **RESULTS:** Initial findings from preliminary bivariate analyses highlight that youth and young adult ever tobacco users at Wave 1 whose first product was flavored were significantly more likely to be current tobacco users at Wave 2 than ever tobacco users at Wave 1 whose first use was a non-flavored product. Young adult current users at Wave 1 whose regular brand was flavored at Wave 1 were more likely at Wave 2 to continue to be current tobacco users, compared to young adults regularly using a non-flavored brand at Wave 1. This relationship did not hold in older adults (aged 25+). **CONCLUSIONS:** To our knowledge, this is the first study based on a nationally-representative longitudinal sample to document that young people who initiate tobacco use with a flavored product are more likely to continue using tobacco.

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SYM5

THE ECONOMICS OF TOBACCO AND TOBACCO CONTROL: KEY FINDINGS FROM THE NCI & WHO TOBACCO CONTROL MONOGRAPH

Frank Chaloupka, PhD, and Ayda Yurekli, PhD, University of Illinois at Chicago, USA; Evan Blecher, PhD, World Health Organization, Switzerland

Tobacco use poses an enormous health and economic burden on a global level. In high-income countries, decades of concerted program and policy efforts, supported by a broad-based research effort, have produced promising results, with the prevalence of smoking falling substantially, in most, although this overall progress masks higher rates among some sub-populations, especially the poor. Many low-and middle-income countries (LMICs) are increasingly making progress as well. At the same time, concerns about the economic impact of tobacco control have deterred some governments from fully implementing effective measures to reduce tobacco use.

To address these concerns, the US National Cancer Institute and the World Health Organization partnered in developing *Monograph 21: The Economics of Tobacco and Tobacco Control*. The monograph, the work of dozens of leading tobacco control and economics experts from around the globe, provides an up-to-date review of the research on the economics of tobacco use and tobacco control, highlighting findings from LMICs and addressing arguments about the economic impact of tobacco control policies.

This symposium will highlight key findings from the monograph and will discuss the following key areas:

- Best practices in tobacco taxation: Evidence on the impact of tobacco tax and price, highlighting issues such as tax structure, affordability, and illicit trade.
- Globalization of the tobacco industry: Describing the trend towards globalization, contributing factors (e.g., trade agreements, privatization, foreign direct investment), and the implications of globalization for tobacco control.
- Economic impact of tobacco control: Evidence on the effectiveness and impact of tobacco control efforts, cost-effectiveness of policies and interventions, and the oppositional arguments about the economic impact of tobacco control.

JUSTIFICATION: Monograph findings provide a strong rationale for the implementation of tobacco control policies, demonstrating their effectiveness and cost-effectiveness, and highlighting their broader economic impact.

FUNDING: U.S. National Cancer Institute and World Health Organization

CORRESPONDING AUTHOR: Frank Chaloupka, PhD, University of Illinois at Chicago, Chicago, IL, USA

SYM5A

BEST PRACTICES IN TOBACCO TAXATION

Frank Chaloupka*, University of Illinois at Chicago, IL, USA

Significant tobacco tax and price increases are the most cost-effective of tobacco control interventions. Tobacco products, particularly cigarettes, are subject to a number of taxes, including excise taxes, value-added or sales taxes, and import duties, with excise taxes accounting for the largest share of retail prices in most countries. Nearly all countries tax cigarettes, but tobacco tax structures vary widely across countries. Higher taxes on tobacco products are effective in reducing tobacco use and improving public health, while at the same time leading to increased tax revenues. How governments tax tobacco products determines how effective tobacco taxes are in achieving these goals. A well-designed tax system is one that is simple and easy to administer in order to minimize tax avoidance and evasion, generate expected revenues, and result in tax increases being passed on to consumers as price increases. Simplicity in tax systems improves transparency and limits opportunities for tax avoidance and tax evasion. To ensure high compliance levels, strong tax administration is needed to implement and administer tax policies efficiently. Compared to *ad valorem* taxation, specific taxation better achieves public health objectives by increasing retail prices more and narrowing price gaps, thus reducing consumers' incentives to trade down from higher priced to lower priced brands or to other tobacco products. Concerns about tax avoidance and evasion are a barrier to tobacco tax increases. Experience from many countries demonstrates that illicit trade can be successfully addressed, even when tobacco taxes and prices are raised, and curbing illicit trade increases tax revenues and reduces tobacco use. Successful strategies include implementing tracking and tracing systems; controlling the supply chain by licensing of all parties involved in tobacco product manufacturing and distribution; implementing appropriate policies, stronger enforcement, and enhanced penalties; and international cooperation in investigation and prosecution of participants in illicit trade.

FUNDING: U.S. National Cancer Institute and World Health Organization

CORRESPONDING AUTHOR: Frank Chaloupka, PhD, University of Illinois at Chicago, IL, USA

SYM5B

GLOBALIZATION OF THE TOBACCO INDUSTRY AND IMPLICATIONS FOR TOBACCO CONTROL

Ayda Yurekli*, University of Illinois at Chicago, USA

The markets for tobacco have become increasingly globalized over the past few decades. Increased trade in tobacco has been facilitated by the implementation of a variety of international, regional, and bilateral trade agreements which have reduced tariff and non-tariff barriers to trade for a variety of goods and services, including tobacco leaf and tobacco products. Foreign direct investment, privatization of government tobacco companies, and mergers and acquisitions have led to an increasingly concentrated tobacco industry, with five companies—the China National Tobacco Company (CNTC), Philip Morris International and Altria (PMI), British American Tobacco (BAT), Japan Tobacco International (JTI), and Imperial Tobacco Group (IT)—accounting for more than 85% of the global cigarette market. Trade in tobacco has also increased as a result of foreign direct investment. We will share new estimates indicating that increased trade openness increases cigarette consumption globally, with a greater impact on low-income countries. We will also provide several case studies highlighting the impact of privatization on tobacco use. In the majority of countries privatization has led to significantly greater efficiency and production, massive marketing campaigns, and increased cigarette consumption, but some countries that have implemented strong tobacco control measures after privatization have seen reductions in consumption. In an increasingly globalized world, trade and investment agreements will continue to exert an important influence on tobacco use and tobacco control efforts. Of particular importance is the use of the agreements by tobacco companies and governments to challenge national tobacco control policies. This presentation highlights the lessons learned from these challenges in the implications for the future adoption and implementation of effective tobacco control policies.

FUNDING: U.S. National Cancer Institute and World Health Organization

CORRESPONDING AUTHOR: Ayda Yurekli, PhD, University of Illinois at Chicago, USA

SYM5C

THE ECONOMIC IMPACT OF TOBACCO USE AND TOBACCO CONTROL

Evan Blecher*, World Health Organization, Switzerland

Effective, evidence-based tobacco control interventions make sense from an economic as well as a public health standpoint. Although there has been considerable progress in the adoption, implementation, and strengthening of tobacco control policies, much of the world's population is not adequately covered by the most effective interventions. This presentation will show that the economic impacts of tobacco control efforts are far and wide-reaching. Policies and programs that work to reduce the demand for tobacco products are highly cost-effective. Significant tobacco tax and price increases, comprehensive bans on tobacco industry marketing, and prominent pictorial health warning labels are the most cost-effective tobacco control interventions. Contrary to tobacco industry claims, tobacco control does not harm economies. The share of jobs that depend on tobacco has been falling in most countries. For the vast majority of countries, implementation of tobacco control measures will have only a modest impact on tobacco-dependent employment, and will not lead to net job losses. Evidence from high-income countries and low- and middle-income countries shows that smoke-free policies do not adversely affect the hospitality sector. For the few countries particularly dependent on tobacco growing and tobacco leaf exports, job losses due to tobacco control are likely to be gradual, predictable, and far enough in the future to have little effect on the current generation of tobacco farmers, and programs could be implemented that help tobacco farmers make the transition to alternative livelihoods. Tobacco control reduces the disproportionate burden that tobacco use imposes on the poor. Tobacco use is increasingly concentrated among the poor and other vulnerable groups, and tobacco use accounts for a significant share of the health disparities between the rich and poor. These disparities are exacerbated by a lack of access to health care and the diversion of household spending from other basic needs, such as food and shelter, to tobacco use. Moreover, tobacco use contributes to poverty, as illnesses caused by tobacco lead to increased health care spending and reduced income.

FUNDING: U.S. National Cancer Institute and World Health Organization

CORRESPONDING AUTHOR: Evan Blecher, PhD, World Health Organization, Switzerland

SYM6

THE CHRNA5-A3-B4 GENE CLUSTER: FROM DISCOVERY TO CAUSALITY, MECHANISM AND THERAPEUTICS

Marcus Munafò, PhD, UK Centre for Tobacco Control Studies, University of Bristol, UK MRC Integrative Epidemiology Unit, University of Bristol, UK, United Kingdom; Glenda Lassi, PhD, University of Bristol and AstraZeneca, United Kingdom; Christie Fowler, PhD, University of California Irvine, CA, USA; Nurulain Zaveri, PhD, AstraZeneca Therapeutics, CA, USA

This symposium is sponsored by the SRNT Basic Science Network.

enome wide association studies (GWAS) have identified and confirmed an association between the *CHRNA5-CHRNA3-CHRNA4* gene cluster and smoking phenotypes, such as smoking heaviness and nicotine dependence. Smoking-related health outcomes, such as lung cancer and chronic obstructive pulmonary disease, have also shown linkage to the *CHRNA5-CHRNA3-CHRNA4* gene cluster, illustrating how GWAS offers the potential to identify modifiable risk factors for disease. In the first talk, Marcus Munafò will discuss his more formal approaches to strengthen causal inference in observational data through Mendelian randomization. Thereafter, Glenda Lassi will highlight human studies demonstrating the variability of individuals' smoking behaviours and the ability of smokers to adjust nicotine intake; these studies demonstrate the need for more precise phenotypic measures, such as cotinine, to capture the behavioural outcomes of the gene variants rs1051730/rs16969968 at the *CHRNA5-CHRNA3-CHRNA4* locus. In the third talk, Christie Fowler will discuss her work from rodent models describing the function of the nicotinic acetylcholine receptors, formed by the $\alpha 5$, $\alpha 3$ and $\beta 4$ subunits encoded by this gene cluster. These subunits, located mainly in the habenulo-interpeduncular system, play a crucial role in modulating nicotine intake by regulating its aversive effects. Finally, Nurulain Zaveri will demonstrate how combining genetic and mechanistic studies of nicotine dependence and smoking heaviness may reveal novel targets for medications development. Validated targets may inform tailored genetic therapeutic interventions for smoking cessation and tobacco-related diseases.

JUSTIFICATION: This symposium will describe recent work on the *CHRNA5-CHRNA3-CHRNA4* gene cluster, illustrating the wide-ranging basic science and translational advances made possible through GWAS of smoking behaviour.

FUNDING: No Funding

CORRESPONDING AUTHOR: Glenda Lassi, PhD, UK Centre for Tobacco and Alcohol Studies, School of Experimental Psychology, University of Bristol, UK Clinical Discovery Unit, Early Clinical Development, IMED Biotech Unit, AstraZeneca, Cambridge, UK, United Kingdom

SYM6A

FROM GENETICS TO CAUSALITY

Marcus Munafò*, UK Centre for Tobacco Control Studies, University of Bristol, UK MRC Integrative Epidemiology Unit, University of Bristol, UK, United Kingdom

The identification of genetic variants in the *CHRNA5-CHRNA3-CHRNA4* gene cluster associated with smoking-related phenotypes has substantially furthered our understanding of the biological basis of smoking. However, these findings have also provided us with tools that enable stronger causal inferences to be drawn through Mendelian randomisation analyses that use genetic variants associated with exposures such as smoking as proxies for these exposures, on the basis that these should not be subject to confounding and are not susceptible to reverse causality. This has led to a rapid growth in the number of studies using variants in *CHRNA5-CHRNA3-CHRNA4* as instrumental variables in Mendelian randomisation analyses. Our ongoing programme of work is exploring the limitations of this approach, including identifying the specific patterns of association between *CHRNA5-CHRNA3-CHRNA4* variants and various smoking behaviours, and the impact of various biases (e.g., selection bias) on the results obtained from large cohort studies. Causal analyses have identified intriguing causal effects of smoking on caffeine consumption, schizophrenia risk and Type 2 diabetes risk. The results of this programme of work will be presented, together with future directions that will emerge as the Mendelian randomisation method is refined and developed, and new genetic variants beyond the *CHRNA5-CHRNA3-CHRNA4* cluster are identified that are associated with a range of smoking-related phenotypes.

FUNDING: Supported by the Medical Research Council (MC_UU_12013/6).



CORRESPONDING AUTHOR: Marcus Munafò, PhD, UK Centre for Tobacco Control Studies, University of Bristol, UK MRC Integrative Epidemiology Unit, University of Bristol, UK, United Kingdom

SYM6B

THE CHRNA5-A3-B4 GENE CLUSTER: FROM GENOTYPE TO PHENOTYPE

Glenda Lassi^{*1}, Tim Eisen², ¹University of Bristol and AstraZeneca, United Kingdom, ²AstraZeneca, Cambridge, UK

GWAS findings have made variants in the CHRNA5-CHRNA3-CHRNA4 locus promising targets for the study of nicotine dependence and smoking heaviness, given their association with response to nicotine and its consequent consumption and titration. The underlying mechanism that links genetic variations to nicotine response are beginning to be understood, through experiments involving an $\alpha 5$ knockout mouse model, analogous to individuals with reduced $\alpha 5$ receptor function (i.e., carriers of the rs1051730/rs16969968 risk allele). We are interested in identifying the behavioural outcomes of these genetic variants in humans. In a recent GWAS Munafò's laboratory showed that the association with smoking heaviness, initially identified using cigarettes smoked per day (CPD), is stronger if we use cotinine as a precise biomarker of exposure. In fact, cigarettes smokers who consume an equal number of CPD may differ in how much nicotine they consume. In our current study we are recalling participants according to their genotype so as to capture the greatest phenotypic difference in smoking behaviour resulting from genetic difference at the CHRNA5-A3-B4. Our outcomes of interest are intended to capture inter-individual variation in smoking topography (number of puffs taken and the volume of smoke inhaled per puff and per cigarette) and its role in the association between genotype and cotinine. Furthermore in a second study we are testing whether non-smokers that are carriers of the risk allele exhibit an altered aversive response when presented with a nicotine challenge (analogously to the observed reduced aversive response of the $\alpha 5$ knockout mice).

FUNDING: Supported by AstraZeneca and Medical Research Council (PSYC RM8537)

CORRESPONDING AUTHOR: Glenda Lassi, PhD, University of Bristol and AstraZeneca, United Kingdom

SYM6C

NICOTINIC RECEPTOR CIRCUITS MEDIATING REINFORCEMENT AND AVERSION

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Increased risk of nicotine dependence with allelic variation in the CHRNA5/CHRNA3/CHRNA4 nicotinic acetylcholine receptor (nAChR) gene cluster has repeatedly been demonstrated in humans. Given this association, investigations with animal models into the neurobiological mechanisms mediating nicotine dependence are essential to more fully understand the disease state. Current studies expand on our prior findings demonstrating that $\alpha 5$ -containing nAChRs in the habenulo-interpeduncular pathway mediate nicotine reinforcement, particularly at higher doses of the drug. In the first series of studies, knockdown of the $\alpha 3$ nAChR subunit in the habenulo-interpeduncular pathway was found to result in a similar behavioural profile as $\alpha 5$ nAChR subunit knockdown, suggesting that an nAChR subtype expressing both of these subunits likely mediate drug consumption. In the second series of studies, we utilized $\alpha 5$ -cre mice with a floxed hM4Gi DREADD virus to selectively induce inhibition in the $\alpha 5$ IPN neurons. We found that $\alpha 5$ -containing neurons in the IPN differentially modulate nicotine reinforcement at a moderate and high dose. Moreover, inhibition of these neurons prevented the formation of a conditioned place aversion for a high dose of nicotine. Taken together, these findings provide evidence that $\alpha 5$ - and $\alpha 3$ -containing nicotinic acetylcholine receptors and circuits downstream from the IPN modulate nicotine reinforcement and aversion. By identifying the characteristics of these neurons, our findings may not only serve to elucidate the mechanistic function of the signalling pathways but may also provide insight into the human condition, as well as potential targets for therapeutic development.

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CORRESPONDING AUTHOR: Christie Fowler, PhD, University of California Irvine, CA, USA

SYM6D

IN VIVO PHARMACOLOGICAL PROFILE OF THE SELECTIVE A3B4 NACHR PARTIAL AGONIST AT-1001, IN NICOTINE SELF-ADMINISTRATION, REINSTATEMENT AND WITHDRAWAL: ROLE OF A3B4 NACHR AS A TARGET FOR SMOKING CESSATION PHARMACOTHERAPY

Nurulain Zaveri*, AstraZeneca Therapeutics, CA, USA

As well as being closely associated with risk for heavy smoking, inability to quit, and increased sensitivity to nicotine, genetic variants in the CHRNA5/A3/B4 gene cluster on chromosome 15q25.1, encoding the $\alpha 3$, $\alpha 5$ and $\beta 4$ nAChR subunits, are also associated with alcohol, opioid and cocaine dependence. Deletion of the $\beta 4$ nAChR subunit diminishes precipitated withdrawal in mice, whereas, overexpression of the CHRNA5/A3/B4 genomic cluster in a transgenic mouse model led to increased acquisition of nicotine self-administration. These studies suggest the involvement of the $\alpha 3$, $\beta 4$ and $\alpha 5$ nAChR in nicotine dependence and reward. We recently reported a selective, high affinity, small-molecule $\alpha 3\beta 4$ nAChR ligand, AT-1001, which has partial agonist activity at $\alpha 3\beta 4$ nAChR, and desensitizes the receptor at the same EC₅₀, effectively blocking the ACh response. AT-1001 significantly decreases responding to nicotine in the rat self-administration paradigm, while having no effect on food-maintained responding. In a model of relapse, AT-1001 reduces cue and stress-induced reinstatement of nicotine-seeking behavior in rats. When administered to rats exposed to chronic nicotine for 7 days, AT-1001 does not produce significant somatic signs of withdrawal compared to mecamylamine, which produced severe withdrawal effects. In other studies, we have also shown that AT-1001 blocks cocaine conditioned place preference and sensitization to cocaine-induced hyperactivity. Overall, our data suggests that $\alpha 3\beta 4$ nAChR-targeted compounds like AT-1001 may have a useful therapeutic profile for tobacco cessation treatment and may also be useful for treating co-morbid substance abuse disorders.

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SYM7

ENDOCANNABINOID MODULATION OF NICOTINE DEPENDENCE: SYMPOSIUM IN MEMORIAM OF DR. LARRY PARSONS

Matthew Buczynski, PhD, Virginia Polytechnic Institute and State University & The Scripps Research Institute, VA, USA; Miriam Melis, PhD, University of Cagliari, Italy; Stéphanie Caillé-Garnier, PhD, CNRS UMR5287 and University of Bordeaux, France; Jose Trigo, PhD, Centre for Addiction and Mental Health (CAMH), ON, Canada

This symposium is sponsored by the SRNT Basic Science Network.

Identification of the neurochemical mechanisms mediating drug reward, reinforcement and relapse are essential to develop a novel foundation for pharmacotherapeutic development to achieve tobacco/nicotine cessation. With this ambitious goal in mind, Loren (Larry) Parsons had been a leader in this field, revealing novel mechanisms of the interaction between nicotinic and endocannabinoid signaling. In honor of his work, this session will present findings highlighting the importance of endocannabinoid signaling in mediating different aspects of nicotine's actions. First, Matthew Buczynski, a former trainee of Larry Parsons, will present findings demonstrating the role of diacylglycerol lipase in modulating VTA signaling during nicotine exposure. In the second talk, Miriam Melis will discuss the role of N-acyl-ethanolamines in nicotine effects on dopamine neurons. In the third talk, Stéphanie Caillé-Garnier will present her work investigating TRPV1, a target of endocannabinoids that has been implicated in addiction-related behaviors. Finally, Jose Trigo will focus on the effects of the MAGL inhibitor JZL184, the FAAH inhibitor URB597, and the CB1 antagonist AM4113 in nicotine addiction. As will be evidenced from this session, Larry Parsons' impact on the field has been significant through his primary research findings, collaborations and mentorship. As discussed, Christie Fowler will summarize how these current and future investigations into the intersection of cannabinoid and nicotinic signaling mechanisms may serve to increase our understanding of the disease processes while further identifying novel therapeutic targets.



JUSTIFICATION: The studies presented in this symposium will provide insight into the importance of endocannabinoid signaling in nicotine's actions; these findings may (1) provide a foundation for future therapeutic development to treat tobacco dependence, (2) insight into potential mechanisms involved in co-abuse of nicotine and cannabinoids, and (3) a scientific basis for future policy.

FUNDING: Abstract 1: This work was supported by NIH grants K99 DA035865 (MWB), P01 DA017259 (LHP and BFC); RO1 DA009789 (BFC); RO1 DA033760 (BFC); RO1 MH084512 (BFC); P60 AA006420 (LHP and MR); and the Hewitt Foundation Postdoctoral Fellowship (KLH). Abstract 2: This work was supported by funding from the Italian Ministry of University (PRIN 2005 and 2009), Philip Morris USA and Philip Morris International (2007). Abstract 3: This work was supported by funding awarded to SC from the Centre National de la Recherche Scientifique and University of Bordeaux. Abstract 4: This work was supported by grants from the following awarded to Bernard LeFoll: CAMH, Ontario Ministry of Innovation, Canadian Foundation for Innovation, Canadian Tobacco Control Research Initiative, Pfizer GRAND Award 2008, 2009, 2010, 2011, Pfizer Cardio-vascular Research Award, CIHR training program, OPGRC, Ontario Lung Association, Heart and Stroke Foundation, CIHR and NIH-NIDA.

CORRESPONDING AUTHOR: Christie Fowler, PhD, University of California, Irvine, CA, USA

SYM7A

DIACYLGLYCEROL LIPASE DISINHIBITS VTA DOPAMINE NEURONS FOLLOWING CHRONIC NICOTINE EXPOSURE

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Chronic nicotine exposure (CNE) alters synaptic transmission in the VTA in a manner that results in enhanced dopaminergic signaling and nicotine reward that propels nicotine-seeking and use. Substantial evidence implicates VTA eCB signaling in the etiology of nicotine addiction through the use of selective receptor antagonists including rimonabant, however the role of specific eCB signaling pathways remains unclear. Recent work demonstrates that chronic nicotine exposure (CNE) selectively enhances nicotine-induced increases in VTA 2-AG formation. The present experiments demonstrate that CNE results in enhanced nicotine-induced increases in VTA 2-arachidonoylglycerol (2-AG) formation, which subsequently blocks nicotine-induced GABA release through CB₁ receptor activation. Inhibition of 2-AG synthesis by novel, highly selective and efficacious DAGL inhibitors restored nicotine-induced GABA signaling in the VTA of CNE rats and reduced nicotine self-administration. Conversely, acute pharmacological attenuation of 2-AG clearance mechanisms in the VTA of nicotine-naïve animals recapitulated the loss of nicotine-induced VTA GABA signaling present CNE animals. Collectively these observations demonstrate that excessive 2-AG signaling is necessary and sufficient for a loss of inhibitory GABAergic constraint of VTA dopamine excitability that contributes to enhanced incentive salience in nicotine-dependent animals.

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CORRESPONDING AUTHOR: Matthew Buczynski, PhD, Virginia Polytechnic Institute and State University & The Scripps Research Institute, VA, USA

SYM7B

ROLE OF N-ACYLETHANOLAMINES IN NICOTINE EFFECTS ON MIDBRAIN DOPAMINE NEURONS

Miriam Melis^{*}, Marco Pistis, University of Cagliari, Italy

Nicotine in tobacco accounts for its psychoactive effects that facilitate the onset of dependence. Its addicting properties lie in the ability to enhance dopamine transmission, and to produce adaptive changes in synaptic plasticity in diverse brain circuits, particularly the midbrain dopamine system. Hence, nicotine excites dopamine neurons by activating nicotinic acetylcholine receptors (nAChRs) located on dopamine cell bodies. Approved therapies for smoking cessation increase the chances of remaining abstinent, although lack high levels of efficacy and are often associated with significant adverse side effects. Consequently, there is an urgent need for more effective antismoking treatment options. We found that N-acyl-

anolamines (NAEs), such as the endocannabinoid-related oleoylethanolamide (OEA) and palmitoylethanolamide (PEA), by acting as endogenous ligands of alpha-type peroxisome proliferator-activated receptors (PPAR α), block nicotine-induced excitation of dopamine neurons both in vivo and in vitro. In addition, drugs targeting PPAR α either directly –i.e., the class of synthetic agonists clinically available as hypolipidemic agents– or indirectly –i.e., drugs that increase endogenous levels of NAEs– show promise for the treatment of nicotine addiction. The specific interaction between PPAR α and nicotine, and the molecular mechanisms whereby these intracellular receptors regulate nAChR functions in neurons will be discussed. Modulation of neurophysiological, neurochemical and behavioral effects of nicotine by PPAR α will be also presented in the context of a role of these lipid signalling molecules as regulators of cholinergic transmission. Notably, the implications of this specific cross talk extend beyond nicotine addiction, and might bear relevance for other psychiatric disorders.

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CORRESPONDING AUTHOR: Miriam Melis, PhD, University of Cagliari, Italy

SYM7C

ROLE OF TRANSIENT RECEPTOR POTENTIAL VANILLOID 1 IN THE CONTROL OF BOTH NICOTINE-RELATED BEHAVIORS AND NICOTINE-INDUCED DOPAMINE NEURONAL ACTIVITY IN MICE

Anne-Emilie Alain, Marie-Line Fournier, Oceane Aribio, Martine Cador, Sandrine Bertrand, Stéphanie Caillé-Garnier^{*}, CNRS UMR5287 and University of Bordeaux, France

It has been shown that nicotine-related behaviors are efficiently controlled by endocannabinoids, via different targets such as the cannabinoid type 1 (CB1) and peroxisome proliferator-activated receptors- α (PPAR α) receptors. However, the brain transient receptor potential vanilloid 1 (TRPV1) is another important target of endocannabinoids. Interestingly, TRPV1 was recently implicated in addiction-related behaviors and controls dopamine neuron activity in the ventral tegmental area (VTA). Thus we investigated the control of TRPV1 on nicotine-induced behavioral and cellular effects in mice. In TRPV1 knockout (KO) and wild type (WT) male mice, locomotor activity was challenged with nicotine 0.3 mg/kg following 5 days of saline or nicotine pretreatment. Separate cohorts of mice were prepared for ex vivo electrophysiological studies assessing the effects of nicotine exposure on the synaptic inputs received by VTA DA neurons. Glutamatergic excitatory and GABAergic inhibitory miniature postsynaptic currents (mEPSCs, mIPSCs, respectively) were recorded in brain slices from each group. **RESULTS:** TRPV1 KO mice did not show behavioral hyperactivity in response to the last challenge with nicotine when compared to WT mice. In brain slices, nicotine increased the spontaneous firing activity of VTA DA neurons in WT but not in KO mice. While our data showed similar effects of nicotine on mEPSCs amplitude and frequency modulation in WT and TRPV1 KO mice, it seemed that TRPV1 receptor deletion impaired nicotine-induced increase in mIPSCs frequency when compared with WT mice. Altogether, these findings suggest that presynaptic TRPV1 receptors at GABAergic terminals control nicotine effects on inhibitory synaptic transmission to VTA DA neurons. It may be also involved in the loss of nicotine-induced locomotor sensitization. Thus our next step to further investigate the therapeutic opportunity with TRPV1 receptor pharmacology in nicotine addiction, is to test whether nicotine rewarding effects are lost in TRPV1 KO mice.

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CORRESPONDING AUTHOR: Stéphanie Caillé-Garnier, PhD, CNRS UMR5287 and University of Bordeaux, France

SYM7D

ROLE OF THE ENDOCANNABINOID SYSTEM IN NICOTINE ADDICTION

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Several lines of evidence have shown that the endogenous cannabinoids are implicated in several neuropsychiatric diseases. The endocannabinoid system is composed of endocannabinoids (anandamide, 2-Arachidonoylglycerol (2-AG)),



their target receptors (CB1 and CB2), the enzymes that degrade them (fatty-acid-amide-hydrolase (FAAH) and monoacylglycerol lipase (MAGL)), and an endocannabinoid transporter. Notably, preclinical and human clinical studies have shown a pivotal role of the cannabinoid system in nicotine addiction. An important example is the CB1 receptor inverse agonist/antagonist rimonabant (also known as SR141716), which has been shown to be effective to decrease nicotine-taking and nicotine-seeking in rodents, as well as the elevation of dopamine induced by nicotine in brain reward area. Rimonabant improved the ability of smokers to quit smoking in randomized clinical trials. However, rimonabant was removed from the market due to increased risk of psychiatric side-effects observed in humans. Recently, other components of the endogenous cannabinoid system have been explored. Here, we present an overview of the recent advances on the understanding of the role of the different components of the cannabinoid system on nicotine's effects and a summary of the results obtained in our laboratory on the effects of the MAGL inhibitor JZL184, the inhibitor of FAAH activity, URB597 and the CB1 neutral antagonist AM4113 in nicotine addiction using pre-clinical models. The promising results with AM4113 and URB597 suggest alternative ways of modulating the cannabinoid system that could have implication for nicotine dependence treatment.

FUNDING: This work was supported by grants from the following awarded to Bernard LeFoll: CAMH, Ontario Ministry of Innovation, Canadian Foundation for Innovation, Canadian Tobacco Control Research Initiative, Pfizer GRAND Award 2008, 2009, 2010, 2011, Pfizer Cardio-vascular Research Award, CIHR training program, OPGRC, Ontario Lung Association, Heart and Stroke Foundation, CIHR and NIH-NIDA.

CORRESPONDING AUTHOR: Jose Trigo, PhD, Centre for Addiction and Mental Health (CAMH), ON, Canada

SYM8

GLOBAL TOBACCO CONTROL DISPARITIES: WHERE ARE WE? WHERE ARE WE GOING?

Nigar Nargis, PhD, American Cancer Society, DC, USA; Ryan Kennedy, PhD, Johns Hopkins Bloomberg School of Public Health, USA; Monika Arora, PhD, MSc, MSc, Public Health Foundation of India

This symposium is co-sponsored by the Health Disparities and Global Health Networks.

This symposium will describe global trends in tobacco control policy implementation, linkages between tobacco control and the United Nation's 2015 Sustainable Development Goals (SDGs), and their potential influences on tobacco use disparities within and across countries. In 2004, the Framework Convention on Tobacco Control (FCTC) established an international legal framework to promote policies with the greatest likelihood of staving off the tobacco epidemic around the world. The 188 countries that have ratified the FCTC are from all major regions of the world, are at diverse stages of economic development, and cover the full range of "stages" in the tobacco epidemic. Little is known about how FCTC implementation has influenced the patterning of tobacco use across these diverse contexts. This symposium will begin with a brief introduction to these issues. Nigar Nargis will then present data from the Global Adult Tobacco Surveys and the International Tobacco Control Policy Evaluation Surveys, in order to characterize how quitting behavior varies by socio-economic characteristics across low- and middle-income countries (LMICs). These results will be interpreted in light of FCTC implementation, economic development, tobacco epidemic stage, and other key issues (e.g., culture, government, industry). Ryan Kennedy will then describe identified challenges associated with the implementation of tobacco-control policies, using examples from Bangladesh and India, and share possible strategies to improve policy implementation developed by experts in each of those countries. Finally, Monika Arora will describe the SDGs and their importance for agenda setting, advocacy, and actions to address health disparities globally. By discussing how tobacco and non-communicable disease are included in the recently adopted SDGs, Dr Arora will highlight the implications of the SDGs for the global tobacco control movement, including opportunities and challenges for linkage with researchers and advocates in other health and development areas. By allowing ample time for discussion, we expect that participants will engage with speakers over key issues related to the future of global tobacco control and strategies to promote equity in health.

JUSTIFICATION: This symposium will inform global tobacco control policy aimed at reducing tobacco use and tobacco disparities within and across countries.

FUNDING: The ITC Bangladesh Survey was supported by the International Development Research Centre (IDRC Grant 104831-002). The ITC Brazil Project was supported by the Brazilian Ministry of Health, National Cancer Institute José Alencar Gomes da Silva (INCA), Brazilian Ministry of Justice, National Secretariat for Drug Policy (SENAD). The ITC China Project was supported by grants from the US National Cancer Institute at the National Institutes of Health (R01 CA125116), Canadian Institutes for Health Research (79551 and 115016); and Chinese Center for Disease Control and Prevention. The TCP India Project was supported by grants from the US National Cancer Institute (P01 CA138389) and Canadian Institute of Health Research (115016). The ITC SEA (Malaysia and Thailand) Project was supported by grants R01 CA100362 and P50 CA111236 (Roswell Park Transdisciplinary Tobacco Use Research Center) from the National Cancer Institute of the USA, Canadian Institutes of Health Research (79551), Thai Health Promotion Foundation, and the Malaysian Ministry of Health. Additional support was provided to Geoffrey T. Fong from a Senior Investigator Award from the Ontario Institute for Cancer Research and a Prevention Scientist Award from the Canadian Cancer Society Research Institute. This work was also supported by the Bloomberg Initiative to Reduce Tobacco Use and the World Heart Federation.

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SYM8A

SOCIODEMOGRAPHIC PATTERNING OF CESSATION BEHAVIOR ACROSS LOW AND MIDDLE-INCOME COUNTRIES: EMERGING EVIDENCE FROM THE GLOBAL ADULT TOBACCO SURVEYS AND INTERNATIONAL TOBACCO CONTROL SURVEYS

Nigar Nargis^{*1}, Hua-Hie Yong², Pete Driezen³, Geoffrey Fong³, Mary Thompson³, Ron Borland², Gary Giovino⁴, Jim Thrasher⁵, ¹American Cancer Society, DC, USA, ²Cancer Council Victoria, ³University of Waterloo, ⁴School of Public Health and Health Professions, University at Buffalo, SUNY, Buffalo, ⁵Arnold School of Public Health, University of South Carolina

Tobacco use is more prevalent among the poor than the rich and is a leading contributor to socioeconomic disparities in health. It creates a disproportionately larger health and economic burden on the poor due to the health cost of tobacco-attributable diseases and the cost of purchasing tobacco products. The inequality in smoking can be partly explained by the inequalities in smoking initiation and quitting. Based on data from the Global Adult Tobacco Surveys and International Tobacco Control Surveys in eight low- and middle-income countries (LMICs), this paper finds modest evidence in support of the hypothesis that the probability of successful quitting is lower for lower socio-economic status (SES) represented by income, wealth, education, employment status and rural-urban residential status. The mixed evidence from the LMICS points out that the explanations of generally lower quitting probability among lower SES gleaned from the studies on high-income countries may not be generalized to LMICs. However modest evidence is in support of the socio-economic gradient of quitting behavior in LMICs, it suggests that low SES people need to be targeted for cessation support in tobacco control initiatives. It also informs policymakers to be aware of the equity implication of all tobacco control policies in so far as the impacts of those policies on the quitting behavior of the poor or disadvantaged are concerned. The equity aspect reemphasizes the need for integrating tobacco control policies in the post-2015 sustainable development agenda of the LMICs to address nationwide poverty and inequality.

FUNDING: The ITC Bangladesh Survey was supported by the International Development Research Centre (IDRC Grant 104831-002). The ITC Brazil Project was supported by the Brazilian Ministry of Health, National Cancer Institute José Alencar Gomes da Silva (INCA), Brazilian Ministry of Justice, National Secretariat for Drug Policy (SENAD). The ITC China Project was supported by grants from the US National Cancer Institute at the National Institutes of Health (R01 CA125116), Canadian Institutes for Health Research (79551 and 115016); and Chinese Center for Disease Control and Prevention. The TCP India Project was supported by grants from the US National Cancer Institute (P01 CA138389) and Canadian Institute of Health Research (115016). The ITC SEA (Malaysia and Thailand) Project was supported by grants R01 CA100362 and P50 CA111236 (Roswell Park Transdisciplinary Tobacco Use Research Center) from the National Cancer Institute of the USA, Canadian Institutes of Health Research (79551), Thai Health Promotion Foundation, and the Malaysian Ministry of Health. Additional support was provided to Geoffrey T. Fong from a Senior Investigator Award from the Ontario Institute for Cancer Research and a Prevention Scientist Award from the Canadian Cancer Society Research Institute.

CORRESPONDING AUTHOR: Nigar Nargis, PhD, American Cancer Society, DC, USA

SYM8B

TOBACCO CONTROL POLICY IMPLEMENTATION AND EVALUATION: A PROPOSED FRAMEWORK FOR LOW- AND MIDDLE-INCOME COUNTRIES

Ryan Kennedy*, Stephen Tamplin, Lisa Lagasse, Joanna Cohen, Johns Hopkins Bloomberg School of Public Health, USA

Tobacco use is a global problem, with an estimated 80% of the world's 1 billion tobacco smokers living in low- and middle-income countries (LMICs) and bearing the heaviest burden of death and disease. Evidence from primarily high-income countries informed the development of the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC), requiring Parties to enact policies demonstrated to be effective in reducing tobacco use and protecting citizens from tobacco smoke; and, helped inform development of related implementation guidelines. If fully implemented, FCTC policies will avert millions of deaths. In this context, there have been calls for improved monitoring of tobacco control policy implementation and enforcement, particularly in LMICs given emerging evidence that these jurisdictions often face challenges in operationalizing their tobacco control laws. The present qualitative study sought to understand tobacco control implementation processes and strategies in Bangladesh and India, and to develop a framework to help guide tobacco control policy implementation and evaluation activities in LMICs. The study included interviews with key informants (KI) in India (n=55) and Bangladesh (n=70). The informants worked for different levels of government responsible for the development, implementation and enforcement of tobacco control laws including elected officials, bureaucrats, enforcement officials, members of non-governmental organizations and policy advocates. Central features of the framework included: (1) Political will and leadership, including addressing tobacco industry influence and understanding natural political cycles; (2) Social climate, including knowledge and attitudes towards tobacco use and the role of civil society and the media in ameliorating social norms around the acceptance or disapproval of tobacco; and, (3) Institutional capacity, including systems to support a functioning bureaucracy, community networking, training and enforcement planning. Key findings included the importance of a national law, on-going staff training, a rational tobacco tax structure, political champions and understanding tobacco industry strategy.

FUNDING: This work was supported by the Bloomberg Initiative to Reduce Tobacco Use.

CORRESPONDING AUTHOR: Ryan Kennedy, PhD, Johns Hopkins Bloomberg School of Public Health, USA

SYM8C

LINKING GLOBAL TOBACCO CONTROL AND THE SUSTAINABLE DEVELOPMENT GOALS: OPPORTUNITIES AND CHALLENGES FOR RESEARCH AND ADVOCACY

Monika Arora*, Shikha Bhasin¹, Amit Yadav², Alice Grainger-Gasser³, ¹Public Health Foundation of India, ²HRIDAY (Health Related Information Dissemination Amongst Youth), ³World Heart Federation

Tobacco control has been identified to be more than purely a health issue, as its consumption and production impede development. Worldwide, tobacco imposes disproportionately higher burden among poor and vulnerable populations. Tobacco-related health disparities not only severely affect the individuals, families, and communities of a given country, but also its economy. Implementation of the WHO Framework Convention on Tobacco Control (FCTC) is included in the Sustainable Development Goals (SDGs). In fact, the FCTC is recognised as a "means of implementation" to reach the overall health goal (i.e. to "Ensure healthy lives and promote well-being for all at all ages") and is a key target on the non-communicable disease (NCD) agenda. The WHO Global Action Plan for the Prevention and Control of NCDs provides a road map and a menu of policy options to attain 9 voluntary global targets, including a 25% relative reduction in premature mortality from NCDs and a 30% relative reduction in tobacco use by 2025. The linkage between tobacco control, NCDs and SDGs provides a unique opportunity to combine efforts and mobilize development assistance for implementation of the FCTC. There is little understanding of the adverse impacts of tobacco on health, health costs and the economy in low- and middle-income countries (LMICs). Government authorities see tobacco use as a health issue rather than a challenge

in development. However, integration of programmes and multi-sectoral action planning remains a challenge in many LMICs. The evidence that shows the links between tobacco (NCDs), poverty and development needs to be exhibited to raise the profile of tobacco control among non- health audiences. A situational analysis of tobacco control implementation was undertaken at the national level in India, adapting the World Heart Federation's Roadmap Toolkit. Data collected from key informant interviews (n=9) and desk and literature reviews were organized into a SWOT analysis. This analysis identified opportunities and challenges for integrating tobacco control research and advocacy efforts with ongoing NCD and development efforts in the country. This presentation will discuss the outcomes of this study's analysis, and will highlight pathways for achieving SDGs through effective implementation of FCTC policies.

FUNDING: This work was supported by World Heart Federation.

CORRESPONDING AUTHOR: Monika Arora, PhD, MSc, MSc, Public Health Foundation of India

SYM9

CONTRIBUTIONS OF BASIC SCIENCE TO PUBLIC POLICY

Maciej Goniewicz, PhD, PharmD, Roswell Park Cancer Institute, NY, USA; Nii Addy, PhD, Yale University, USA; Tracy Smith, PhD, University of Pittsburgh, PA, USA; Stephen Higgins, PhD, University of Vermont, VT, USA

This symposium is sponsored by the SRNT Basic Science Network.

Urgent action is needed to curb the health impact of combustible cigarettes. In the United States, the Food and Drug Administration (FDA) has the authority to regulate tobacco products for the improvement of public health. Globally, over 170 countries have ratified the World Health Organization Framework Convention on Tobacco Control, which identifies tobacco control as an urgent priority. Tobacco control policies in the United States and other countries should be grounded in scientific evidence showing that they are likely to improve public health. While clinical work is integral to this science, basic science approaches have distinct advantages, and in many cases can complement clinical science. Chief among these advantages is the high degree of experimental control over key variables offered by basic science. A growing number of basic scientists are now conducting research that aims to guide public policy. In this symposium four researchers will describe emerging basic science from their laboratories that inform key areas of public policy including e-cigarettes, flavors, nicotine reduction, and vulnerable populations. Presentations will highlight the advantages of their approach for informing public policy. The data presented in this symposium span in vitro, animal, and human models and span critical topic areas identified as research priorities by the FDA Center for Tobacco Products. First, Dr. Maciej Goniewicz will present data from an in vitro model of e-cigarette toxicology. Second, Dr. Nii Addy will present data from an in vivo model of the rewarding value of menthol and other flavorings. Third, Dr. Tracy Smith will present data utilizing behavioral economic assessments of nicotine reduction in both rats and humans. Finally, Dr. Stephen Higgins will present laboratory data regarding reduced nicotine products in several vulnerable populations. Dr. Jonathan Foulds will serve as the discussant and will synthesize the implications of presentations as well describe the utility of the approaches for informing clinical public policy scientists and policy makers.

JUSTIFICATION: The aim of this symposium is to describe basic science contributions to public policy including the topic areas of e-cigarettes, flavors, nicotine reduction, and vulnerable populations.

FUNDING: This work was supported by the National Institute on Drug Abuse (NIDA) (R01DA037446), the National Cancer Institute (P30 CA016056 and T32 CA186783 (TS)), the National Institute on Child and Human Development (R01HD075669 and R01HD078332), the Food and Drug Administration (FDA) Center for Tobacco Products (P50 DA036151, P50DA036114, U54 DA031659), the Roswell Park Alliance Foundation, NSF Graduate Research Fellowships (RJW and PRS), and the Centers of Biomedical Research Excellence award (P20GM103644) from the National Institute on General Medical Sciences. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or FDA.

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SYM9A

TESTING INHALATION TOXICITY OF NOVEL TOBACCO PRODUCTS USING IN VITRO MODELS - IMPLICATIONS FOR REGULATORY SCIENCE AND POLICY

Maciej Goniewicz*, Roswell Park Cancer Institute, NY, USA

SIGNIFICANCE: Inhalation of complex mixtures like tobacco smoke and ENDS aerosol can cause a wide range of adverse health effects, ranging from simple irritation to systemic diseases. Traditionally, inhalation toxicity has been performed on test animals to identify various end points including the lethal concentration of airborne materials or maximum tolerable concentration. **METHODS:** A modern in vitro exposure system for testing tobacco products consists of 4 major components: the smoking machine, dilution system, exposure interface and dosimetry tools. More recently, novel in vitro methods have been developed that allow the direct exposure of airborne material to cultured human target cells on permeable porous membranes at the air-liquid interface (ALI). The use of primary human cells and immortalized cell lines is favored and recommended. Recently, the biologically relevant 3D models of human tissues have been developed and are commercially available. Ex vivo tissue studies can be done by using precision-cut lung slices (PCLS). Upcoming technologies that might further improve in vitro testing include lung-on-a-chip that recreates expansion and contraction of the airways during breathing, to mimic changes in air and blood flow. **RESULTS:** Our group has studied the effects of tobacco smoke and ENDS aerosols on respiratory cells cultured at the ALI to measure cell injury or activation and the release of bioactive mediators including cytokines. We found that various ENDS products differ with regard to their cellular toxicity in cells directly exposed to aerosols. Measuring dose at the exposure interface allows the comparison of data from different exposure system and products. **CONCLUSIONS:** In vitro studies using an ALI model open up new ways to test acute toxicity of novel tobacco products. The direct exposure with whole smoke or ENDS aerosol at the ALI is the future-oriented approach that can be used for regulatory science and policy. The identification, validation and dissemination of robust in vitro methods for the evaluation of tobacco products and their constituents will advance regulatory decision-making to protect human health.

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SYM9B

INTRAORAL FLAVORANTS ENHANCE DOPAMINE SIGNALING AND NICOTINE-TAKING IN A PRECLINICAL RAT MODEL

Nii Addy*, Robert Wickham¹, Eric Nunes¹, Phillip Silva¹, Jinwoo Park², ¹Yale University, USA, ²University of Buffalo

Given the availability of over 7000 different e-cigarette flavors, an increased understanding of whether tobacco product flavorants alter nicotine addiction can provide an important scientific foundation to inform public policy. To date, researchers have successfully integrated preclinical nicotine self-administration models with pharmacological, molecular and genetic tools to investigate the neurobiological basis of nicotine addiction. However, a robust preclinical methodology for determining how oral flavorants influence nicotine addiction has not been previously established. Here, we developed a novel, combined intraoral (i.o.) flavorant and intravenous (i.v.) nicotine operant paradigm in rats to investigate how flavorants influence the acquisition and maintenance of nicotine self-administration. We also integrated i.o. flavorant delivery with in vivo voltammetry in awake rats to determine whether menthol and sweet oral flavorants alter phasic dopamine (DA) signaling in the nucleus accumbens (NAc). We found that caloric and non-caloric appetitive flavorants (10% sucrose or 0.32% saccharin) increased phasic DA in the NAc and also enhanced nicotine self-administration during fixed ratio (FR) schedules of reinforcement. In contrast, menthol (0.005%) did not alter phasic DA nor nicotine self-administration. Furthermore, neither saccharin nor menthol altered the motivation for nicotine taking, as assessed in a progressive ratio (PR) test. In a separate experiment, pairing flavorants with nicotine did not confer additional conditioned reinforcing properties to the flavors. Our preclinical physiological and behavioral findings complement ongoing clinical and population research examining whether oral flavorants influence the motivation for and prevalence of e-cigarette

use in humans. Our preclinical in vivo methodology also provides unique biological understanding as phasic DA signaling, which serves as a biomarker of reward and reward-seeking, currently cannot be measured in human tobacco product users. In future work, our methodology can be applied to other tobacco product flavorants and can be extended to include preclinical nicotine relapse models.

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SYM9C

BEHAVIORAL ECONOMIC ASSESSMENTS OF THE IMPACT OF NICOTINE REDUCTION ON RAT SELF-ADMINISTRATION AND HUMAN SMOKING

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A mandated reduction in the nicotine content of cigarettes may improve public health by reducing the rate and the prevalence of smoking. Behavioral economics is a conceptual framework in which the value of a reinforcer is assessed by examining effects of reinforcer cost on self-administration. In this presentation, we will evaluate the impact of nicotine reduction on reinforcement value in rats and human smokers using three different behavioral economic tasks. First, rats (n=11-14/group) self-administered a low or high dose of nicotine and experienced an increase in the effort (i.e., cost) required to earn an infusion every four sessions. The lower dose of nicotine produced lower levels of maximal responding (p < 0.01). Finally, in an ongoing clinical trial, participants (N=240) were provided with investigational cigarettes that either had normal or very low nicotine content. After six weeks, participants were given daily monetary incentives to remain abstinent from smoking for up to one week, verified with daily carbon monoxide samples. Analyses will test the impact of nicotine reduction on abstinence duration, indicating the value of smoking relative to the competing monetary reinforcer. Collectively, these data demonstrate that a reduction in nicotine content results in reduced reinforcement value, and demonstrate the utility of the behavioral economics framework for research questions related to abuse liability and public policy.

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SYM9D

EXAMINING TOBACCO CONTROL AND REGULATORY SCIENCE QUESTIONS IN THE CLINICAL LABORATORY SETTING

Stephen Higgins*, University of Vermont, VT, USA

RATIONALE: I will present results from two experimental studies with tobacco control and regulatory science implications that were conducted in vulnerable populations under controlled laboratory conditions. The first study examined the acute effects of varying nicotine content cigarettes in smokers from three vulnerable populations (disadvantaged women, opioid abusers, individuals with affective disorders). The second study examined sensitivity to variations in the price of cigarettes among pregnant women using a behavioral economic simulation task (Cigarette Purchase Task, CPT). **METHODS:** Participants in Study 1 were 26 adult, daily cigarette smokers from one of three populations: economically disadvantaged women of reproductive age (n = 9), opioid-dependent individuals (n = 11), individuals with affective disorders (n = 6). Those in Study 2 were 95 pregnant cigarette smokers enrolled in a smoking-cessation trial. Study 1 participants completed fourteen 2-4 hr experimental sessions in a within-subjects research design where they smoked cigarettes varying in nicotine content (0.4, 2.4, 5.2,

15.8 mg/g) under double-blind conditions. Study 2 participants completed a single 20-min session in a quiet laboratory space where they indicated on a laptop computer the # of hypothetical cigarettes they would consume at 19 different prices. RESULTS: Study 1 results supported comparable efficacy across these varying dose cigarettes in reducing nicotine withdrawal/craving, revealed no evidence of compensatory smoking at very low doses, and demonstrated a lower abuse liability with the very low vs. higher dose cigarettes. Study 2 results validated the utility of this time- and cost-efficient simulation task for generating orderly and detailed cigarette consumption information characterizing how this vulnerable population responds to price manipulations without directly exposing them to the tobacco product of interest. CONCLUSIONS: Human laboratory procedures can highly effectively and safely examine questions with considerable tobacco control and regulatory science implications.

FUNDING: Tobacco Centers of Regulatory Science (TCORS) award (P50DA036114) from the National Institute on Drug Abuse and Food and Drug Administration, Centers of Biomedical Research Excellence award (P20GM103644) from the National Institute on General Medical Sciences, Research Grant Awards from the National Institute on Child and Human Development (R01HD075669 and R01HD078332).

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SYM10

UNDERSTANDING NON-ADHERENCE TO SMOKING INTERVENTIONS: DETECTION, REASONS, INDIVIDUAL DIFFERENCES, AND CONSEQUENCES

Natalie Nardone, PhD, University of California - San Francisco, CA, USA; Neal Benowitz, MD, University of California San Francisco, USA; Joseph Koopmeiners, PhD, University of Minnesota, MN, USA; Sarah Dermody, PhD, Centre for Addiction and Mental Health, ON, Canada; Robert Schnoll, PhD, University of Pennsylvania, PA, USA

Randomized clinical trials (RCTs) are the gold standard for evaluating the effects of interventions on smoking outcomes. When evaluating the effectiveness of these interventions, a key obstacle is participant non-adherence to the assigned intervention. Specifically, non-adherence has the potential to bias estimates of the effects of interventions on smoking outcomes as well as associated unintended consequences. This symposium will provide an integrative overview of the methodological challenges associated with non-adherence when conducting RCTs of smoking interventions from a variety of perspectives. First, Dr. Nardone will present on self-reported reasons for non-adherence in a 6-week, multi-site RCT of reduced nicotine content (RNC) cigarettes, including an examination of how self-reported non-adherence differs based on assigned treatment condition, sex, and nicotine dependence level. Then, Dr. Benowitz will present data examining the effects of forcing compliance to RNC cigarettes on compensatory smoking behavior in a study where smokers were confined to a hotel where they only could smoke investigational cigarettes. Dr. Koopmeiners will then present a novel analytic approach for estimating causal effects from randomized trials of RNC cigarettes in the presence of non-adherence and illustrate the proposed approach by estimating the causal effects of RNC cigarettes on cigarettes smoked and compensation from a 6-week RCT of RNC cigarettes. Next, Dr. Dermody will share results, from the same multi-site RCT, which explore the effects of non-adherence determined using nicotine biomarkers on withdrawal symptoms, which is an expected consequence of switching to RNC cigarettes. Lastly, Dr. Schnoll, using a 12-week, multi-site RCT of varenicline, will discuss results from an evaluation of self-report and biological measures of non-adherence and associated prospective predictors. The discussant, Dr. Benowitz, will end the symposium by synthesizing the results from the five presentations and discussing the implications of these data for determining the effectiveness of each of these interventions.

JUSTIFICATION: This symposium will provide insight into the effects of non-adherence in RCTs, as well as highlight strategies to address non-adherence at multiple points in the research process, from study design to data collection, analysis, and interpretation. The results have important implications for clinical research and public health or policy.

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SYM10A

REASONS FOR NON-COMPLIANCE IN A CIGARETTE NICOTINE REDUCTION CLINICAL TRIAL

Natalie Nardone¹, Neal Benowitz¹, Tracy Smith², Joseph Koopmeiners³, Dorothy Hatsukami³, Eric Donny², ¹University of California - San Francisco, CA, USA, ²University of Pittsburgh, ³University of Minnesota

Non-compliance in reduced nicotine cigarette (RNC) clinical trials is an important topic for extrapolating results to a potential regulatory environment in which only RNCs are available legally. Rates of smoking at least some usual brand cigarettes (UBCs) are 60-78% as assessed by biochemical methods. However, little is known about why or when non-compliance is most likely to occur. The use of non-study cigarettes (NSCs) could be motivated both by factors directly related to nicotine reduction (e.g., withdrawal) or factors unrelated to nicotine reduction (e.g., social context). Further, non-compliance may be most likely to occur at the beginning phases of RNC clinical trials, as participants are adjusting to the RNCs. Participants completing a 6-Week RNC clinical trial with a usual brand cigarette condition and investigational cigarettes ranging from high levels of nicotine to very low ($N=237$) were asked to endorse situations in which they were most likely to cheat and smoke non-study cigarettes (NSCs). Self-reported non-compliance was asked throughout the 6-weeks via daily phone calls. Non-compliance at some point throughout the trial ranged from 30% in the usual brand condition, to 80% in the RNC groups. The most frequently endorsed cheating situation was the first cigarette of the day (43% of participants) with older and highly dependent participants more likely to endorse ($p(s)=0.01$). Use of NSCs decreased over the 6-Weeks of the study. The findings of greater non-compliance in the RNC groups vs. higher nicotine groups, and that the most frequently cited reason for non-compliance was the first cigarette of the day, supports the importance of nicotine in non-compliance. This can inform future policy initiatives in that when deprived of nicotine, some smokers are likely to seek it from another source particularly early on in the switching process and if they are highly dependent on nicotine.

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CORRESPONDING AUTHOR: Natalie Nardone, PhD, University of California - San Francisco, CA, USA

SYM10B

COMPENSATORY SMOKING OF REDUCED NICOTINE CONTENT CIGARETTES IN CONFINED SMOKERS

Neal Benowitz¹, Natalie Nardone¹, Tracy Smith², Rachel Denlinger³, Joseph Koopmeiners⁴, Dorothy Hatsukami⁴, Eric Donny², ¹University of California San Francisco, USA, ²University of Pittsburgh, ³Brown University, ⁴University of Minnesota

The possibility of compensatory smoking resulting in greater exposure to tobacco-smoke toxicants has been of concern in considering mandatory reduction of the nicotine (NI) content of cigarettes (CIG) to make CIG less addictive. Compensatory smoking in clinical trials of reduced NI content CIG (RNC) is difficult to assess because conventional CIG are widely available and partial non-compliance with RNCs is common. We recently published a study on biomarkers of exposure to CIG toxicants in smokers who were switched to RNCs while confined to a hotel where compliance was enforced (Denlinger et al 2016). Data from this study were used to determine the extent and behavioral mechanisms of compensation. For 5 days 24 confined smokers received RNC (0.26 mg NI/cig) with no access to other CIG. Daily NI intake was estimated using urine total NI equivalents (TNE). NI content of usual brands was measured for each subject and averaged 12.2 mg (7.8 to 14.5). Thus, switching to RNC represented a 98% reduction in NI content. RNC use resulted in a 95% reduction in urine TNE. Compensation averaged 24%. Average daily CIG consumption increased from 20.1 to 28.4 (41%). The geometric mean intensity of smoking RNC, defined as actual/predicted NI exposure, increased on average 2-fold compared to usual brand. Baseline intensity of smoking strongly predicted both the increase in smoking intensity and the extent of compensation, while baseline CPD predicted neither. In summary, in smokers switched from usual brand to RNC, compensation was modest, averaging about 25%, but NI exposure was reduced substantially. On average 70% of compensation occurred by smoking CIG more intensively and 30% by smoking more CPD. Our compensation estimate is a worst case scenario compared to real world because CIG were free



and there were no smoking restrictions. Our findings differ from studies of switching to commercial low yield NI CIG (NI content not reduced), where compensation is complete. Our data support the feasibility and safety of a nation-wide policy to reduce the NI content of CIG to non- or minimally-addictive levels.

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SYM10C

ESTIMATING THE IMPACT OF MANDATED REDUCTIONS IN THE NICOTINE CONTENT OF CIGARETTES FROM DATA COLLECTED IN AN UNREGULATED WORLD

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Recently, an intention-to-treat analysis of data from a large, randomized clinical trial of reduced nicotine content cigarettes (RNC) found that subjects randomized to the lowest nicotine content (0.4 mg/g of tobacco) had significantly reduced nicotine exposure, nicotine dependence and cigarettes smoked compared to normal-nicotine controls after six weeks. However, the effect of RNC when all subjects are compelled to comply (i.e., the causal effect) better approximates the effect of nicotine reduction as a regulatory strategy. A number of statistical techniques have been developed for estimating causal effects from randomized clinical trials in the presence of non-compliance, but all assume that non-compliance is measured without error. Self-reported non-compliance is not a reliable measure of non-compliance in randomized trials of RNC, and biomarkers of nicotine exposure can be used instead to identify non-compliers. However, no biomarker perfectly discriminates between compliers and non-compliers, and a failure to account for the potential misclassification in compliance status can result in biased estimators of causal effects. We propose an extension of inverse probability of compliance weighted (IPCW) estimators that properly accounts for misclassification in compliance status by utilizing a mixture-model approach to estimate the probability that subjects were compliant given their biomarker values. The proposed estimator converges to the true causal effect in large sample sizes, and simulation results illustrate that the proposed estimator is unbiased in finite sample sizes and more efficient than IPCW using a single biomarker cut-off for identifying non-compliance. Application of our method to a recently completed trial of RNC shows that after 6 weeks subjects randomized to the lowest nicotine condition would smoke 5.13 (95% CI: 0.10, 8.51) fewer cigarettes per day than subjects in the normal nicotine control condition if compliance were compelled. Our novel analytical approach can also be used to assess other important outcomes (e.g., dependence, compensatory smoking), providing an important tool for understanding the impact of regulatory action.

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SYM10D

THE EFFECTS OF ADHERENCE WITH EXCLUSIVELY SMOKING VERY LOW NICOTINE CONTENT CIGARETTES ON WITHDRAWAL SYMPTOMS

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The effect of very low nicotine content (VLNC) cigarettes on smoking outcomes has been evaluated in clinical trials. Non-adherence in such trials by smoking

usual-brand cigarettes may lead to underestimating consequences of VLNC cigarettes. This project investigated the effect of non-adherence with VLNC cigarettes on nicotine withdrawal. A secondary analysis was completed of a 10-site, double-blind clinical trial of non-treatment seeking smokers (Donny et al., 2015) who were instructed to smoke one of the following cigarettes exclusively for 6-weeks and then complete a 24-hour abstinence period: usual brand (n=118), investigational normal nicotine content (NNC; 15.8 mg nicotine/g tobacco; n=119), or VLNC (0.4 mg/g with high (n=119) or normal tar (n=119) levels). At weekly visits and the post-abstinence visit, participants rated 15 symptoms using the Minnesota Nicotine Withdrawal Scale (MNWS). Each condition was compared to the NNC condition with respect to (1) the trajectories over 6-weeks of the 15 MNWS items using latent growth curve models, and (2) levels of 15 MNWS items after abstinence using regression analyses. The effect of VLNC adherence was tested using a binary predictor by using a predetermined TNE cut-off (TNE <6.41 nmol/ml at both Weeks 2 and 6). The Bonferroni-corrected significance threshold was .0125. After one week of VLNC cigarette use relative to NNC control, participants using the high tar product reported increased irritability (p=.002; Cohen's d=.52); however, there were no differences in irritability from Weeks 2 to 6. No additional group differences occurred during the 6-weeks or the abstinence visit. The non-adherence or adherence status in the 0.4 mg/g conditions was not significantly related to withdrawal. In sum, minimal withdrawal symptoms were associated with VLNC cigarette use even among individuals who were judged to be adherent to the assigned VLNC cigarettes. This suggests that a nicotine reduction policy may not considerably impact withdrawal. Future analyses will test these associations using daily assessments of withdrawal and using a statistical model to estimate withdrawal symptoms if compliance could be enforced.

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SYM10E

MEASURES AND PREDICTORS OF VARENICLINE ADHERENCE IN THE TREATMENT OF NICOTINE DEPENDENCE

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The issue of adherence to treatment remains relatively under-studied in the context of smoking cessation clinical trials, despite evidence that the degree of treatment adherence is a strong predictor of treatment response. In this study we evaluated week 1 varenicline salivary levels and self-reported pill count as measures of adherence and evaluated prospective predictors of adherence to varenicline. Data for this study were taken from 376 individuals who received 12-weeks of varenicline within a randomized placebo-controlled clinical trial. First, we translated an existing cut-point for varenicline adherence from plasma to salivary levels and found that, relative to 3-day, 7-day, and 14-day pill count (prior to the collection of salivary varenicline), 12-week pill count (collected from medication initiation through to the end-of treatment) was the only significant self-report measure as assessed by area under the curve (AUC = .59, p=.004) within a receiver operating characteristic curve analysis. Adherence was higher among older, white, and better educated participants. Seventy-two percent of participants who indicated adherence on 12-week pill count were classified as adherent based on salivary varenicline levels (sensitivity 0.80; specificity 0.40). There was also some variability in the relationship between 12-week pill count and varenicline salivary levels across race and rate of nicotine metabolism. Lastly, prospective changes in withdrawal and craving, negative and positive affect, and side effect count and severity were not related to adherence. These results indicate that 12-week pill count may be the optimal self-report measure of varenicline adherence and that additional studies are needed to identify factors associated with treatment adherence.

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CORRESPONDING AUTHOR: Robert Schnoll, PhD, University of Pennsylvania, PA, USA

SYM11

DEVELOPMENT AND TESTING OF SMARTPHONE APPS FOR SMOKING CESSATION

Reuven Dar, PhD, Tel Aviv University, Israel; Roger Vilardaga, PhD, Duke University, USA; Kathleen Garrison, PhD, Yale University, CT, USA

This symposium will describe the development and testing of three smartphone apps for smoking cessation. Key topics will include user-centered design, experience sampling, novel technologies such as wearables, and randomized controlled trials. Saul Shiffman PhD will serve as discussant. Reuven Dar PhD from Tel Aviv University will present a smoking cessation app that uses big data over wearables to deliver cognitive behavioral therapy: SmokeBeat. Findings from qualitative testing and a wait-list controlled pilot study will be discussed. Roger Vilardaga PhD from University of Washington will present an app for acceptance and commitment therapy tailored to smokers with chronic mental illness: Learn to Quit. Findings from iterative formative evaluation and feasibility testing will be presented. Kathleen Garrison PhD from Yale University will present a smartphone app for mindfulness training for smoking cessation: Craving to Quit. Findings from a randomized controlled trial will be presented. Together these reports will highlight the usability, feasibility and potential efficacy of smartphone app-based treatments for smoking.

JUSTIFICATION: These reports will inform the development of smartphone apps for smoking cessation, as well as testing stages from feasibility and pilot studies to clinical trials of efficacy.

FUNDING: No Funding

CORRESPONDING AUTHOR: Kathleen Garrison, PhD, Yale University, New Haven, CT, USA

SYM11A

A NOVEL SMOKING CESSATION APP UTILIZING BIG DATA OVER WEARABLES: A PILOT STUDY

Reuven Dar*, Tel Aviv University, Israel

SmokeBeat is a novel app designed for use with smartwatches and wristbands for delivering cognitive-behavioral treatment (CBT) for smoking cessation. SmokeBeat is powered by a data analytics software platform, which processes information from the sensors embedded in wearables. SmokeBeat relies on an original algorithm to identify in real time, accurately and reliably the hand-to-mouth gestures that characterize smoking a cigarette and distinguish them from similar gestures (e.g., eating, drinking, shaving, smoking, tooth brushing). This unique ability of SmokeBeat to identify smoking can be used to generate data analytics on a vast number of smoking parameters and to distill from these data both general and personal smoking patterns. Thanks to its ability to detect smoking in real time, SmokeBeat does not depend on users registering every smoking event, as do all other current apps. This unique feature enables SmokeBeat to increase smokers' awareness and counter the tendency of the smoking habit to become automatic and "mindless." Moreover, by analyzing individual smoking patterns over time, SmokeBeat can predict when smoking is likely to take place and alert the smoker, as well as suggest means to halt or shorten the duration of the next cigarette. The smoking patterns of individual users are identified by running machine-learning algorithms on the data collected, which include information on location context, social setting, temporal patterns, etc. The presentation will summarize findings from a wait-list controlled pilot study of SmokeBeat demonstrating its accuracy in detecting smoking gestures. The presentation will illustrate some of the rich data generated SmokeBeat's backend platform and include initial findings on smokers' responses to the feedback provided by the app.

FUNDING: No Funding

CORRESPONDING AUTHOR: Reuven Dar, PhD, Tel Aviv University, Israel

SYM11B

UX DESIGN AND N-OF-1 TRIALS OF LEARN TO QUIT, A NOVEL SMOKING CESSATION APP FOR CHRONIC MENTAL ILLNESS

Roger Vilardaga^{*1}, Javier Rizo¹, Arpita Bhattacharya², Emily Zeng³, Brain Marr⁴, Julie Kientz², Richard Ries², ¹Duke University, USA, ²University of Washington, ³Brown University, ⁴Smashing Ideas, Inc.

BACKGROUND: Mobile health applications tailored to people with chronic mental illness (CMI) can potentially address their low quit rates and provide wider reaching evidence-based treatments for this population. **OBJECTIVE:** To ideate and design a smoking cessation app tailored to CMI and test it using agile research methods. **METHODS:** In Phase I, we developed a tailored CMI app prototype, Learn to Quit, based on Acceptance and Commitment Therapy, and conducted an iterative formative evaluation of the app using user centered design methods. In Phase II, we conducted a series of 30-day N-of-1 trials to test Learn to Quit's initial feasibility as compared to QuitGuide, an app developed for the general population. **RESULTS:** Phase I resulted in minimal app mechanics usability errors, supported the design of the app dashboard, and the apps' gamified storytelling approach to delivering cessation skills (SUS = 74; standard cutoff: >68). Preliminary results on Phase II indicate that when compared to QuitGuide, Learn to Quit has higher system usability scores (SUS: 83 vs 64); leads to sustained app use (94% of possible usage days), is highly engaging (66% of possible practice stars; Average use per individual = 4h 24') and leads to high levels of retention and comprehension of smoking cessation concepts (97% correct app quizzes). **CONCLUSION:** Learn to Quit appears to be a feasible and highly engaging smoking cessation app amongst people with CMI. A pilot randomized controlled trial is needed to test its feasibility in a larger sample of people from this underserved population.

FUNDING: NIDA (1K99DA037276-01) to RV

CORRESPONDING AUTHOR: Roger Vilardaga, PhD, Duke University, USA

SYM11C

USING OUR SMARTPHONES TO LEARN TO PAY ATTENTION AND QUIT SMOKING: SMARTPHONE APP-BASED MINDFULNESS TRAINING FOR SMOKING CESSATION

Kathleen Garrison^{*1}, Prasanta Pal², Stephanie O'Malley¹, Judson Brewer², ¹Yale University, CT, USA, ²University of Massachusetts Medical School

Smartphone-app based smoking cessation puts treatment into the hands of the smoker at the moment cravings arise. Mobile device-based treatment also enables experience sampling to query smokers behavior and experience in real time. Experience sampling minimizes recall bias, maximizes ecological validity, and documents change over time. The current analysis evaluated the feasibility of experience sampling in a randomized controlled trial of a smartphone app for mindfulness training for smoking cessation: Craving to Quit. The trial compared Craving to Quit to a control app that provided only experience sampling, in order to disentangle the effects of mindfulness from effective self-monitoring. By tracking smoking, craving and mood, experience sampling may increase mindfulness and decrease smoking. Participants were randomized to Craving to Quit with experience sampling (n=246) or experience sampling-only (n=263) apps. They were asked to check-in 6 times per day across the 22-day treatment, and were sent a text message reminder if they checked in less than 3 times per day. High engagement in experience sampling was achieved and did not differ between groups. Treatment starters checked-in on average 55.3 ± 48.5 times across the study (p=.74), on more than 60% of treatment days (mean=14±8 days, p=.94). The average number of check-ins per day was 3.6 ± 1.7 (p=.19). Other outcomes including changes in smoking, craving, mood and mindfulness evaluated from this experience sampling dataset will be discussed.

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CORRESPONDING AUTHOR: Kathleen Garrison, PhD, Yale University, CT, USA



SYM12

TIME-VARYING EFFECT MODELING TO SHED NEW LIGHT ON THE DEVELOPMENTAL COURSE OF NICOTINE PRODUCT USE IN THE US

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Time-varying effect modeling (TVEM) is a novel statistical technique that offers exceptional potential toward improving our understanding of the developmental course of nicotine product use. TVEM estimates regression coefficients as flexible, nonparametric functions of age. This session will begin with a five-minute conceptual introduction to TVEM, followed by three empirical papers that apply TVEM to three different US national datasets to elucidate the emergence and duration of nicotine product use and associated risks across the early life course. New findings may assist in the timing and targeting of future behavioral interventions. Paper 1 presents age-varying rates of alternative nicotine/product use, including e-cigarettes, snus, hookah, cigars/cigarillos, and combustible cigarettes, throughout adolescence. Trends are examined using data from the 2014 National Youth Tobacco Survey. This study presents intercept-only models of flexible, age-varying prevalence of each product by sex and race/ethnicity. Paper 2 builds on the first talk by incorporating adolescent exposure to family poverty as a covariate, with race/ethnicity as a moderator of the age-varying association between poverty and smoking. The study spans early adolescence through young adulthood (ages 12-32) and provides new findings on the emergence of racial/ethnic disparities in smoking. Paper 3 presents age-varying associations between depression and various smoking milestones (ever smoking, weekly smoking, daily smoking, nicotine dependence). Stronger associations were detected in younger compared to older adolescents for early smoking milestones, with a consistent, strong association across age for dependence. Each empirical talk will be in part didactic, including brief summaries of the data structure, models that were estimated, and sample SAS syntax. The symposium will conclude with a discussion that provides insight into the growing role of TVEM in nicotine and tobacco research, including its relevance to studying processes that unfold over different speeds ranging from moment-to-moment craving during a smoking quit attempt to long-term developmental behavior change.

JUSTIFICATION: The method presented in this symposium, time-varying effect modeling, holds great potential to inform the targeting and timing of behavioral interventions.

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SYM12A

AGE-VARYING RATES OF NICOTINE PRODUCT USE THROUGHOUT ADOLESCENCE

Jessica Braymiller*, Stephanie Lanza, The Pennsylvania State University, PA, USA

Adolescent use of alternative nicotine/tobacco products is an emergent public health concern. However, differences in rates of product use have rarely been studied as a continuous function of developmental age. In the present study, the authors use time-varying effect modeling (TVEM) to examine age-varying prevalence rates for past 30 day use of 5 nicotine products: combustible cigarettes, e-cigarettes, hookah, smokeless tobacco, and cigars/cigarillos/little cigars. Sex and race/ethnicity were examined as moderators of these age trends in product use. Analyses are based on the 2014 wave of the National Youth Tobacco Survey (NYTS), a public use dataset representative of U.S. middle and high school students. Past 30 day product use was assessed in adolescents ages 11-19+; the analytic sample of N=22,007 adolescents comprised 48% females and 45% non-Hispanic Whites. For males and females, the prevalence of e-cigarette use was significantly higher than all other products between ages 12-15. For females only, prevalence of smokeless tobacco was the lowest of all products between ages 13-18. E-cigarettes were also the most prevalent product used between ages 12-17 for White and 13-16 for Hispanic adolescents. Cigarettes were the second most prevalent product for white adolescents, and hookah for Hispanics. For Black adolescents, all nicotine product use remained low between ages 11-16. However

between ages 16-18, cigars/cigarillos/little cigars emerged as the most prevalent product (13%). Prevalence of nicotine product use today among U.S. adolescents varies by age, and age-trends for each product also differ by use by sex and race/ethnicity. Findings provide insight on early disparities in product use, and have the potential to inform targeted prevention and intervention efforts.

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SYM12B

LOW FAMILY SES AND SMOKING: AGE-VARYING ASSOCIATIONS FROM ADOLESCENCE TO YOUNG ADULTHOOD

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Adolescents' health is partly dependent on their families' socioeconomic status (SES). One way that low family SES may influence adolescents' health is through increased uptake of health-risking behaviors such as tobacco use. Evidence suggests that health behavior patterns established during adolescence can persist into adulthood, making low-income adolescents an important target for primary prevention efforts. In order to aid prevention efforts, more fine-grained information is needed on the ages at which low-income youth are at greater risk for smoking so that interventions can be most efficiently deployed. The current study uses time-varying effect modeling (TVEM), an innovative method that allows regression coefficients to vary as a complex function of age, to examine the age-varying association between poverty and youth smoking from ages 12-32 in the The National Longitudinal Study of Adolescent to Adult Health (Add Health; N = 11,240, N = 31,975 person-waves; 67% white, 20% black, 13% Latino). Because previous research found differences in the SES and adolescent smoking relationship by race/ethnicity, we tested race/ethnicity as a moderator of this age-varying association. Adolescents whose family received welfare support or whose total family income fell below the poverty line were considered low SES (32%). Results showed that the prevalence of recent (any past month) smoking started low at age 12 (5%), increased linearly to age 18 (35%) and remained steady to age 32. Low SES was associated with increased risk for recent smoking during early adolescence (ages 12.5-14.5), decreased risk in late adolescence (ages 18-20), and increased risk again in young adulthood (ages 24-30). Low SES was more strongly associated with recent smoking for White versus Hispanic youth from ages 13-30, and for White versus Black youth from ages 30-32. These results suggest that associations between low family SES and smoking wax and wane across development and appear strongest for White youth, and mark early adolescence and young adulthood as key periods for tobacco use intervention among low-income youth. Implications for theory, research, and prevention will be discussed.

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CORRESPONDING AUTHOR: Michael Russell, PhD, The Pennsylvania State University, PA, USA

SYM12C

AGE-VARYING RISK FOR INITIATION AND ESCALATION ACROSS MAJOR SMOKING MILESTONES DURING ADOLESCENCE

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Despite the highly replicated relationship between depression and smoking, little is known about this association across both time and individual smoking milestones. In the present study, we evaluate if major depression is associated with ever smoking, weekly smoking, daily smoking and/or nicotine dependence and whether these relationships vary across the critical period of adolescence. Analyses are based on data from The National Comorbidity Survey-Adolescent Supplement (NCS-A), a face-to-face survey conducted between 2001 and 2004 and the

only nationally representative study to allow an evaluation of four major smoking milestones. In the present study, we estimate: 1) the occurrence of nicotine dependence following the achievement of previous smoking milestones; and 2) the time varying association (TVEM) between each of these smoking milestones and the experience of major depression. Smoking initiation was found to be associated with depression early in adolescence with the strength of the association decreasing among older adolescents and becoming non-significant. Similar results were seen when examining the association between depression and the escalation to weekly and daily smoking, with the association remaining significant, though weaker among older adolescents. Nicotine dependence was strongly and consistently associated with depression across adolescence, suggesting no time-varying effects for those who will escalate to dependent use. Differences in the time-varying relationship between depression and each of the major smoking milestones suggest that while depression may be a common risk factor for smoking, its role in targeting intervention toward groups that are most vulnerable to the establishment of regular and dependent smoking patterns may differ based on the age of the cohort. These findings will be compared to time-varying associations between smoking and other common psychiatric disorders with the goal of understanding patterns of risk that are contingent on age and other key measures of time that define the developmental course of smoking (e.g. age of smoking initiation, time between smoking milestones, and age of first depressive episode.)

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SYM13

THE POTENTIAL OF ELECTRONIC CIGARETTES FOR REDUCING THE HARM OF TOBACCO IN PRIORITY POPULATIONS: PEOPLE, PLACES, POLICIES, PROMOTION AND PRACTICES

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Smoking rates are highest amongst the most vulnerable and disadvantaged groups in society including low socioeconomic status groups, those with mental health or substance use disorders, Indigenous people, and people who are unemployed and homeless. As a result, the burden of tobacco use is highest amongst the most disadvantaged - for example, the average life expectancy for people with serious mental illness is 25 years shorter than those without, primarily due to tobacco-related disease. Research has consistently shown high interest in quitting, and numerous quit attempts made by smokers in these priority populations, however, quit rates are low and sustaining abstinence challenging, even when provided with conventional smoking cessation support. There is a critical need for novel approaches in addressing the harm that tobacco causes in priority populations. Electronic cigarettes hold significant potential for meeting that need. E-cigarettes deliver nicotine in an inhalable form without the tobacco, thus limiting exposure to the toxins in combustible tobacco cigarettes. A recent extensive review of the scientific evidence on e-cigarettes concluded they are likely to be around 95% less harmful than tobacco cigarettes. The few trials available suggest e-cigarettes are just as effective at promoting cessation as other forms of nicotine replacement therapy. However, the science on e-cigarettes is still emerging. Unlike other parts of the world including the United States (US) and the United Kingdom (UK), where nicotine e-cigarettes are readily available to the public, in Australia and New Zealand access is highly restricted. This provides a unique context for the exploration of e-cigarettes for tobacco harm reduction and smoking cessation. The aim of this symposium is to communicate the latest Australian and New Zealand research about e-cigarettes for harm reduction and smoking cessation in priority populations. The presentation will report on the perceptions, use, and behaviours of smokers from priority populations as well as their health care providers. Priority populations will include low socioeconomic groups, people with mental illness, substance use disorders, and comorbidities including HIV. In addition, the symposium will include a discussion of the role of e-cigarettes in a country with a Smoke-free New Zealand endgame policy. The knowledge gained from this research is likely to influence the development of tobacco control policy for the optimal therapeutic use of e-cigarettes not only in Australia and New Zealand but globally.

JUSTIFICATION: Legislation for e-cigarettes varies across countries. While e-cigarettes are readily available in the US, parts of Europe and UK, they are restricted in Australia and New Zealand. No country has evidence-based policy regarding their therapeutic use. This research will inform the development of policies for their use in smoking cessation and tobacco harm reduction in priority groups.

FUNDING: National Health and Medical Research Council of Australia Health Research Council of New Zealand, National Cancer Institute of the United States, Canadian Institutes of Health Research, Cancer Research UK

CORRESPONDING AUTHOR: Billie Bonevski, BA(Hons), PhD, University of Newcastle, Australia

SYM13A

SOCIOECONOMIC DIFFERENCES IN USE OF VAPORIZED NICOTINE: FINDINGS FROM THE ITC FOUR COUNTRY SURVEYS

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SIGNIFICANCE: Vulnerable people come mainly from low socioeconomic (SES) populations and include a subset with additional problems. They have higher smoking prevalence. This paper compares low SES with other smokers in use of, experiences and beliefs about Personal Nicotine Vaporisers (PNV). **METHODS:** Data from the longitudinal International Tobacco Control (ITC) Four Country Survey of recent nicotine users in USA, and UK, where access is easy and Canada and Australia where access is limited, with approximately 1500 per country per wave, and approximately 70% inter-wave retention. Low SES was defined as low education and either low or unknown income, and was compared with all others. We conducted analyses comparing VNP use from 2013 and 2014 waves, and will also report on the 2016 wave and trends at the meeting. **RESULTS:** Low SES smokers were less likely to have tried PNVs in the UK (42% vs. 58% among the higher SES group, $p < .001$), but slightly more likely in the US (47% vs 43%, $p < .05$). There were no differences in percentages currently using PNVs by SES among those who had ever tried, with levels varying by country (from 54% in UK to 27% in Canada). Low SES current users may be more likely to use cigalikes, but not when restricted to daily users. Low SES users also tended to report lower satisfaction with VN products, but not when those using cigalikes were removed, or it was restricted to daily vapers. There was a common tendency over time among all regular PNV users to reduce puffing and move to lower strength liquids. Beliefs about the addictiveness and harmfulness of PNVs were also similar across SES, with significant minorities misunderstanding, or acknowledging lack of knowledge, particularly for perceived harmfulness with uncertainty greater in countries with low access to vaping. These data will be updated and trends reported for the latest survey wave (July-Sept 2016). **DISCUSSION:** There is little difference in vaping related behaviours and beliefs as a function of SES. Vaping has rapidly reached all sections of the community and there are no clearly identified SES-related barriers to adoption. Country differences in policies are far more important likely determinants of use.

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CORRESPONDING AUTHOR: Ron Borland, PhD, Cancer Council Victoria, Australia



SYM13B

USE OF ELECTRONIC CIGARETTES BY AUSTRALIAN SMOKERS IN SUBSTANCE ABUSE TREATMENT: REASONS FOR USE, AND PLACE OF PURCHASE

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SIGNIFICANCE: Smoking rates among people receiving treatment for substance use disorders has been reported to be as high as 75%-95%. Due in part to heavy nicotine dependence, these smokers have low cessation rates. The use of nicotine electronic cigarettes holds great potential to assist cessation in this group, however, is highly restricted in Australia. The aim of this study was to examine nicotine electronic cigarette awareness, use, and place of purchase amongst clients of substance use treatment centres, as well as reasons for use. **METHODS:** A telephone-administered cross-sectional survey of 427 clients from 32 substance use treatment centres in four states and territories of Australia (New South Wales, Queensland, South Australia and Australian Capital Territory) was conducted. Eligible clients were adults, receiving treatment at the centre for substance use disorder and current tobacco smokers. Participants were provided with a brief verbal description of electronic cigarettes and asked whether they had ever heard of e-cigarettes, whether they had ever used an e-cigarette, and if they do, whether it contained nicotine, and their reason for using e-cigarettes from a list of "Yes/No" options, and finally whether they currently use e-cigarettes. **RESULTS:** The sample was 58% male and mean age was 37 years. Respondents reported high rates of a number of forms of disadvantage including low income (80% on government benefit); homelessness (63%); and Indigenous status (13%). The primary substances for which they were receiving treatment included alcohol (67%); cannabis (43%); and opioids (42%). Poly-substance use was common. Most respondents (93%) reported awareness of electronic cigarettes, and 39% reported ever use. However, only 7% reported current use with 3% reporting it as daily use. Of those reporting to ever used e-cigarettes, 52% said they used e-cigarettes with nicotine and 16% said they were unsure whether it contained nicotine. The most common reasons for trying e-cigarettes were "wanted to just try them" (72%); "help cut down smoking" (70%); and "to help quit cigarettes" (68%). The most common place of e-cigarette purchase was the tobacco shop (22%). **DISCUSSION:** Smokers receiving substance use treatment are trialling e-cigarettes to help them quit smoking, but few continue with e-cigarette use. This may be due in part to the highly restricted context of e-cigarettes in Australia, and particularly within the treatment service setting. This appears to be an opportunity for tobacco treatment and harm reduction that is being missed.

FUNDING: National Health and Medical Research Council of Australia Project Grant (1045840). BB holds a National Health and Medical Research Council Career Development Award (1063206).

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SYM13C

"VAPING NOT ONLY SAVED MY LIFE, BUT FREED ME FROM A CAGE": A QUALITATIVE ANALYSIS OF SOCIAL MEDIA DISCUSSIONS ABOUT MOTIVATIONS FOR AND BARRIERS TO SMOKERS WITH MENTAL ILLNESS SWITCHING TO E-CIGARETTES

Ratika Sharma^{*1}, Britta Wigginton², Carla Meurk², Pauline Ford², Coral Gartner², ¹Queensland University, Australia, ²University of Queensland

SIGNIFICANCE: Online social media provides a platform for exchanging information about electronic cigarettes between peers. This study aims to gain an understanding of factors that motivate smokers with mental illness to switch to vaping and barriers to switching. We analysed discussions about e-cigarettes on the popular online bulletin board and social networking site Reddit in the context of having a mental illness. **METHODS:** Reddit was systematically searched for posts using keywords related to e-cigarettes and mental illness. We used thematic analysis to code the relevant posts into themes under the framework of motivators for and barriers to taking up vaping. **RESULTS:** A total of 3263 comments from 133 discussion threads and 1682 individual poster IDs were analysed. Around a quarter (24.6%, n=413) of posters self-identified as living with a mental illness, including schizophrenia (2.9%, n=49), depression (47.7%, n=802) and anxiety (54.5%, n=917); 367 (21.8%) reported having multiple diagnoses. Twelve posters (0.7%) identified

as being mental health practitioners and 30 (1.8%) were a friend or relative of a person with mental illness. Three themes emerged as the motivators for people with mental illness to take up vaping: 1) Coping with mental illness/self-medication; 2) Quitting smoking and harm reduction; 3) Positive views of caregivers and health practitioners toward vaping. The barriers to taking up vaping included: 1) Not a good enough substitute for cigarettes/psychiatric medicines; 2) Perceived risks of vaping; 3) Concerns about nicotine addiction; 4) Practical difficulties. **DISCUSSION:** The discussions revealed that smokers with mental illness are interested in vaping for a number of reasons, but various barriers can prevent them from switching from smoking to vaping. These findings have implications for policy and practice concerning assisting smokers with mental illness to reduce their health risk.

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SYM13D

HEALTH PRACTITIONERS' ATTITUDES TOWARD TOBACCO HARM REDUCTION APPROACHES FOR SMOKERS FROM PRIORITY POPULATIONS WITH CO-MORBIDITIES

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SIGNIFICANCE: Priority populations with co-morbidities (e.g. severe mental illness [SMI] and HIV) have high smoking rates. These populations may benefit from harm reduction approaches, such as switching to non-smoked nicotine products. Health practitioners have a potentially important role in helping these smokers reduce their risk of tobacco-related disease. **METHODS:** An invitation to complete a cross-sectional online survey was distributed to Australian health practitioners who provide healthcare to people living with SMI or HIV, through government and non-government organisations and professional bodies. **RESULTS:** Of the 446 health practitioners who completed the survey, 89% agreed that harm reduction (non-abstinence) approaches could benefit smokers with SMI or HIV who are unable or unwilling to quit; 75% disagreed that abstinence should be the only goal discussed; 74% agreed that cutting down can substantially reduce health risk; 59% reported advising their patients with SMI or HIV who are unable or unwilling to quit smoking to reduce their smoking 'always' or 'most of the time'. Fewer agreed that switching completely to nicotine replacement therapy (NRT) (69%) or vaping (35%) as a long-term substitute can substantially reduce the risk of smoking-related diseases. 44% and 55% of respondents were uncertain ("don't know"/"neither agree nor disagree") whether switching from smoking to vaping would reduce health risk, or if vaping was too harmful to recommend to smokers who are unable to quit, respectively. **DISCUSSION:** While there was widespread support for harm reduction approaches to reduce smoking harms among these priority populations, more respondents endorsed cutting down as a harm reduction approach rather than completely switching from cigarettes to NRT or vaping. There was substantial uncertainty about the safety and efficacy of vaping. Health practitioners need robust evidence-based information about harm reduction options to best help their patients.

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SYM13E

WHAT ROLE DO E-CIGARETTES HAVE IN A COUNTRY WITH A SMOKEFREE GOAL?

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SIGNIFICANCE: Despite New Zealand having a smokefree 2025 goal, the downward trajectory in smoking prevalence has slowed over recent years, and there remain marked inequalities in smoking prevalence in some population subgroups: indigenous Maori, people of low socioeconomic position, those with alcohol and other drug problems and people with poor mental health with prevalence (40-45%) more than double that overall (17%). These priority populations should be targeted by tobacco control policies and interventions that could include making nicotine e-cigarettes more widely available, so that 'no smoker is left behind'. We outline the policy environment on e-cigarettes in New Zealand, and present findings from New Zealand research on the effect of e-cigarettes in smokers with mental health conditions, and use in addiction treatment facilities in New Zealand. **METHODS:** Policy overview; sub-group analysis of Maori and of people with mental health conditions in a large randomised controlled trial of e-cigarettes; and a study of the impact on patients and staff of the introduction of e-cigarettes in an addiction treatment facility. We also outline two large new randomised trials involving e-cigarettes, including one (target n=750) among people with co-existing mental health and drug and alcohol conditions. **RESULTS:** People with mental health conditions who were randomised to e-cigarettes were just as likely to succeed in quitting as those without. Maori smokers randomised to e-cigarettes were also as likely to quit as others in the trial who used e-cigarettes. E-cigarettes were highly acceptable to staff and patients in the addiction treatment facility. **DISCUSSION:** E-cigarettes have high acceptability and equivalent effectiveness for smokers in priority populations and may therefore play an important role, alongside other tobacco control strategies, in achieving New Zealand's smokefree 2025 goal.

FUNDING: Health Research Council of New Zealand

CORRESPONDING AUTHOR: Chris Bullen, MBChB, PhD, University of Auckland, New Zealand

SYM14

NATURAL, ORGANIC, ADDITIVE-FREE, AND ECO-FRIENDLY THEMES IN CIGARETTE PACKAGING AND ADVERTISING: THE NEW "LIGHT," "LOW," AND "MILD"?

Jennifer Pearson, MPH, PhD, Schroeder Institute for Tobacco Research and Policy Studies at Truth Initiative, DC, USA; Meghan Moran, PhD, Johns Hopkins Bloomberg School of Public Health, USA; M. Jane Lewis, DrPH, Rutgers School of Public Health, NJ, USA; RD Kennedy, PhD, Johns Hopkins Bloomberg School of Public Health, MD, USA

Research has established that descriptors such as "light," "low," and "mild," as well as pack colors and shape, inappropriately communicate reduced harm messages to consumers. These descriptors and design elements have been removed in many jurisdictions; however, brands with "natural," "organic" and "additive-free" descriptors and eco-friendly positioning have become more popular recently. This symposium will bring together researchers in public health, communication, psychology, and marketing who are actively investigating the use of natural, organic, and eco-friendly appeals in cigarette packaging and advertising. The chair, Dr. Hammond, will give an introduction on the history and current state of research in this area. Following this overview, Dr. Pearson will present data from the U.S. Population Assessment of Tobacco and Health (PATH) Study, showing that majority of U.S. Natural American Spirit (NAS) smokers (a prominent global brand using "natural" and "organic" appeals) inaccurately believe their cigarettes are harm reducing and describing the brand's consumer base. Next, Drs. Moran and Lewis each provide in-depth analyses of marketing tactics used by NAS. Dr. Moran will present data describing the lexical and iconic symbols used in NAS ads to position the brand as eco-friendly and harm reducing. Dr. Lewis will present data on NAS's direct mail campaign, and how the brand uses eco-friendly gifts and themes to create a relationship with the consumer, build brand loyalty, and add value. Finally, Dr. Kennedy will provide a global perspective with data on the prevalence and content of natural and organic themes on cigarette packs collected from 14 low- and middle- income countries with high tobacco burdens. The discussant, Robin Koval, is current CEO of Truth Initiative and former CEO of a large New York advertising agency. Ms. Koval will apply a professional marketer's perspective to explain how companies position their brands as "safer" without explicitly claiming reduced harm. Together, the presenters provide interdisciplinary perspectives on the use

of natural, organic, additive-free, and eco-friendly themes in cigarette packaging and advertising.

JUSTIFICATION: This symposium will draw links between "natural," "organic," "additive-free" descriptors and eco-friendly themes with smokers' misperceptions of reduced harm for brands with these characteristics.

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SYM14A

MISPERCEPTIONS OF HARM AMONG AMERICAN SPIRIT SMOKERS: RESULTS FROM WAVE 1 OF THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH) STUDY (2013-2014)

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SIGNIFICANCE: Natural American Spirit (NAS), produced by Santa Fe Natural Tobacco Company (SFNTC; owned by Reynolds American Incorporated), sells cigarettes and roll your own tobacco with packaging that features the descriptors "natural," "organic," and "additive-free." Prior research has shown that consumers believe cigarette packages with these and similar descriptors are significantly more appealing, healthier, or less harmful than packages without these descriptors. This study compared differences in cigarette harm perceptions among smokers of the Natural American Spirit brand (NAS) and smokers of other cigarette brands, and examined correlates of NAS use. **METHODS:** Data were drawn from Wave 1 of the Population Assessment of Tobacco and Health (PATH) Study, a nationally representative study of U.S. adults (2013-2014). Weighted analyses using a sub-set of current adult smokers (n=10,565) estimated the prevalence of NAS use (vs. all other brands) and examined associations between NAS use and sociodemographics (including sexual orientation), tobacco/substance use, tobacco harm perceptions, quit intentions, quit attempts, and mental/behavioral health. **RESULTS:** Overall, 2.3% of adult smokers or 920,000 people in the U.S. reported NAS as their usual brand. Nearly 64% of NAS smokers inaccurately believed that their brand is less harmful than other brands compared to 8% of smokers of other brands, even after controlling for potential confounders such as age, education, alcohol, and marijuana use (aOR = 22.82). Younger age (18-34 vs. 35+; aOR 1.54), more frequent thinking about tobacco harms (aOR 1.84), past 30-day alcohol use (aOR 1.57), past 30-day marijuana use (aOR 1.87), and sexual orientation (non-straight vs. straight; aOR 2.07) were also associated with increased odds of smoking NAS. **CONCLUSIONS:** The majority of NAS smokers inaccurately believe their cigarettes are less harmful than other brands. Given the brand's rapid growth and its more common use in vulnerable groups (e.g. young adults, non-straight), corrective messaging and enforcement action are necessary to correct harm misperceptions of NAS cigarettes.

FUNDING: This research was support by Truth Initiative.

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SYM14B

THE USE OF IMAGERY AND TEXT THAT COULD CONVEY REDUCED HARM IN AMERICAN SPIRIT ADVERTISEMENTS

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BACKGROUND: In 2015, the U.S. Food & Drug Administration issued warning letters to three tobacco companies regarding use of the terms "natural" and/or "additive-free" to describe their products, as these terms inaccurately convey reduced harm. Santa Fe Natural Tobacco Company, Inc., maker of American Spirit cigarettes, was the largest of these companies. However, tobacco advertising is a complex system of both lexical and iconic symbols and tobacco companies may engage in myriad techniques to convey reduced harm. Thus, it is critical to monitor these techniques to inform research and regulatory action. **METHODS:** Trained coders ($k > 8$) coded 142 American Spirit ads downloaded from the Trinkets & Trash archive (trinketsandtrash.org) for a variety of lexical and iconic features. **RESULTS:** Many ads used the terms natural (72.5%) or additive-free (70.4%); fewer used the terms organic (27.5%), tobacco and water (19.0%), whole leaf (16.9%) or fresh (2.8%). Ads referenced eco-friendly business practices (39.4%), farms or farmers (23.2%), US grown tobacco (14.8%) or local/small farms or businesses (2.8%). Many ads featured images of plants (55.6%), farms/farmers (23.2%), water (22.5%), wildlife (3.5%), and seeds (3.5%). **CONCLUSIONS:** American Spirit ads use a wide range of techniques that convey a natural product image and could inaccurately convey reduced harm to consumers. The inventory of techniques identified in this study can be used to guide studies that test the effects of these techniques, and to inform more comprehensive regulatory action.

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CORRESPONDING AUTHOR: Meghan Moran, PhD, Johns Hopkins Bloomberg School of Public Health, USA

SYM14C

AMERICAN SPIRIT DIRECT MAIL: BUILDING RELATIONSHIPS WITH CONSUMERS AND REINFORCING BRAND POSITIONING

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SIGNIFICANCE: Direct mail (DM) from the tobacco industry to names on its customer database provides a direct connection with consumers and a powerful tool for building customer relationships and communicating and reinforcing brand identity. This study examined DM from American Spirit (AS), a premium brand of cigarette currently growing in U.S. and global market share that uses claims of being "natural," additive-free, and "organic" along with eco-friendly imagery and text reinforcing these concepts. **METHODS:** A quantitative content analysis of over 100 pieces of AS DM in the Trinkets and Trash archive from 1995 – 2016 identified the use of misleading claims and strategies designed to reinforce brand positioning, increase brand loyalty, add value to the brand, and build a relationship with NAS smokers. **RESULTS:** AS DM contained colorful eco-friendly concepts, terms and imagery (e.g., flowers, agriculture, wildlife). Misleading claims were common, including using the term "natural" as a descriptor separate from the brand name (50%), "additive free" (55%), and "organic" (42%). Nearly all DM (94%) personalized text by using a personal reference (e.g., "you" or "your") and 22% were birthday/ holiday greetings, including several for Earth Day. 17% delivered eco-friendly gifts (e.g., flower seeds) and almost 40 % noted the DM was printed on recycled paper. 35% mentioned the brand's support for or contributions to environmental/farming causes. Over 40% carried price-reducing coupons and 10% included offers for coupons or free tobacco products, strategies that, along with gifts, add value to the brand. Recipients of DM were referred to other sources of marketing, including the brand's website (45%), and phone number and email address (70%). **CONCLUSIONS:** AS DM utilizes established marketing strategies to build bonds between customers and the brand and encourage continued use. AS consistently reinforces its brand positioning as environmental friendly utilizes images and terms suggesting corporate responsibility and reduced harm.

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SYM14D

THE USE OF NATURAL, ORGANIC, AND NATURE APPEALS ON TOBACCO PACKS IN 14 LOW AND MIDDLE INCOME COUNTRIES

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SIGNIFICANCE: Article 11 of the Framework Convention on Tobacco Control requires countries that have ratified the convention to ban misleading descriptors such as 'light' or 'mild' on tobacco product packaging. It is critical to monitor and describe the battery of alternate tactics tobacco companies use to convey reduced harm through text and images on cigarette packs. In the US marketplace, RJ Reynolds has positioned its American Spirit brand as 'natural', 'organic' or 'additive-free'. There is emerging evidence that these types of appeals explicitly or implicitly communicate reduced harm. There is little understanding about the prevalence of natural or organic imagery and text references on tobacco packs in countries outside the US. **METHODS:** The Tobacco Pack Surveillance System (TPackSS) project systemically collects tobacco packs available in 14 low- and middle-income countries with high tobacco use: Bangladesh, Brazil, China, Egypt, India, Indonesia, Mexico, Pakistan, Philippines, Russia, Thailand, Turkey, Ukraine and Viet Nam. In 2013, TPackSS collected 3240 unique packs; packs were coded for key design features and appeals. The present study reports the proportion of packs that included lexical or visual design elements that connote 'natural or organic' or 'nature', including plants or nature scenes. **RESULTS:** Lexical appeals included the terms 'organic' or 'natural' and were identified in 10 of the 14 countries on approximately 2% of packs ($n=62$). Imagery from nature included trees and other plants (other than tobacco), present on 8% of packs ($n=257$) and landscape scenery including clouds, rivers and mountains on 6% of packs ($n=182$). **CONCLUSIONS:** Imagery and lexical appeals that connote organic/natural, or nature, are being used in many low- and middle-income countries included in the TPackSS project. It will be important to further understand how these appeals are interpreted by tobacco users particularly with respect to absolute and relative harm of tobacco products within and across brands and products.

FUNDING: This work was supported with funds from the Bloomberg Initiative to Reduce Tobacco Use.

CORRESPONDING AUTHOR: RD Kennedy, PhD, Johns Hopkins Bloomberg School of Public Health, MD, USA

SYM15

E-CIGARETTE USE AMONG YOUTH AND YOUNG ADULTS: FINDINGS FROM THE U.S. SURGEON GENERAL'S REPORT

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The first U.S. Surgeon General's report on the health consequences of cigarette smoking was published in 1964; of the subsequent reports, those published in 1994 and 2012 focused solely on youth and young adults. Most recently, the 2012 report documented evidence regarding what works to prevent tobacco use among youth and young adults. However, that report was prepared before the recent rise in electronic cigarette (e-cigarette) use among this population. It is crucial that the progress made in reducing cigarette smoking among youth and young adults not be compromised by the initiation and use of e-cigarettes. Therefore, the U.S. Surgeon General commissioned a report to review and document the scientific literature on e-cigarettes specific to youth and young adults. This symposium provides an overview of the recently released report, which summarizes the history, epidemiology, and health effects of e-cigarette use among youth and young adults; the companies involved with marketing and promoting these products; and existing and proposed public health policies to reduce the use of these products by youth and young adults. The report also issues a call to action from the Surgeon General to accelerate these efforts. Prior Surgeon General's Report findings (1994 and 2012) underscore what we know works to effectively prevent tobacco use among young people. Now we must apply these strategies to e-cigarettes to protect our nation's young people from harm. To achieve success, we must work together,

aligning and coordinating efforts across a wide range of stakeholders: individuals and families; public health professionals and clinicians; federal, state, local, and tribal governments; public health agencies; and researchers. The report also notes that gaps in scientific evidence still exist, and this Call to Action is being issued while these products and their patterns of use are changing quickly.

JUSTIFICATION: The findings from this landmark report can be used to inform efforts at the national, state, and local levels to inform public health policy, planning, and practice related to e-cigarette use among youth and young adults.

FUNDING: U.S. Government

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SYM15A

FINDINGS FROM THE SURGEON GENERAL'S REPORT ON E-CIGARETTE USE AMONG YOUTH AND YOUNG ADULTS: HISTORICAL BACKGROUND AND PATTERNS OF USE

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Chapter 1 ("Introduction, Conclusions, and Historical Background Relative to E-cigarettes") presents an overview of how the report was prepared, then provides a summary of the report's major conclusions, which will be presented here. The chapter grounds development of the e-cigarette device, historically, by reviewing prior examples of "reduced-harm" products and associated health claims, and the impact of these products on the public's health. It also summarizes justification for federal regulation of e-cigarettes in the United States and regulatory options the US Food and Drug Administration (FDA) has now, given the "deeming rule." Chapter 2 ("Patterns of E-Cigarette Use Among US Youth and Young Adults") presents the epidemiology of e-cigarette use among young people, relying primarily on data from the most recent nationally representative studies available when the report was prepared. E-cigarette use has risen considerably among youth (12-17 years old) since 2011 and is now the most commonly used tobacco product in this age group, surpassing conventional cigarette use in 2014. The prevalence of current, or past 30-day, use of e-cigarettes is similar among high school students and young adults 18-24 years of age (13.4%-16.0%) and exceeds that for middle school students and adults 25 years of age or older (3.9%-5.7%). The use of e-cigarettes flavored to taste like something other than tobacco (e.g., menthol/mint, candy, fruit, sweets) is quite common. Among youth and young adults, e-cigarette use is strongly associated with other tobacco product use, especially combustible ones. Five longitudinal studies reviewed in the report show e-cigarette use is related to the onset of combustible tobacco product use, including cigarette smoking. The most commonly cited reasons youth and young adults report using e-cigarettes include curiosity; flavorings/taste; use as a less harmful/less toxic alternative; and avoidance of indoor smoking restrictions and disturbing people with secondhand smoke from conventional cigarettes. Using e-cigarettes to help in quitting or reducing conventional cigarette smoking is not a primary motivator among youth or young adults.

FUNDING: U.S. Government.

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SYM15B

FINDINGS FROM THE SURGEON GENERAL'S REPORT ON E-CIGARETTE USE AMONG YOUTH AND YOUNG ADULTS: HEALTH EFFECTS

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Chapter 3 ("Health Effects of E-Cigarette Use Among U.S. Youth and Young Adults") focuses on the short-term and potential long-term health effects related to the incidence and continued use of e-cigarettes by youth and young adults. The sharp increase in the prevalence of e-cigarette use among youth highlights the compelling need to learn more about this evolving class of products. Chapter 3 summarizes the known evidence and concludes that while the health effects and

potentially harmful doses of heated and aerosolized constituents of e-cigarette liquids, including solvents, flavorants, and toxicants, are not completely understood, there is evidence of immediate, and potential long term health consequences, of e-cigarette use. Animal and human studies point to an age-dependent susceptibility to nicotine as a neurobiological insult. E-cigarette use can result in equivalent or higher blood levels of nicotine as cigarettes, and nicotine exposure can cause addiction and can harm the developing brain. Nicotine can cross the placenta and has known effects on fetal and postnatal development; therefore, nicotine delivered by e-cigarettes during pregnancy can result in multiple adverse consequences. E-cigarettes can expose users to chemicals known to have adverse health effects, including nicotine, carbonyl compounds, and volatile organic compounds. Ingestion of e-cigarette liquids containing nicotine can cause acute toxicity and possibly death if the contents of refill cartridges or bottles containing nicotine are consumed. Under certain conditions, e-cigarette batteries can become volatile, and explosions causing facial and bodily injury have been reported. Epidemiological risk analysis is challenging, owing to the diversity of e-cigarette devices, varying levels of nicotine in e-cigarette liquids, varying manufacturing standards, and varying user e-cigarette smoking topography. However, sufficient evidence currently exists, particularly with nicotine exposure or ingestion, to warrant accelerated research and public warnings.

FUNDING: U.S. Government

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SYM15C

FINDINGS FROM THE SURGEON GENERAL'S REPORT ON E-CIGARETTE USE AMONG YOUTH AND YOUNG ADULTS: ACTIVITIES OF THE E-CIGARETTE COMPANIES

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Chapter 4 ("Activities of the E-Cigarette Companies") describes e-cigarette companies' influences on e-cigarette use and considers manufacturing and price, the impact of price on sales and use, the rapid changes in the industry, and the marketing and promotion of e-cigarettes. The e-cigarette market has grown and changed rapidly in the past decade, with notable increases in total sales of e-cigarette products, types of products, consolidation of companies, marketing expenses, and sales channels. The e-cigarette marketplace is complicated by the differences in brands that are owned by tobacco companies versus independent brands; still, e-cigarette companies continue to evolve and influence the manufacturing, price, marketing and promotion, and distribution of e-cigarette products and accessories. Consolidation of e-cigarette companies has been rapid, with the first major merger taking place in 2012. Data show that since they were first introduced into the US market, prices for disposable and rechargeable e-cigarettes have declined; and, as prices decline, sales have sharply increased. Many of the marketing techniques and themes used to promote e-cigarettes are similar to those used for conventional cigarettes. Awareness by youth and young adults of this marketing, and their levels of exposure to it, is high. Further, tracking marketing expenditures and product sales is difficult because of the rapidly changing venues, including "vape shops"; use of social media and online advertising; and lack of regulation. The dynamic e-cigarette market will require close attention, particularly research investigating the influence of marketing on youth and young adult e-cigarette use behaviors, and given recently established regulations for these products.

FUNDING: U.S. Government

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SYM15D

FINDINGS FROM THE SURGEON GENERAL'S REPORT ON E-CIGARETTE USE AMONG YOUTH AND YOUNG ADULTS: E-CIGARETTE POLICY AND PRACTICE IMPLICATIONS

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Chapter 5 ("E-cigarette Policy and Practice Implications") explores the policy landscape of e-cigarettes and sets forth recommendations that should protect the public's health, particularly as these policies relate to the short- and long-term health of youth and young adults. In doing so, the chapter underscores the importance of adopting public health strategies that are precautionary to protect youth and young adults from adverse effects related to e-cigarettes. This report calls attention to the rising use of e-cigarettes among youth and young adults, and the need to immediately implement a comprehensive strategy to minimize any negative public health impact now and in the future. The chapter concludes that the dynamic nature of the e-cigarette landscape calls for expansion and enhancement of tobacco-related surveillance, and that strategic, comprehensive research is critical to identify and characterize the potential health risks for e-cigarette use, particularly among youth and young adults. Additionally, a broad program of behavioral, communications, and educational research is crucial to assess how youth perceive e-cigarettes and associated marketing messages, and to determine what kinds of tobacco control communication strategies are most effective. The chapter also notes that health professionals represent an important channel for education about e-cigarettes among youth and young adults. In formulating public policies related to e-cigarettes, the context and possibilities vary across the national, state, local, and tribal governments and public entities. Diverse actions, modeled after evidence-based tobacco control strategies, can be taken at the state and local levels to address e-cigarette use among youth and young adults, including incorporating e-cigarettes into smoke-free policies; preventing youth access to e-cigarettes; retail licensure; regulation of e-cigarette marketing that is oriented toward youth and young adults, to the extent feasible under the law; and educational initiatives targeting youth and young adults.

FUNDING: U.S. Government

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SYM16

CYTISINE UPDATE: MOVING RESEARCH FORWARD TOWARD A GLOBALLY AFFORDABLE TOBACCO CESSATION MEDICATION

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The availability worldwide of an affordable, effective, and safe tobacco cessation pharmacotherapy could reduce the enormous global toll of tobacco use, especially in low and middle-income countries where an increasing proportion of tobacco users live and pharmacotherapy is rarely affordable. Cytisine is a natural plant-based product that could potentially fill this gap. A selective partial nicotinic acetylcholine receptor agonist with activity similar to varenicline, cytisine has been sold as an inexpensive smoking cessation product in Eastern Europe for decades. Cytisine is not marketed outside that region despite the availability of recent high-quality randomized clinical trials demonstrating its efficacy and tolerability as a smoking cessation aid. Regulatory and financial barriers have hindered cytisine's path to wider market availability. Current research is underway to provide new information on cytisine's safety, optimal dosing, and effectiveness in various populations. This symposium will update attendees on pre-clinical, clinical, and regulatory science research underway around the world, address future research needs, and discuss the policy challenges to making cytisine available worldwide. It is sponsored by a Cytisine Working Group of SRNT members. On behalf of the group, Dr. Rigotti will introduce the symposium, review the unusual history of cytisine, and summarize existing clinical research data. Starting with pre-clinical data, Dr. Shurtleff of NIH will summarize regulatory science research funded by the U.S. National Center for Complementary and Integrative Health to support regulatory approval. Dr. Jeong will report on new pharmacologic studies of cytisine to help inform dosing options.

Three speakers (Drs. Siddiqi, Courtney, and Walker) who are currently conducting randomized clinical trials of cytisine in South Asia, Australia, and New Zealand, respectively, will outline their study designs and progress to date. Dr. Walker will identify challenges to the wider availability of cytisine and present recommendations for surmounting these barriers. Drs. McRobbie will discuss future research needs and strategies to move the agenda forward.

JUSTIFICATION: The availability of affordable, effective, and safe pharmacotherapy for tobacco dependence could help reduce the enormous global toll of tobacco. Cytisine potentially fits this bill but is not yet marketed outside Eastern Europe. This symposium will update SRNT on pre-clinical and clinical research ongoing and address policy aspects.

FUNDING: No funding

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SYM16A

MEASURING PLASMA CYTISINE CONCENTRATIONS, CIGARETTE CRAVING, WITHDRAWAL, SMOKING SATISFACTION AND MOOD TO INVESTIGATE THE CONCENTRATION-EFFECT RELATIONSHIP IN SMOKERS

SooHee Jeong*, David Newcombe, Janie Sheridan, Malcolm Tingle, University of Auckland, New Zealand

BACKGROUND: This study measured plasma cytisine concentrations and the effects of cytisine on cigarette craving, withdrawal, smoking satisfaction and mood in smokers taking Tabex(r) (a commercial form of cytisine). Investigating the concentration-effect relationship of cytisine could improve the understanding of how cytisine works as a smoking cessation agent and shed light on whether there is an optimal or threshold concentration required to produce a desired response in smokers. METHODS: Ten smokers were instructed to follow the 25-day standard Tabex(r) dosing regimen. Blood was collected at 0, 2, 4, 8 and 10 hours on day 1 then on subsequent visits (days 2, 3, 4, 6, 13, 14, 17, 18, 21, 22, 25 and 26) to measure plasma cytisine concentrations. The brief Questionnaire on Smoking Urges, Mood and Physical Symptoms Scale, modified Cigarette Evaluation Questionnaire and Profile of Mood States were administered concurrently with blood collection to measure cigarette craving, withdrawal, smoking satisfaction and mood respectively. RESULTS: There were no significant changes to the severity of withdrawal symptoms and total mood disturbance. For participants who did not quit smoking, there was a reduction in smoking satisfaction. Mean craving scores declined over time and had significantly decreased from baseline at the end of the study. On day 1, when accumulation of cytisine was observed, mean plasma cytisine concentration was highly correlated to the mean changes in the craving scores. However there appeared to be no relationship between plasma cytisine concentrations and mean cigarette craving for the rest of the treatment duration. CONCLUSIONS: Cytisine may be effective in reducing cigarette craving but no simple relationship between plasma cytisine concentration was found during the 25-day cytisine therapy.

FUNDING: Faculty of Medical and Health Sciences Faculty Research Development Fund, Auckland University and the Auckland Medical Research Foundation

CORRESPONDING AUTHOR: SooHee Jeong, PhD, University of Auckland, New Zealand

SYM16B

CYTISINE FOR SMOKING CESSATION IN TB PATIENTS: A MULTI-COUNTRY RANDOMIZED CONTROLLED TRIAL IN SOUTH ASIA

Kamran Siddiqi*, Omara Dogar, University of York, United Kingdom

Tobacco smoking leads to adverse consequences in TB patients. The World Health Organization agrees that smoking cessation should be offered as part of the TB treatment. However, such support is generally not available within routine TB care even in countries with high TB incidence and high tobacco use. A potential barrier in making progress in this area is the lack of cheap and effective treatment options. Our aim is to assess the effectiveness and cost-effectiveness of cytisine when added to behavioural support compared to behavioural support alone on smoking cessation in TB patients who smoke on a daily basis. We are conducting a double-blind, randomized, placebo-controlled trial in Bangladesh, Nepal and Pakistan.

Participants will be recruited from health centers that offer TB treatment. Our aim is to recruit 2,388 adults that are diagnosed with pulmonary TB and currently smokes tobacco. Trial participants will be randomised to receive either cytosine or placebo. Everyone will get behavioural support. The primary outcome is self-reported continuous abstinence from the quit date for six months, biochemically verified by a carbon monoxide breath test and cotinine dip-stick test, if using smokeless tobacco as well. Patients will be followed up to 12 months. We will also assess the effect of the intervention on clinical TB outcomes; including those routinely collected by the TB programmes as well as those based on an eight-point clinical score, sputum conversion rates and chest X-ray grading. We will also assess cost per additional quitter and cost per Quality Adjusted Life Year, which estimates the value for money afforded by adding cytosine to behavioural support. Furthermore, an ancillary study embedded in implementation science, will examine the potential for scaling up and sustaining smoking cessation within TB programmes. The trial is likely to report in the spring of 2019 at the earliest. However, we will provide update on the progress of the trial at the symposium including recruitment figures and any teething problems. Moreover, we will discuss some of the challenges faced in conducting such trials that are unique to low-income settings in south Asia.

FUNDING: European Commission, H2020-HCO-2015 Funding scheme; Grant number 680995

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SYM16C

CYTISINE VERSUS VARENICLINE FOR SMOKING CESSATION: TWO CLINICAL TRIALS FROM THE AUSTRALASIAN CYTISINE TRIALIST GROUP

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BACKGROUND: Cytisine is a well-tolerated smoking cessation treatment that is superior to placebo and NRT. Like varenicline, cytosine is a nicotinic acetylcholine receptor partial agonist, yet has never been formally compared against varenicline. Cytisine has the lowest cost per quality-adjusted-life-year of all smoking cessation medications, and modelling suggests cytosine may be more cost-effective than varenicline. A head-to-head comparison between cytosine and varenicline is justified. METHOD/DESIGN: Two trials are underway in Australasia (one in Australia and one in New Zealand) comparing cytosine to varenicline for smoking cessation. Trial one is a single-blind, pragmatic, non-inferiority trial (N=1242) comparing abstinence rates in smokers randomly allocated to cytosine (25-day treatment) or varenicline (12-week treatment), and behavioural support. Trial two (N=2140) utilizes a pragmatic single-blind, non-inferiority design, with indigenous New Zealand Māori randomised to a 12-week course of cytosine or a 12-week course of varenicline, plus behavioural support. Both trials have the same primary outcome of biochemically-verified 6-month continuous abstinence. Secondary outcomes are also similar and include cost-effectiveness analysis. Individual patient data meta-analyses are planned. The development and implementation of these trials will be discussed. CONCLUSION: The findings from these trials are vital for informing policy makers around the world, given the opportunity for significant health-care system savings, particularly for low- and middle-income countries where the majority of cessation medications are cost-prohibitive.

FUNDING: The trials discussed are funded by 1) a Project Grant (APP1108318) from the Australian National Health and Medical Research Council (NHMRC) and 2) The Health Research Council of New Zealand (16/076). RJC is supported by a Cancer Institute New South Wales Early Career Research Fellowship (GNT14/ECF/1-46). The National Drug and Alcohol Research Centre at the University of New South Wales is supported by funding from the Australian Government under the Substance Misuse Prevention and Service Improvements Grants Fund.

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SYM16D

THE REGULATORY SCIENCE OF CYTISINE: RESULTS FROM PRE-CLINICAL GLP-REGULATED SAFETY ASSESSMENT

David Shurtleff¹*, Craig Hopp¹, Hanna Ng², Gary Wolfe³, ¹National Center for Complementary and Integrative Health, National Institutes of Health, MD, USA, ²SRI International, ³Gary Wolfe Toxicology, LLC

Cytisine is an alkaloid partial nicotinic acetylcholine receptor agonist that is structurally similar to nicotine. It is a natural product found in the leaves of the *Cytisus laburnum* plant. It has been marketed in tablet form as an inexpensive smoking cessation aid in Eastern Europe under the trade name Tabex since 1964. Because of its potential benefit and relatively low cost compared to other smoking cessation medications (e.g., varenicline), there is interest in making cytosine available to smokers in many countries around the world. Before cytosine can be marketed in the United States (U.S.), however, there are drug regulatory requirements and compliance that must be met. The U.S. Food and Drug Administration (FDA) considers cytosine to be a new drug molecular entity, which requires the full range of good laboratory practice (GLP) safety and toxicity studies before an Investigational New Drug Application (IND) can be filed. These studies include repeat oral dose toxicity and toxicokinetic studies in two species, battery of genotoxicity, and safety pharmacology and pharmacodynamics (PD) studies. With support and oversight from the National Institutes of Health (NIH), National Center for Complementary and Integrative Health (NCCIH), the following full range of GLP-regulated preclinical IND-enabling studies are being conducted: pharmacokinetics in rats and dogs; 28-day toxicity study in rat; 28-day toxicity study in dog; cardiovascular safety pharmacology study in dog; pulmonary safety pharmacology study in rat; hERG study; bacterial mutagenicity (Ames assay), in vitro mammalian chromosomal aberration assay, and in vivo micronucleus study in rat. A summary of these pre-IND safety data will be presented. The collection and reporting of these data is a critical first step toward filing an IND and subsequent New Drug Application (NDA). The data gathered for the IND and the subsequent human clinical trials become part of the NDA submission to the FDA. In addition to the presentation of the preclinical IND-enabling data, an overview of future studies and the strategies for the further development of cytosine as an approved smoking cessation aid in the U.S. will be presented.

FUNDING: Studies were supported under an NIH research and development contract with funds from National Center for Complementary and Integrative Health (NCCIH), National Institutes of Health

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SYM16E

THE CHALLENGE TO GETTING CYTISINE LICENSED FOR USE WORLD-WIDE: POLICY CONSIDERATIONS

Natalie Walker^{*}, University of Auckland, New Zealand

Cytisine is a partial agonist at nicotinic acetylcholine receptors that aids cessation by reducing the severity of withdrawal and the satisfaction associated with tobacco use. Four systematic reviews (five trials, undertaken in central/eastern Europe, n = 3250) found cytosine to be superior to placebo for short- and long-term abstinence from smoking. A New Zealand non-inferiority trial (n = 1310) found that cytosine was more effective than combination nicotine replacement therapy (NRT) at increasing 6-month quit rates. Cytisine is well tolerated when taken according to the recommended dose. Cytisine is affordable (even in LMICs) and has the lowest cost per quality-adjusted life-year of all smoking cessation medications. Cytisine is manufactured according to the principles of European Union (EU) Good Manufacturing Practice standards by two companies: Sopharma (Bulgaria) and Aflofarm (Poland), yet cytosine is currently authorized by regulatory authorities for smoking cessation in only 17 countries in central/eastern Europe. There is urgent need for action by key stakeholders to get cytosine licensed worldwide so that its life saving potential can be realized. If cytosine is effective, cost-effective, affordable and well tolerated, why is it not licensed more widely? A key reason is that Sopharma and Aflofarm have not sought regulatory approval actively outside central/eastern Europe. There is little incentive for pharmaceutical companies to conduct the necessary research, as cytosine is a generic drug. Potential investors may not see the opportunity for substantial return unless a patent can be attached; this would almost certainly increase the cost to consumers. To date, international health donors have shown limited interest in tobacco cessation or supporting efforts to make cytosine available. This presentation will consider what can be done now to promote wider marketing authorization and availability of the existing low-



cost cytosine, including a series of recommendations made by an ad hoc Cytosine Working Group of SRNT members.

FUNDING: No funding

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SYM17

EXAMINING LINKS BETWEEN MENTHOL USE AND SMOKING PERSISTENCE IN VULNERABLE POPULATIONS

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In the US, menthol cigarettes (i.e., cigarettes with menthol as a characterizing flavor) constitute approximately one-third of cigarettes sold, and the proportion of menthol cigarette use is increasing. There is also evidence that menthol cigarettes are preferred by and may contribute to smoking persistence and adverse health outcomes in vulnerable populations, including youth and psychiatric populations. This symposium will take a closer look at associations between menthol use and smoking persistence, use of alternative products, biomarkers, and symptoms of withdrawal in three vulnerable populations. The symposium will integrate over levels of analysis and study design, from policy/national survey to clinical/longitudinal to mechanistic/laboratory. Our first speaker (Rose) will discuss results from a national sample of young adults, which found that the availability of alternative menthol combustible products could undermine the potential beneficial effects of menthol cigarette sales restrictions. Our second speaker (Stroud) will present strikingly high rates of menthol use, and associations between menthol use, nicotine exposure levels, and low quit rates in two diverse prospective cohorts of pregnant smokers. Our third speaker (Tidey) will discuss results from two laboratory studies in smokers with schizophrenia showing that menthol use is associated with stronger effects of abstinence on withdrawal-related negative affect, which may contribute to their low cessation rates. Finally, our discussant (Niaura) will synthesize across populations and levels of analysis and lead a discussion of implications for regulatory policy, cessation efforts, and alternative tobacco products. Overall, the symposium will address the role of menthol in perpetuating tobacco health disparities in vulnerable populations, with implications for regulatory and other approaches to reducing tobacco dependence in vulnerable smokers.

JUSTIFICATION: This symposium uses data from human laboratory studies, clinical trials, and a national cohort study to examine the role of menthol in perpetuating tobacco health disparities, which has implications for tobacco regulatory policy.

FUNDING: Research presented in this symposium is supported by the Truth Initiative, by grants U54DA031659 and P50DA036114 (JWT) and by grants R01DA019558, R01DA035999, and R01DA035999-02S2 (LRS) from the National Institute on Drug Abuse (NIDA) and the FDA Center for Tobacco Products (CTP). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the Food and Drug Administration.

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SYM17A

MENTHOL TOBACCO USERS' RESPONSE TO RESTRICTIONS ON MENTHOL CIGARETTES: RESULTS AMONG US YOUNG ADULTS

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BACKGROUND: Information on menthol tobacco users' potential responses to menthol sales restrictions is limited. We examined the prevalence and correlates of young adult menthol users' likely responses to restrictions on menthol cigarettes over time. METHODS: Data are from a national sample of 18-34 year olds assessed every 6 months (December 2011-April 2015) in the Truth Initiative Young Adult Cohort. Menthol tobacco users of any product (n=2,540 observations) were asked what they would most likely do if menthol cigarettes were no longer sold. Response options were: switch to non-menthol cigarettes, switch to some other tobacco product, quit smoking, other, or don't know. Weighted analyses estimated the prevalence of each response by wave. Multinomial logistic regression analy-

ses examined correlates of each response. RESULTS: Between 2011 and 2015, the percent of respondents who said they would quit smoking was unchanged (23% in 2011 and 2015). However, the percent of respondents saying they would switch to a non-menthol cigarette decreased from 39.6% in December 2011 to 26.7% in April 2015. There was also a non-significant increase in respondents saying they would switch to another tobacco product (9% in 2011 vs 13.2% in 2015). In adjusted analyses of the latest wave of data, those who said they would switch to another tobacco product (vs. switch to a non-menthol cigarette) were more likely to be Hispanic and currently use a menthol non-cigarette product. Those who were more likely to say they would quit smoking (vs. switch to a non-menthol cigarette) were more likely to be African American or Hispanic, interested in quitting in the next 30 days (vs. not interested), and be less nicotine dependent. CONCLUSIONS: Reduced intention to switch to a non-menthol cigarette if menthol were no longer sold suggests a strengthening of menthol preference in young adult menthol tobacco users. While menthol cigarette sales restrictions could result in beneficial changes among those interested in quitting, availability of menthol in other tobacco products could limit the public health benefit.

FUNDING: This study was funded by Truth Initiative.

CORRESPONDING AUTHOR: Shyanika Rose, PhD, Schroeder Institute for Tobacco Research and Policy Studies at Truth Initiative, DC, USA

SYM17B

HIGH RATES OF MENTHOL USE IN PREGNANT SMOKERS: PRELIMINARY REPORT FROM TWO PREGNANCY COHORTS

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SIGNIFICANCE: Smoking during pregnancy is the most widespread prenatal insult in the world, with known causal associations with maternal and neonatal morbidity. Despite potential for both maternal and fetal toxicity from menthol and continued exposure to nicotine and combustion products, little is known regarding use of menthol in pregnant smokers or racial/ethnic variation in menthol cigarette use during pregnancy. METHODS: Rates of menthol cigarette use were investigated in two racially/ethnically diverse cohorts of pregnant smokers recruited between 2006-2010 (Cohort I) and 2012-2015 (Cohort II). Cohort I included 83 pregnant mothers (Mage=25, SD=5; 51% minorities); Cohort II included 73 pregnant mothers (Mage=26, SD=5; 60% minorities). Cigarettes per day (CPD), cigarette brand, and menthol use were assessed by structured interviews; maternal and neonatal cotinine was assessed in saliva. RESULTS: High rates of menthol use were found in both cohorts (84% of pregnant smokers in Cohort I; 89% of pregnant smokers in Cohort II). Rates of menthol cigarette use were similarly high across all race/ethnicity groups in both studies (Cohort I [whites: 75%; blacks: 94%; Hispanic: 89%; Other/multi-race: 100%]; Cohort II [whites: 83%; blacks: 91%; Hispanic: 95%; Other/multi-race: 86%]); menthol and non-menthol users also did not differ in socio-economic status (SES) or age. 77% and 81% of Cohorts I and II, respectively, endorsed use of Newport brand cigarettes. In Cohort I, menthol smokers showed increased maternal cotinine (M's=102 vs 46 ng/ml; p<.01) and cotinine/CPD (p<.01) and were less likely to quit (20% quit) over pregnancy compared to non-menthol smokers (38% quit) (p=.16). Neonatal cotinine values were lower at day 2, but higher by day 30 in the menthol-exposed group (p's<.15). CONCLUSIONS: We found extraordinarily high rates of menthol cigarette use in pregnant smokers, with little variability by race/ethnicity or SES in two Northeast cohorts between 2006 and 2015. Given known fetal morbidity from maternal smoking, consideration of effects of tobacco and menthol on the next generation is warranted in evaluating regulation of menthol in cigarettes.

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SYM17C

MENTHOL EFFECTS ON WITHDRAWAL AND CRAVING IN SMOKERS WITH SCHIZOPHRENIA

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BACKGROUND: One factor that may contribute to low cessation rates in smokers with schizophrenia (SS) is menthol use. Previous studies have found that people with psychotic symptoms are disproportionately likely to smoke menthol cigarettes and that menthol smoking is associated with greater levels of nicotine exposure. However, mechanisms that may underlie these associations have not been examined. **METHODS:** We performed a secondary analysis of two laboratory studies to examine whether menthol use moderated the effects of diagnosis and abstinence on withdrawal symptoms (MNWS scale) and craving (QSU scale) in SS and controls. For Study 1, we used 2x2x2 ANOVAs to examine the effects of diagnosis (SS [n=27], controls [n=30]), menthol preference, and abstinence duration (0 and 5 hrs) on MNWS and QSU scores. For Study 2, we used 2x2x7 ANOVAs to examine the effects of diagnosis (SS [n=30], controls [n=30]), menthol preference and abstinence duration (0, 5, 24, 30, 48, 54 and 72 hrs) on MNWS and QSU scores. **RESULTS:** There were no effects of menthol on cigarettes per day or dependence (FTND score) in either study. In Study 1, 46% of SS and 66% of controls reported smoking menthols (NS). Significant Menthol x Abstinence interactions were found on MNWS scores, such that menthol and non-menthol smokers reported similar MNWS scores when non-abstinent, but effects of 5-hr abstinence on MNWS total scores and on the items Anger, Anxiety, Difficulty Concentrating and Restlessness were stronger in menthol smokers, regardless of diagnosis (p's < .05). In Study 2, 57% of SS and 67% of controls reported smoking menthols (NS). As in Study 1, a significant Menthol x Abstinence interaction was found on MNWS total score (p < .05), such that scores were lower in menthol smokers when non-abstinent but increased to a greater extent in menthol smokers across the abstinence period, regardless of diagnosis. Menthol did not moderate the effects of abstinence on QSU score in either study. **CONCLUSIONS:** Stronger effects of abstinence on withdrawal-related negative affect may contribute to difficulty quitting in heavy smokers who use menthol cigarettes.

FUNDING: Supported by grants U54DA031659 and P50DA036114 from the National Institute on Drug Abuse (NIDA) and the FDA Center for Tobacco Products. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the Food and Drug Administration.

CORRESPONDING AUTHOR: Jennifer Tidey, PhD, Brown University Center for Alcohol & Addiction Studies, RI, USA

SYM18

BEYOND PLAIN PACKAGING: PACK INSERTS AND DISSUASIVE CIGARETTES

Crawford Moodie, PhD, University of Stirling, United Kingdom; James Thrasher, PhD, University of South Carolina, USA; Karine Gallopel-Morvan, PhD, Ecole des hautes études en santé publique - Rennes, France; Ingeborg Lund, Department of Drug Policy, Norwegian Institute of Public Health - Oslo, Norway

Packaging is a key marketing tool for tobacco companies as it can capture attention, heighten appeal, influence product perceptions, build relationships through possession and usage, play a role in how the product is experienced, and ultimately drive sales. Tobacco packaging is also important for governments, allowing them to warn consumers about the risks associated with consumption. Pictorial health warnings on cigarette packs are now a requirement in approximately 100 countries, with more than 50 countries requiring these warnings to cover more than 50% of the principal display areas on packs. Some countries have went a step further and introduced plain packaging, but while the number of countries adopting plain packaging will increase, in time, is this an end-point or is there more scope for using the packaging to dissuade consumers? Regulators and academics have tended to focus on the exterior of the cigarette pack, with little consideration of how the interior, for instance inserts or indeed the cigarettes themselves, could be used to deter smoking. In the first talk, Moodie will discuss findings from a focus group study with smokers in Scotland, exploring their response to pack inserts used in Canada, which feature coloured graphics and messages intended to promote cessation. Thrasher will then present findings from a between-subjects survey using an experimental design with smokers in the US to explore their response to health warnings, either presented on their own, or accompanied by pack inserts with messages about the benefits of quitting or recommendations to increase confidence to quit. The cigarette itself can also be designed to encourage cessation

or deter use and Gallopel-Morvan will discuss findings from an online survey in France exploring young adults' response to cigarette design, including a standard cigarette, attractive cigarettes (pink, superslims) and a dissuasive cigarette (grey cigarette). Finally, Lund will present findings from a survey in Norway exploring adolescents' perceptions of standard cigarettes, unattractively coloured cigarettes and also cigarettes displaying health warnings.

JUSTIFICATION: The findings have important implications for public health and may help to inform future policy.

FUNDING: Cancer Research UK, US National Cancer Institute, French National Institute of Prevention and Health Education, Norwegian Institute of Public Health

CORRESPONDING AUTHOR: Crawford Moodie, PhD, University of Stirling, United Kingdom

SYM18A

ADULT SMOKERS' PERCEPTIONS OF CIGARETTE PACK INSERTS WITH CESSATION MESSAGES: A FOCUS GROUP STUDY

Crawford Moodie*, University of Stirling, United Kingdom

INTRODUCTION: Tobacco companies have a long tradition of including promotional material within cigarette packs, such as cigarette cards and coupons. Only in Canada are they required to include educational material within cigarette packs, in the form of inserts highlighting the benefits of quitting or providing tips on how to do so. **METHODS:** Twenty focus groups were conducted in Glasgow and Edinburgh in 2015 with smokers (N=120) segmented by age (16-17, 18-24, 25-35, 36-50, >50), gender and social grade, to explore perceptions of the inserts used in Canada. **RESULTS:** The consensus was that these inserts would capture attention and be read due to their novelty, visibility before reaching the cigarettes, and as they can be removed from the pack. While they may be ignored or discarded, and rotation was considered necessary, they were generally thought to prolong the health message. The positive style of messaging was described as refreshing, educational, encouraging, reassuring and inspirational, and thought to increase message engagement. It was regarded as more sympathetic than command-style messaging, offering smokers 'a bit of hope'. The inserts were often considered preferable to the on-pack warnings, although it was suggested that there was a need for both. Inserts were generally viewed as having the potential to alter others smoking behaviour, particularly younger people and those wanting to quit, and could help smokers think about or question their smoking behaviour and encourage them to stop. **CONCLUSIONS:** Inserts are an inexpensive means of communication and offer regulators a simple way of supplementing on-pack warnings.

FUNDING: Cancer Research UK

CORRESPONDING AUTHOR: Crawford Moodie, PhD, University of Stirling, United Kingdom

SYM18B

CAN CIGARETTE PACKAGE INSERTS PROMOTE CESSATION-RELATED BELIEFS? AN EXPERIMENT WITH ADULT SMOKERS IN THE US

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INTRODUCTION: In Canada, pictorial warnings printed on cigarette packs are accompanied by inserts with rotating messages to enhance response efficacy (i.e., benefits of quitting) and self-efficacy (i.e., confidence to quit). Observational research suggests that these inserts promote self-efficacy and sustained cessation behaviors. The current experimental study examined the effects of Canadian-style package inserts among US smokers. **METHODS:** Adult smokers, aged 18 to 65, who resided in the US (n=301) were recruited using Amazon Mechanical Turk (mTurk). Through online administration, participants evaluated the same set of five warning messages, shown in random order on cigarette packs, with between-subject randomization to different insert types shown alongside the pack warning: 1) inserts with response efficacy messages; 2) inserts with self-efficacy messages; 3) no inserts (i.e., control group). Within the experiment, participants rated each of the five stimuli for: negative emotional arousal; message credibility; utility for quitting; and positive cessation expectancies. A post-experiment survey queried perceived benefits of quitting (alpha=0.79) and self-efficacy to quit (alpha=0.66). Analyses in-



involved crude and adjusted mean comparisons of insert groups with the control (no insert), including interactions between condition and quit intentions. RESULTS: For within-experiment ratings, average ratings were higher for utility for quitting when comparing either insert condition to the control ($p < 0.001$). Compared to the control group, inserts with self-efficacy messages were rated lower for negative arousal ($p = 0.036$) and cessation expectancies ($p = 0.012$). For post-experiment ratings, participants in the self-efficacy insert condition had higher self-efficacy beliefs compared to control ($p = 0.03$). Interactions with quit intention were not significant for any outcome. CONCLUSIONS: Package inserts with efficacy messages may help promote smoking cessation. Longer follow-up and assessment of more cessation-related outcomes may be necessary to determine the public health impact of this communications strategy.

FUNDING: National Cancer Institute

CORRESPONDING AUTHOR: James Thrasher, PhD, University of South Carolina, USA

SYM18C

CONSUMER PERCEPTIONS OF CIGARETTE DESIGN IN FRANCE

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INTRODUCTION: With large health warnings required on cigarette packs in a growing number of countries, which reduces the available space for on-pack branding, brand communication is moving to the inside of the pack and also to the cigarette, which is becoming an increasingly important promotional tool for tobacco companies. One way to counter this would be to make cigarettes off-putting. METHODS: An online survey was conducted with 998 smokers and non-smokers (aged 15-30 years) in France to explore perceptions of cigarette design. Participants were shown an image of a regular, slim or fun (pink) cigarette, and also a plain (grey) cigarette, and asked their perceptions of these cigarettes in terms of taste, quality, danger and the likelihood that they would motivate teenagers to start smoking and smokers to quit. RESULTS: The regular, slim and fun cigarettes were rated as better tasting, better quality and more likely to motivate teenagers to start smoking than the plain cigarette. Conversely, the plain cigarette was perceived as more dangerous than the regular, slim and fun cigarettes, and also less likely to motivate teenagers to start and more likely to motivate smokers to quit. CONCLUSIONS: For cigarette manufacturers, creative product design is more important than ever. This study shows that the appearance of cigarettes can influence how they are perceived, as is the case with cigarette packaging, and that 'plain' (unattractively coloured) cigarettes could reduce their appeal, as with plain cigarette packaging.

FUNDING: French National Institute of Prevention and Health Education

CORRESPONDING AUTHOR: Karine Gallopel-Morvan, PhD, Ecole des hautes études en santé publique - Rennes, France

SYM18D

ADOLESCENT PERCEPTIONS OF DISSUASIVE STICKS: A WEB SURVEY AMONG 16-20 YEAR OLDS IN NORWAY

Ingeborg Lund*, Janne Scheffels, Department of Drug Policy, Norwegian Institute of Public Health - Oslo, Norway

INTRODUCTION: While increasingly stringent rules for cigarette pack design and larger health warnings restrict the advertising potential of cigarette packs, the cigarette stick itself remains a potential medium for marketing. Common design features include cork or white filters, slim cigarettes and capsule cigarettes. Recent research indicates lower general appeal, greater harm, and more negative perceptions of taste for cigarettes designed to be unappealing (dissuasive sticks). This study explored perceptions of cigarette sticks, including dissuasive cigarettes, among Norwegian adolescents, and factors associated with likely product trial. METHODS: A sample of 281 adolescent smokers and non-smokers (aged 16-20 years) participated in a web survey to assess the appeal, taste and harmfulness of six different cigarette sticks, and which one they would be most likely to try. Of the six cigarettes used, two were standard designs (cork filter or white filter), two unattractively coloured (green or brown), and two displayed a health warning on the cigarette paper (Smoking kills or Minutes of life lost from smoking). RESULTS: All the dissuasive sticks (unattractively coloured or displaying a warning) were

perceived as less appealing, worse tasting, and more harmful than the standard sticks. The dissuasive sticks were also less likely to be chosen as a cigarette that they would want to try. The evaluation of the stick designs was relatively similar across gender, smoking and snus use status, and smoking susceptibility. In logistic regressions, gender, current snus use and a positive perception of taste were associated with the wish to try a particular cigarette design. CONCLUSIONS: The cigarette is an important communications tool, and this study found that changing the appearance of cigarettes, by altering the colour or adding a health warning, resulted in them being viewed more negatively and reduced perceived product trial.

FUNDING: Norwegian Institute of Public Health

CORRESPONDING AUTHOR: Ingeborg Lund, Department of Drug Policy, Norwegian Institute of Public Health - Oslo, Norway

SYM19

THE BRIGHTER SIDE OF NICOTINE: BEYOND NICOTINE ADDICTION AND TOWARDS DEVELOPMENT OF BENEFICIAL NICOTINIC DRUGS

Edward Levin, PHD, Duke University, NC, USA; Jill Turner, PHD, University of South Carolina, USA; Julie Blendy, PHD, University of Pennsylvania, PA, USA; Kenneth Kellar, PHD, Georgetown University, DC, USA

This symposium is sponsored by the SRNT Basic Science Network.

Nicotine is a principal driver of tobacco addiction. While the motivational properties of the drug are well documented and thought to be the primary determinant of dependence, nicotine has a wide variety of behavioral actions including positive effects on cognition, emotional response, and weight regulation which may also contribute to its attractiveness to smokers. Understanding these diverse pharmacological effects of nicotine can lead to a better understanding of tobacco use and its effective treatment. In addition, understanding these effects of nicotine has the potential to help in the development of therapeutic treatments for cognitive impairment, affective/emotional dysfunction and obesity. This symposium will examine the diverse actions of nicotine and related drugs on cognition, models of affective dysfunction, and regulation of body weight. First, Dr. Ed Levin will present work on nicotine effects on attention, learning and memory. Then, Dr. Jill Turner will present her studies on the anxiolytic effects of nicotine and discuss the neural substrates underpinning these effects. Next, Dr. Julie Blendy will present data demonstrating the transgenerational effects of nicotine on blunting nicotine sensitization in offspring. Then, Dr. Ghazal Dezfouli will present studies examining the nicotinic receptor subtypes involved in regulation of body weight in mice. Following the presentations, the discussant will describe how these advances in understanding nicotine's pro-cognitive, anxiolytic, and weight control effects may impact therapeutic development for a range of disorders, including amelioration of withdrawal during smoking cessation.

JUSTIFICATION: Understanding the diverse pharmacological effects of nicotine can lead not only to a better understanding of tobacco use and its effective treatment, but also to help in the development of therapeutic treatments for cognitive impairment, affective/emotional dysfunction and obesity.

FUNDING: EL: This work was supported by the National Institutes of Health (ES022831 and DA027840). JRT: NIH/NIDA R00DA032681 JAB: National Institute of Health (R01 DA033646; T32 DA28874) GD: Supported by Georgetown University Medical Center

CORRESPONDING AUTHOR: Jill Turner, PhD, University of South Carolina, Columbia, SC, USA

SYM19A

NICOTINIC INVOLVEMENT IN ATTENTION, LEARNING, AND MEMORY: BASIC DISCOVERIES AND THERAPEUTIC DEVELOPMENT.

Edward Levin*, Duke University, NC, USA

Nicotinic acetylcholine receptors are found on neurons throughout the brain and the rest of the nervous system. Nicotinic receptors are critically involved in sensory, motor, appetitive, emotional and cognitive functions. Drugs affecting nicotinic receptors, including nicotine, have important effects on a spectrum of cognitive functions including attention, learning and memory. In animal models from zebra-

ish to mice and rats to moneys, nicotine and nicotinic agonists have been shown to improve cognitive function. Chronic nicotine infusion improves spatial memory in rats. This effect does not diminish with continued treatment. Nicotine has been shown to reverse cognitive impairments due to blockade of muscarinic acetylcholine receptors or NMDA glutamate receptors. Nicotinic receptors in the hippocampus, frontal cortex and thalamus play important roles for memory function. Both $\alpha 4\beta 2$ and $\alpha 7$ nicotinic receptor subtypes are involved. Inasmuch as nicotinic receptors are very readily desensitized, it may be the case that net antagonism could improve cognitive function. Modest doses of nicotinic antagonists have been seen in preclinical models to improve cognitive function. In human studies, both nicotine and other nicotinic ligands have been shown to improve attention and memory. People with attention deficit hyperactivity disorder (ADHD) or schizophrenia have been shown to have cognitive improvement caused by nicotine skin patch treatment. People with aging-induced cognitive impairment including age-associated cognitive impairment, mild cognitive impairment and mild to moderate Alzheimer's disease have also shown cognitive improvement with nicotine skin patch treatment. Other nicotinic drugs have shown promise for treatment of cognitive impairment. High smoking rates among some groups, such as with people with ADHD or schizophrenia, may be exacerbated by the cognitive benefit they receive with nicotine. That is, they may be self-medicating with tobacco, albeit in a particularly hazardous way. Development of safe and effective ways to deliver nicotine or other nicotinic ligands to improve cognition may help them quit tobacco use as well as provide cognitive benefit.

FUNDING: This work was supported by the National Institutes of Health (ES022831 and DA027840).

CORRESPONDING AUTHOR: Edward Levin, PHD, Duke University, NC, USA

SYM19B

DIVERGENT RESPONSES TO NICOTINE IN MODELS OF ANXIETY MAY REPRESENT DIFFERING CIRCUITRY EFFECTS IN THE HIPPOCAMPUS AND ORBITOFRONTAL CORTEX

Jill Turner*, University of South Carolina, USA

Alterations in nicotinic cholinergic signaling in the brain have been implicated in numerous diseases and disorders, including anxiety. In addition, studies using mice lacking specific nicotinic receptor subunits have implicated these receptors in anxiety. Therefore, nicotine and subtype-specific nicotinic drugs present a rich area for investigation of their therapeutic potential in these mental disorders. Here, we present data on the effects of acute and chronic administration of nicotine in mouse models of anxiety. We find that both acute and chronic administration of nicotine has anxiolytic effects in the marble-burying test and in the novelty-induced hypophagia (NIH) test. However, these effects may be task dependent, as we find that acute nicotine can induce anxiogenic effects in mice when performing a cognitive task. These divergent effects on anxiety may be due to the different neural substrates mediating the behavioral responses in these various tasks. For example, we find that nicotine differentially modulates circuitry function in the hippocampus and the orbitofrontal cortex, two regions implicated in anxiety disorders. Furthermore, in tasks with a hippocampal-dependent component, nicotine administration elicits an anxiolytic response; in contrast, nicotine administration in tasks engaging the orbitofrontal cortex results in an anxiogenic response. This would suggest that individuals with different anxiety disorders (ie, generalized anxiety disorder, panic disorder, obsessive-compulsive disorder) may respond differently to nicotinic stimulation depending upon what neural circuitry is predominantly engaged. Therefore, nicotinic compounds may represent a promising avenue for drug development in certain subsets of anxiety disorders.

FUNDING: NIH/NIDA R00-DA032681

CORRESPONDING AUTHOR: Jill Turner, PHD, University of South Carolina, USA

SYM19C

TRANSGENERATIONAL EFFECTS OF NICOTINE AND STRESS: INTERACTIONS ACROSS GENERATIONS

Nicole Yohn, Julie Blendy*, University of Pennsylvania, PA, USA

Chronic administration of nicotine produces long-lasting behavioral and physiological changes in humans and animals alike. However, it is unknown if nicotine exposure in one generation influences behavior or subsequent response to nicotine in future generations. Further, nicotine response may be influenced by stress

exposure within a generation. However, to determine if nicotine and stress interact across generations to influence offspring behavior we exposed F0 male mice to nicotine and F1 male and female mice to chronic unpredictable stress during adolescence and characterized affective behaviors, reflexive startle, and response to nicotine in subsequent F2 and F3 generations. F0 male nicotine exposure decreased anxiety- and depression- like behavior exclusively in F1 male offspring while sex- and lineage- dependent changes in response to nicotine were found in F2 and F3 male and female offspring. F1 male offspring of fathers exposed to adolescent CUS showed a different locomotor response to chronic nicotine exposure as compared to controls (Figure 3.2A). Control animals developed behavioral sensitization to nicotine with increased locomotor response on nicotine day 4 ($P < 0.05$) and on the challenge day ($P < 0.05$) compared to the first day of nicotine administration. However, the same development of sensitization was not found in male F1 offspring whose fathers were exposed to adolescent CUS. In addition, we found that grand paternal (F0) exposure to nicotine and paternal (F1) exposure to stress interact to blunt response to locomotor activating effects of nicotine in female but not male offspring. Further, these F3 mice showed altered anxiety- and startle behaviors. This novel multigenerational exposure paradigm examining the inheritance of two different environmental exposures demonstrates that nicotine response in one generation can be strongly influenced by nicotine and/or stress exposure in previous generations. Thus, therapeutics for smoking cessation should consider generational exposure to nicotine and/or stress and how this may impact medication development.

FUNDING: Grant Support: National Institute of Health (R01 DA033646; T32 DA28874)

CORRESPONDING AUTHOR: Julie Blendy, PHD, University of Pennsylvania, PA, USA

SYM19D

DESENSITIZATION OF NICOTINIC RECEPTORS: THERAPEUTIC IMPLICATIONS FOR OBESITY PHARMACOTHERAPY

Ghazaul Dezfili*, Kenneth Kellar, Georgetown University, DC, USA

Association of cigarette smoking with reduced body weight (BW) has been shown through numerous cross-sectional studies, with adolescent females in particular sometimes using smoking for weight control. Animal models have confirmed that nicotine decreases feeding and lowers BW in both lean mice and obese mice (Grunberg 1982; Grunberg et al, 1984; Mineur et al., 2011; Dezfili et al., 2016; for review, see Zoli & Picciotto, 2012). This suggests that nicotine-based pharmacotherapy could be a promising approach to address the growing global obesity epidemic. Despite this knowledge however, nicotinic receptor-based treatment for obesity has not been explored clinically. Our current research is focused on nicotinic acetylcholine receptor (nAChR) desensitization as a major mechanism by which nicotine and selective nicotinic ligands affect energy homeostasis and exert weight-reducing effects. Initial activation of the nAChR is virtually always followed by an extended period of receptor desensitization, the intriguing molecular phenomenon whereby nAChR ion channel activity is markedly decreased by continuous or repeated exposure to agonist. However, the role of desensitization and the associated nAChR subtypes that mediate nicotine-induced changes in energy homeostasis are not fully understood. Our research effort focuses on further elucidating these questions using pharmacological tools, animal models of obesity, genetic mouse models, and metabolic phenotyping. Towards this end, I will present data showing 1) drugs that desensitize nAChRs result in weight loss in animal models of obesity; 2) $\beta 2$ -containing nAChRs in the desensitized state are implicated in regulation of BW; and 3) the contribution of other nAChR subunits in conjunction with the $\beta 2$ subunit in mediating nicotine-induced weight loss in animal models. Finally, I will discuss how an understanding of nAChR desensitization can inform and lead to development of more effective nAChR-based therapeutics.

FUNDING: Supported by Georgetown University Medical Center

CORRESPONDING AUTHOR: Kenneth Kellar, PHD, Georgetown University, DC, USA



SYM20

INCREASING REACH WITHIN AND BEYOND HEALTH CARE SETTINGS TO IMPROVE ACCESS TO TOBACCO USE TREATMENT: LEVERAGING COMMUNITY AND TREATMENT SETTINGS IN ASIA, AUSTRALIA, AND THE UNITED STATES

Nina Siman, MEd, MA, New York University School of Medicine, NY, USA; Janice Tsoh, PhD, University of California San Francisco, USA; Billie Bonevski, PhD, and Christine Paul, PhD, University of Newcastle, Australia

Globally, adoption of evidence based tobacco use treatment (TUT) in health care settings continues to be suboptimal, and is particularly limited in low and middle income countries (LMICs). This symposium will present results from four trials in Vietnam, Australia, and the United States that test innovative methods for increasing access to evidence-based TUT within and outside of various health care settings. Two of the studies describe interventions that extend TUT outside of the patient-provider health care visit (i.e., a robust network of community health workers (CHW) in Vietnam, and use of new technology in the US) and two describe organizational changes to accelerate implementation of TUT in the context of addictive services and cancer care (Australia). Study 1 leverages an extensive network of community health workers in Vietnam, that is typical of LMIC public health systems, to compare the effectiveness of two strategies for implementing TUT in 26 community health centers: 1) training and clinical reminder system (TC) vs 2) TC + CHW counselling. Study 2 examines the efficacy of an interactive "Mobile Doctor" intervention for Korean- and Vietnamese-speaking male smokers in a community health primary care center in the United States. The study includes data from both self-report and electronic health records for patients. Study 3 is a cluster randomized controlled trial to examine the effectiveness of an organizational change intervention to reduce smoking amongst clients attending 32 addiction treatment centres in Australia (n=449 participants at 6-month follow-up). Study 4 describes a pilot study which examined the context and implementation processes for embedding smoking cessation support into cancer patient care in Australia (n= 34 administrators; 193 clinical staff and 281 cancer patients across seven cancer clinics). The studies will provide data on strategies for implementing TUT guidelines that are generalizable across other LMIC public health systems and alternative health care settings globally.

JUSTIFICATION: The discussion of these four trials (in Vietnam, Australia, and the U.S) regarding methods for increasing access to evidence-based tobacco use treatments, will identify core elements for the implementation of cessation support in a range of practice settings.

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CORRESPONDING AUTHOR: Christine Paul, BA(Hons) PhD, University of Newcastle, Australia

SYM20A

EFFECTIVENESS OF STRATEGIES FOR IMPLEMENTING TOBACCO USE TREATMENT GUIDELINES IN COMMUNITY CENTERS IN VIETNAM

Nina Siman¹, Nam Truong Nguyen², Charles Cleland³, Nancy VanDevanter⁴, Trang Thi Nguyen², Linh Thi Nguyen², Donna Shelley¹, ¹New York University School of Medicine, NY, USA, ²Institute of Social and Medical Studies, ³NYU Rory Meyers College of Nursing, ⁴New York University Rory Meyers College of Nursing

BACKGROUND: Vietnam has one of the highest rates of smoking in the world yet services to treat tobacco dependence are not readily available. This is in part due to a lack of research on strategies for implementing WHO endorsed tobacco use treatment (TUT) guidelines in primary care settings. We are conducting a NIH funded cluster randomized controlled trial that is comparing the effectiveness of two system-level strategies for implementing evidence-based guidelines for the treatment of tobacco use in 26 public health centers (CHCs) in Vietnam. **METHODS:** We present data from 8 of the 26 CHCs that were in the first of three intervention waves. Sites were randomized to receive 12 months of: 1) training, reminder system and tool kits (ARM 1) vs 2) ARM 1 + referral to a Village Health Worker for three in person counseling sessions (ARM 2). The primary outcomes was provider adherence to TUT defined as patient reports of being asked about tobacco use (ask), advised to quit (advise), assessed for readiness to quit (assess), and offered assistance to quit (assist). Data were obtained via cross sectional

patient exit interviews (PEIs) (50 per site) at baseline and again at 12 months. **RESULTS:** 794 participants completed PEIs (398 at baseline and 396 at 12-months); 394 (49.6%) in ARM 1 sites and 400 (50.4%) in ARM 2 sites. In combined analysis of ARM 1 and ARM 2 PEIs, providers were far more likely to ask, advise and assess at 12-months than baseline visits ($p < .0001$). At 12-months, providers in ARM 2 sites were less likely than those in ARM 1 sites to ask, advise, assess, and assist with information (all $p < .01$), but 17.5% of ARM 2 patients reported referral to a village health worker. **CONCLUSION:** Findings suggest that training and health system changes can lead to significant increases in provider adherence to TUT in Low and Middle Income Countries like Vietnam.

FUNDING: NCT02564653

CORRESPONDING AUTHOR: Nina Siman, MEd, MA, New York University School of Medicine, NY, USA

SYM20B

ADDRESSING TOBACCO USE IN KOREAN AND VIETNAMESE SMOKING PATIENTS IN COMMUNITY HEALTH PRIMARY CARE SETTINGS IN CALIFORNIA, UNITED STATES

Janice Tsoh¹, Thu Quach¹, Thomas Duong¹, Emily (Sa Nan) Park², Ching Wong¹, Hy Lam¹, Susan Huang², Tung Nguyen¹, ¹University of California San Francisco, USA, ²Asian Health Services

BACKGROUND: Fewer Asian American smokers reported receiving physician advice to quit when compared to the U.S. general population. This pilot project examined the efficacy of an interactive "Mobile Doctor" intervention (iMD) for Korean- and Vietnamese-speaking male patients whose smoking prevalence rates remain high. **METHODS:** Using a community-based participatory research approach, we created the iMD that delivers tailored in-language video messages via a mobile tablet to Korean and Vietnamese male smokers right before their clinic visit with a provider. iMD delivers the "5 A's" and generates a bilingual tailored printout. Participants were Korean- and Vietnamese-speaking patients who self-identified as daily smokers and received primary care at a federally-qualified health center. Primary outcomes were patient-provider discussion on tobacco use from patients' self-report and electronic health record (EHR), and self-reported quit attempts and smoking abstinence at 3 months post iMD visit. **RESULTS:** The study sample included 47 male patients (87% participation rate) with mean age = 56.4 (range: 28 to 71 years old); 98% spoke limited English, 45% had < high school education, mean cigarettes smoked/day = 9.3 (SD=4.5); 32% had never tried quitting smoking and 53% in precontemplation. iMD took an average of 12.9 minutes (range: 10-25 minutes) to complete. All patients reported discussing their smoking with their providers during the visit. Many (87%) perceived iMD was helpful in their decision of quitting and in enhancing their communication with providers. Content analyses of EHR progress notes showed that physician's delivery of the 5A's increased from 37% at one visit prior to iMD to 75% at the visit right after iMD ($p = .002$). At 3 months, 51% reported having at least one 24-hour quit attempt since the iMD session. The intent-to-treat self-reported 7-day point prevalence abstinence was 19%. **CONCLUSIONS:** The iMD is feasible and highly acceptable to Korean and Vietnamese smoking patients including those who were unmotivated to quit smoking. This intervention is promising in increasing patient-provider discussion of tobacco use among Asian American immigrants.

FUNDING: Tobacco-Related Disease Research Program grants 21BT-0056H, 24AT-1301

CORRESPONDING AUTHOR: Janice Tsoh, PhD, University of California San Francisco, USA



SYM20C

AN ORGANISATIONAL CHANGE INTERVENTION FOR INCREASING THE DELIVERY OF SMOKING CESSATION SUPPORT IN ADDICTION TREATMENT CENTRES

Billie Bonevski¹, Ashleigh Guillaumier¹, Anthony Shakeshaft², Flora Tzelepis¹, Catherine D'Este³, Michael Farrell⁴, Christine Paul¹, Adrian Dunlop⁵, Scott Walsberger⁶, Pete Kelly⁷, Christopher Oldmeadow⁸, Andrew Searles⁸, ¹University of Newcastle, Australia, ²National Drug and Alcohol Research Centre, ³Australia National University, ⁴National Drug and Alcohol Research Centre, ⁵Hunter New England Local Health District, ⁶Cancer Council New South Wales, ⁷University of Wollongong, ⁸Hunter Medical Research Institute

BACKGROUND: In Australia, 77-95% of people receiving substance use treatment smoke tobacco, which is similar to the high rates reported in the US and UK. The provision of smoking cessation support in Australian addiction treatment centres is sub-optimal. This study aims to examine the effectiveness of an organisational change intervention to reduce smoking amongst clients attending addiction treatment centres. **METHODS:** A cluster randomised controlled trial was conducted with addiction treatment centre as the unit of randomisation. Biochemically verified (carbon monoxide by breath analysis) client 7-day point prevalence of smoking cessation at six weeks follow-up is the primary outcome measure. Secondary outcome measures include 7-day point prevalence abstinence at 6 month follow-up and prolonged smoking abstinence, quit attempts, and use of nicotine replacement therapy (NRT) at 6 weeks and 6 months follow-up. The study was conducted in 32 addiction treatment centres in four mainland states and territories of Australia: New South Wales, Australian Capital Territory, Queensland and South Australia. Eligible services were those with ongoing client contact and that include pharmacotherapy services, withdrawal management services, residential rehabilitation, and counselling services. Eligible clients were those aged over 16 years who are attending their first of a number of visits, are self-reported current smokers, proficient in the English language and do not have severe untreated mental illness as identified by the service staff. Control services continued to provide usual care to the clients. Intervention group services received an organisational change intervention including assistance in developing smoke-free policies, nomination of champions, staff training, educational resources for clients and staff, and free NRT in order to integrate smoking cessation support as part of usual client care. **RESULTS:** A sample of 900 smokers across 32 treatment centres were recruited, 485 (54%) retained at 6 week follow-up and 449 (50%) retained at 6 month follow-up. This presentation will outline the primary and secondary outcomes of the trial.

FUNDING: National Health and Medical Research Council (NHMRC1045840), the Cancer Council New South Wales

CORRESPONDING AUTHOR: Billie Bonevski, PhD, University of Newcastle, Australia

SYM20D

EMBEDDING SMOKING CESSATION SUPPORT IN CANCER CARE CLINICS IN NEW SOUTH WALES AUSTRALIA

Christine Paul¹, Emma Sherwood¹, Megan Freund¹, Ann Dadich², Bettina Meiser³, Natalie Taylor⁴, Tim Shaw⁵, Fiona Day⁶, Megan Varlow⁷, Sanchia Aranda⁸, ¹University of Newcastle, Australia, ²Western Sydney University, ³University of New South Wales, ⁴Macquarie University, ⁵University of Sydney, ⁶Calvary Mater Hospital, ⁷Cancer Institute of New South Wales, ⁸Cancer Council Australia

BACKGROUND: Despite the evidence for improved outcomes of quitting smoking at or after a cancer diagnosis, the implementation of smoking cessation care in this settings is limited. This pilot project aimed to i) identify the capacity of New South Wales hospitals to implement system-wide smoking cessation advice and support; ii) identify the proportion of oncology staff who routinely delivered cessation advice and support; iii) explore cancer patient perceptions and experiences of receiving cessation advice and support; iv) pilot-test the feasibility of a cessation model at one site and v) obtain preliminary consensus on the key components of cessation care for cancer patients. **METHOD:** Electronic surveys of 34 cancer care administrators or coordinators; 193 oncology staff (medical, nursing and allied health) and 281 cancer patients across seven cancer clinics. A pilot implementation plan and patient pathway were developed based on the survey data. Qualitative interviews with staff and patients occurred after implementation. A modified Delphi process was used to develop care principles and key cessation messages. **RESULTS:** Stakeholder data indicated a lack of cancer-patient-specific policies on smoking cessation (0%), a lack of electronic support and confusion regarding current cessation care provision. Approximately three-quarters of stakeholders reported that

existing services did not meet the needs of cancer patients who wish to quit smoking. Oncology staff indicated asking just under half of their patients about their smoking status for (48% inpatients, 43% outpatients), and few reported referring their patients to external supports to help them quit. Both oncology staff and patients indicated high (over 90%) levels of support for cessation care for cancer patients, and patients reported relatively low levels of practical cessation support. The implementation pilot identified a series of ongoing challenges. The outcomes of the Delphi process included a preference for delaying the timing of the discussion of cessation, in contrast to the limited evidence from oncology cessation trials.

FUNDING: Cancer Institute New South Wales, Hunter Cancer Research Alliance

CORRESPONDING AUTHOR: Christine Paul, PhD, University of Newcastle, Australia

SYM21

E-CIGARETTES AND OTHER GLOBAL TOBACCO EXPOSURES DURING PREGNANCY

Linda Bauld, PhD, University of Stirling, United Kingdom; Omar El Shahawy, MD, MPH, PhD, New York University School of Medicine and New York University in Abu Dhabi Public Health Research Center; Jean Schensul, PhD, Institute for Community Research, CT, USA; Gillian Gould, PhD, MA, MBChB, University of Newcastle, Australia

Exposures to tobacco during pregnancy mainly centre on smoking. However, women are exposed to tobacco and nicotine in other forms globally. Some exposures are linked with adverse maternal and infant outcomes; the effect of others is uncertain. This symposium highlights topics pertinent to new exposures of e-cigarettes: and older ones including smokeless tobacco (SLT). It brings together researchers investigating uses in pregnant women from UK, Australia, India and the Middle East; provides global perspectives from consumers, clinicians and policy-makers. Prof Bauld will give an overview of e-cigarettes during pregnancy. Nicotine in pregnancy is controversial, e.g. nicotine replacement is accepted in some countries and not in others. Many consider e-cigarettes to have a lower risk profile than tobacco smoking, and some pregnant smokers are already using these devices. Prof Bauld in her overview summarises surveys and qualitative research with pregnant women on e-cigarettes. She considers the barriers and opportunities to research on e-cigarettes. Dr El Shahawy researches hookah and tobacco smoking by pregnant women in Egypt. He reports on prevalence of single and dual use, and attitudes of pregnant women to these delivery systems. Most pregnant smokers reported transition to sole hookah use once pregnant, perceiving it to be safer. Dr Schensul presents a mixed methods study using Simulation Modeling to explore perinatal health outcomes of SLT in Indian pregnant women. This innovative study incorporates government tobacco control and community led interventions to illustrate how combinations of interventions at multiple levels can make a difference in reducing tobacco related perinatal health consequences. The model can be extended to other forms of tobacco and beyond India. Finally the chair, Dr Gould will present the clinicians view. In a national study, GPs and Obstetricians were surveyed about their practices of asking about different tobacco exposures. While over 95% ask about smoking, few ask about other forms, such as e-cigarettes and chewing tobacco. Well-known exposures such as second hand smoke and cannabis with tobacco are seldom discussed. There were significant differences between professional groups. Dr Gould discusses the importance of guidelines even when the evidence is not clear. A/Prof Glover, a passionate advocate of women suffering from health disparities, will discuss the implications of the studies, and how we can progress to understand the relative risks of these other forms of tobacco and nicotine exposures.

JUSTIFICATION: This symposium will inform clinicians, public health and policy makers about new and old tobacco exposures that need to be critically considered in pregnant women globally.

FUNDING: Royal Australian College of General Practitioners Chris Silagy Scholarship, National Health and Medical Research Council Fellowship, and Cancer Institute New South Wales Fellowship (to Gould), Cancer Research UK Professorial Fellowship and UK Centre for Tobacco and Alcohol Studies grant (to Bauld), Public Health Research Center at New York University in Abu Dhabi (to El Shahawy).

CORRESPONDING AUTHOR: Gillian Gould, PhD, MA, MBChB, University of Newcastle, Australia



SYM21A

ELECTRONIC CIGARETTES IN PREGNANCY: WHAT DO WE KNOW?

Linda Bauld*, University of Stirling, United Kingdom

The World Health Organisation has estimated that 50% of the world's population live in countries where e-cigarettes or nicotine vapourisers are available for purchase. Use amongst adults and young people has risen in recent years with regular use concentrated in smokers who use e-cigarettes for smoking reduction or cessation. However, little is known about e-cigarette use amongst pregnant women. To date no published trials or cohort studies with pregnant women have been published and concerns exist about the safety of e-cigarette use in pregnancy. This presentation will examine existing use of e-cigarettes in pregnant women and new mothers and outline examples of practical guidance on e-cigarettes developed for health professionals and women themselves. A recent systematic review published in 2016 identified just six studies examining knowledge and perceptions of e-cigarettes amongst pregnant women but these highlighted that: women were unsure about the amount of nicotine in e-cigarettes and possible effects on the fetus; e-cigarettes were perceived as safer than tobacco and could be used for smoking cessation; fewer side effects could be experienced from e-cigarettes than tobacco; and media reports were conflicting. Two new studies have been conducted since this review was published - a survey in the USA and qualitative research with 30 pregnant women in the UK and this presentation will highlight key findings. The development of tools for women and professionals to inform decision-making regarding e-cigarettes is also required. In the UK, the smoking in pregnancy challenge group (a multi-agency national group formed to develop a strategy to reduce smoking in pregnancy) has published guidance for midwives and other health care workers and pregnant women. This guidance focuses on weighing the risks and benefits of continued smoking in pregnancy and e-cigarette use and highlights gaps in knowledge. Finally, the research design for a newly funded randomised controlled trial of e-cigarettes for smoking cessation will be outlined.

FUNDING: Cancer Research UK Professorial Fellowship and UK Centre for Tobacco and Alcohol Studies grant

CORRESPONDING AUTHOR: Linda Bauld, PhD, University of Stirling, United Kingdom

SYM21B

ASSESSMENT OF EXCLUSIVE AND DUAL CIGARETTE AND HOOKAH SMOKING AMONG A SAMPLE OF PREGNANT WOMEN IN EGYPT

Omar El Shahawy^{1,2}, Kareem Labib³, Erin Mead⁴, Ahmed Nagib³, Scott Sherman^{1,5}, Cheryl Oncken⁴, ¹New York University School of Medicine, ²New York University in Abu Dhabi Public Health Research Center, ³Ain Shams University School of Medicine, Cairo, Egypt, ⁴UConn School of Medicine, Connecticut, USA, ⁵New York University in Abu Dhabi, United Arab Emirates

BACKGROUND: Limited data exists regarding tobacco use during pregnancy, particularly in Middle Eastern countries where cigarette and hookah use is common. The purpose of this study was to examine tobacco use patterns and beliefs regarding secondhand smoke exposure (SHS) before and during pregnancy among Egyptian women. METHODS: Pregnant women were recruited during their last trimester from maternity hospitals in Cairo, Egypt from June, 2015 to May, 2016. Two hundred women were interviewed about their tobacco use before and during pregnancy, as well as their attitudes and beliefs regarding tobacco use and SHS. RESULTS: Participants had a mean age of 27 (+4.6) years. Before pregnancy, 30% of the women reported using tobacco. Among tobacco users, 60% were dual users of cigarettes and hookah, 35% were exclusive cigarette smokers, and 5% were exclusive hookah smokers. Prevalence of daily cigarette smoking decreased during pregnancy (-62.9%, $p < .0001$), but daily hookah use did not change (-7.4%, $p = 0.215$). Most dual users (75%) transitioned to exclusive hookah smoking during pregnancy. Only 13% of smokers quit all products, whereas 28% continued their same smoking behaviors. Social acceptability of hookah and cigarette smoking was high among tobacco users and did not differ by product. The majority of women agreed that tobacco use is harmful during pregnancy (92%) and SHS is harmful to a newborn (94%), and this did not differ by smoking status. However, only 68% agreed that a pregnant woman's SHS was harmful to herself and her unborn child; smokers were much more likely to agree than non-smokers (92% vs. 59%, $p < .0001$) with no difference by type of tobacco product used. CONCLUSIONS: Among this sample of pregnant women, dual use of hookah and cigarettes was common before pregnancy. The transition from dual to exclusive hookah smoking

during pregnancy suggests that hookah may be perceived as less harmful than cigarettes and could serve as a substitute for conventional cigarettes. Future work is needed to understand and address hookah smoking during pregnancy and misperceptions about the harmful effects of SHS among women of child-bearing age in Cairo, Egypt.

FUNDING: Public Health Research Center, New York University in Abu Dhabi

CORRESPONDING AUTHOR: Omar El Shahawy, MD, MPH, PhD, New York University School of Medicine and New York University in Abu Dhabi Public Health Research Center

SYM21C

USING SIMULATION MODELING TO EXAMINE PERINATAL HEALTH CONSEQUENCES OF SMOKELESS TOBACCO USE AMONG PREGNANT INDIAN WOMEN

Jean Schensul^{*1}, Saritha Nair², David Lounsbury³, ¹Institute for Community Research, CT, USA, ²National Institute for Medical Statistics, Delhi, India, ³Montefiore Medical Center, Albert Einstein School of Medicine, NY, USA

SIGNIFICANCE: In India smokeless tobacco use is a significant population level women's health problem contributing to oral cancers and perinatal health problems including anemia, low birth weight and premature births. Regulatory efforts to curb SLT use (eg. Bans, restrictions on marketing and sales) have been ineffective because they have not considered how supply and demand factors, social norms, local response gaps and individual needs intersect in complex ways to influence women's SLT use and health consequences. Also low income Indian women view SLT use as offering many advantages overall and during pregnancy and women have few incentive to reduce use or community level tobacco availability or accessibility. METHODS: Over a four year period a U.S./India team conducted mixed methods community ethnography (mapping tobacco outlets, indepth interviews with female SLT users of reproductive age and tobacco sellers, observations of tobacco use, surveys with SLT using women aged 18 - 40 and group feedback on results). These observations identified systemic factors (availability, accessibility, acceptability, social influence on tobacco use) and socio-cultural/cognitive factors associated with use including during pregnancy. In this paper we report on a system dynamics approach to modeling factors contributing to SLT use among women and reproductive health consequences using an ethnographically based causal loop diagram showing feedback loops promoting and preventing use, and a simulation model using multiple data sources to project low birthweight, premature births, mortality and post-birth morbidity. The model incorporates government tobacco control inputs and community led tobacco control interventions to illustrate how combinations of interventions affect tobacco related perinatal health consequences in an SLT using population. Conclusions/implications. This approach addresses a significant gender gap in tobacco control in S. Asia, demonstrates how causal loop diagrams and system dynamics simulations can model alternative inputs to influence tobacco related perinatal outcomes and related tobacco control policies among low income women in India and elsewhere.

FUNDING: Fogarty/NCI grant #1R03TW008350-01 (Schensul, J. PI)

CORRESPONDING AUTHOR: Jean Schensul, PhD, Institute for Community Research, CT, USA

SYM21D

ARE AUSTRALIAN CLINICIANS ASKING ABOUT CONTEMPORARY EXPOSURES TO TOBACCO, SMOKING AND NICOTINE DURING PREGNANCY IN AUSTRALIA? A NATIONAL CROSS-SECTIONAL SURVEY

Gillian Gould^{*1}, Yael Bar-Zeev¹, Laura Twyman², Christopher Oldmeadow³, Billie Bonevski¹, ¹University of Newcastle, Australia, ²Cancer Council New South Wales, ³Hunter Medical Research Institute, Newcastle, NSW, Australian

INTRODUCTION: Tobacco smoking has serious effects on mothers and babies. Over 75% of Australian health professionals ask pregnant women about tobacco smoking. Pregnant women are exposed to other forms of smoking, and new exposures have appeared. The study explored clinician practices of asking pregnant women about e-cigarette use, cannabis smoking, chewing tobacco, and second hand smoke (SHS) exposure. METHODS: National cross-sectional surveys included an on-line survey of General Practitioners (GPs), and a paper survey of GPs and Obstetricians (OBS). The on-line survey was emailed to a random sam-

ple of 500 GPs from the National Faculty of Aboriginal and Torres Strait Islander Health (NFATSIH). The paper-based survey was posted to 5571 GPs and OBS from Royal Australian and New Zealand College of Obstetricians and Gynaecologists. The eligibility criterion was consulting with pregnant women. N=378 GPs and OBS in clinical practice participated. Outcome measures were percentages of clinicians asking pregnant women about using e-cigarettes, cannabis, chewing tobacco and SHS (5-point Likert Scales). Kruskal-Wallis (KW) tests analysed the scales by clinician group. Likert Scales were transformed into dichotomous variables for logistic regressions, and significant associations from univariate analyses placed in the model. RESULTS: Total percentages of respondents asking often-always were: 13-14% e-cigarettes with/without nicotine; 58% cannabis; 38% cannabis with tobacco; 27% SHS, and 10% chewing tobacco. Regression analysis revealed significant associations with NFATSIH GPs and asking about cannabis -OR=3.1 (95% CI 1.2-8), compared with other GPs; and SHS - OR=3.0 (95% CI 1.3-7.1), compared with OBS. Geographic location was associated with asking about cannabis (regional) OR=1.9 (95% CI 1.1-3.2) and chewing tobacco (remote) - OR=5.4 (95% CI 1.3-21.9): compared to urban. CONCLUSION: Most Australian GPs and Obstetricians infrequently ask pregnant women about e-cigarette use, chewing tobacco and SHS exposure. Clinical practice guidelines need to incorporate how clinicians should ask and advise pregnant women about other forms of smoking, including e-cigarettes and cannabis.

FUNDING: Royal Australian College of General Practitioners Chris Silagy Scholarship, National Health and Medical Research Council Fellowship, and Cancer Institute New South Wales Fellowship.

CORRESPONDING AUTHOR: Gillian Gould, PhD, MA, MBChB, University of Newcastle, Australia

SYM22

TOBACCO USE TRANSITIONS AMONG YOUTH AND ADULTS: DESCRIPTIVE LONGITUDINAL DATA FROM WAVES 1 AND 2 OF THE PATH STUDY

The PATH Study Team, NIDA/FDA, MD, USA

This symposium will present preliminary longitudinal results from the Population Assessment of Tobacco and Health (PATH) Study. The PATH Study is an address-based nationally representative, longitudinal cohort study of 45,675 adults and youth in the United States aged 12 years and older. The study uses Audio-Computer Assisted Self-Interviews for adults and youth to collect information on tobacco-use patterns across tobacco products on the U.S. market; risk perceptions and attitudes towards tobacco products including emerging tobacco products; and tobacco initiation, cessation, and relapse behaviors. After a short overview of the PATH Study design and methods, we will expand on the cross-sectional Wave 1 data presented at SRNT in 2016 by describing selected longitudinal tobacco use transitions between Waves 1 and 2 (2013/14 to 2014/15) across different tobacco products focusing on the following four Wave 1 groups: 1) youth and adult never tobacco users, 2) youth and adult single, 3) youth and adult poly-tobacco product users, and 4) adult former users. The presentation will conclude with a discussion regarding the significance of the findings for tobacco regulatory science, an update for researchers on what PATH Study data are available and how to access it, and an opportunity for questions from the audience.

JUSTIFICATION: The cumulative, population-based data generated over time by the PATH Study will contribute to the evidence base to inform FDA's regulatory mission under the Family Smoking Prevention and Tobacco Control Act and efforts to reduce the Nation's burden of tobacco-related death and disease

FUNDING: This project has been funded in whole with federal funds from the National Institute on Drug Abuse, National Institutes of Health, and the Food and Drug Administration, Department of Health and Human Services under a Contract to Westat (Contract No. HHSN271201100027C). The views and opinions expressed in this presentation are those of the authors only and do not necessarily represent the views, official policy or position of the US Department of Health and Human Services or any of its affiliated institutions or agencies.

CORRESPONDING AUTHOR: Andrew Hyland, Roswell Park Cancer Institute, Buffalo, NY

SYM22A

TOBACCO USE TRANSITIONS AMONG YOUTH AND ADULTS: DESCRIPTIVE LONGITUDINAL DATA FROM WAVES 1 AND 2 OF THE PATH STUDY

The PATH Study Team*, NIDA/FDA, MD, USA

This symposium will present preliminary longitudinal results from the Population Assessment of Tobacco and Health (PATH) Study. The PATH Study is an address-based nationally representative, longitudinal cohort study of 45,675 adults and youth in the United States aged 12 years and older. The study uses Audio-Computer Assisted Self-Interviews for adults and youth to collect information on tobacco-use patterns across tobacco products on the U.S. market; risk perceptions and attitudes towards tobacco products including emerging tobacco products; and tobacco initiation, cessation, and relapse behaviors. After a short overview of the PATH Study design and methods, we will expand on the cross-sectional Wave 1 data presented at SRNT in 2016 by describing selected longitudinal tobacco use transitions between Waves 1 and 2 (2013/14 to 2014/15) across different tobacco products focusing on the following four Wave 1 groups: 1) youth and adult never tobacco users, 2) youth and adult single, 3) youth and adult poly-tobacco product users, and 4) adult former users. The presentation will conclude with a discussion regarding the significance of the findings for tobacco regulatory science, an update for researchers on what PATH Study data are available and how to access it, and an opportunity for questions from the audience.

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CORRESPONDING AUTHOR: Andrew Hyland, Roswell Park Cancer Institute, Buffalo, NY

SYM22B

TOBACCO USE TRANSITIONS AMONG YOUTH AND ADULTS: DESCRIPTIVE LONGITUDINAL DATA FROM WAVES 1 AND 2 OF THE PATH STUDY

The PATH Study Team*, NIDA/FDA, USA

This symposium will present preliminary longitudinal results from the Population Assessment of Tobacco and Health (PATH) Study. The PATH Study is an address-based nationally representative, longitudinal cohort study of 45,675 adults and youth in the United States aged 12 years and older. The study uses Audio-Computer Assisted Self-Interviews for adults and youth to collect information on tobacco-use patterns across tobacco products on the U.S. market; risk perceptions and attitudes towards tobacco products including emerging tobacco products; and tobacco initiation, cessation, and relapse behaviors. After a short overview of the PATH Study design and methods, we will expand on the cross-sectional Wave 1 data presented at SRNT in 2016 by describing selected longitudinal tobacco use transitions between Waves 1 and 2 (2013/14 to 2014/15) across different tobacco products focusing on the following four Wave 1 groups: 1) youth and adult never tobacco users, 2) youth and adult single, 3) youth and adult poly-tobacco product users, and 4) adult former users. The presentation will conclude with a discussion regarding the significance of the findings for tobacco regulatory science, an update for researchers on what PATH Study data are available and how to access it, and an opportunity for questions from the audience.

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CORRESPONDING AUTHOR: Andrew Hyland, Roswell Park Cancer Institute, Buffalo, NY



SYM22C

TOBACCO USE TRANSITIONS AMONG YOUTH AND ADULTS: DESCRIPTIVE LONGITUDINAL DATA FROM WAVES 1 AND 2 OF THE PATH STUDY

The PATH Study Team*, NIDA/FDA, MD, USA

This symposium will present preliminary longitudinal results from the Population Assessment of Tobacco and Health (PATH) Study. The PATH Study is an address-based nationally representative, longitudinal cohort study of 45,675 adults and youth in the United States aged 12 years and older. The study uses Audio-Computer Assisted Self-Interviews for adults and youth to collect information on tobacco-use patterns across tobacco products on the U.S. market; risk perceptions and attitudes towards tobacco products including emerging tobacco products; and tobacco initiation, cessation, and relapse behaviors. After a short overview of the PATH Study design and methods, we will expand on the cross-sectional Wave 1 data presented at SRNT in 2016 by describing selected longitudinal tobacco use transitions between Waves 1 and 2 (2013/14 to 2014/15) across different tobacco products focusing on the following four Wave 1 groups: 1) youth and adult never tobacco users, 2) youth and adult single, 3) youth and adult poly-tobacco product users, and 4) adult former users. The presentation will conclude with a discussion regarding the significance of the findings for tobacco regulatory science, an update for researchers on what PATH Study data are available and how to access it, and an opportunity for questions from the audience.

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CORRESPONDING AUTHOR: Andrew Hyland, Roswell Park Cancer Institute, Buffalo, NY

SYM23

NICOTINE PRELOADING: EFFECTIVENESS AND MECHANISMS

Paul Aveyard, FRCGP PhD, University of Oxford, United Kingdom; Peter Hajek, PhD, Queen Mary University of London, United Kingdom; Stuart Ferguson, PhD, University of Tasmania, Australia

There currently exist several effective pharmacotherapies that can help smokers quit. Even with a high degree of efficacy compared to placebo however, most patients treated with the standard treatment regimens do not achieve long-term smoking cessation and there remains a considerable scope for improvement. Both nicotine replacement treatments and varenicline have been shown to reduce urges to smoke and enjoyment of smoking and this opens a possibility that providing such treatments for a period of time PRIOR to stopping smoking may enhance treatment efficacy. The current use of these medications relies on their effects on alleviating post-cessation withdrawal discomfort. Using them while still smoking (pre-loading) could utilise this other effect that they can have on lowering the subjective reward that accompanies smoking and thus weakening the association of smoking with enjoyment. This in turn could in theory enhance smoking cessation and treatment efficacy. Several early tests of this hypothesis were inconclusive. This symposium will report for the first time the results from the largest study of nicotine pre-loading to date, as well as from a new study that included both NRT and varenicline. The presentations will cover treatment efficacy as well as the results of testing the hypothetical active ingredients of any effects. The concluding panel discussion with the presenters and the invited discussant will focus on directions for future research.

JUSTIFICATION: Using cessation medication prior to quit day is rarely used in clinical practice and there is equivocal evidence on whether it is effective. This symposium will present new data on effectiveness and mechanisms of action.

FUNDING: The Preloading trial was funded by the UK National Institute for Health Research. The trial by Ferguson and colleagues was funded by Pfizer via a GRAND award.

CORRESPONDING AUTHOR: Paul Aveyard, FRCGP PhD, University of Oxford, United Kingdom

SYM23A

NICOTINE PRELOADING: A RANDOMISED TRIAL

Paul Aveyard*, University of Oxford, United Kingdom

BACKGROUND: The most recent meta-analysis of nicotine preloading shows no strong evidence that nicotine preloading improves quit rates, but with heterogeneity between studies. Here we examine the efficacy, safety, and tolerability of a new and so far the largest trial of preloading. **METHODS:** In a multi-centre, non-blinded, randomised controlled trial, we aimed to enrol 1786 smokers who wanted to quit. Participants were randomised to use a 21 milligram/24-hour nicotine patch for four weeks before quitting, whilst smoking as normal, or to a control group with no intervention. Thereafter, participants enrolled in the NHS Stop Smoking Service and used standard cessation pharmacotherapy of their choice and had weekly behavioural support from quit day onwards. We followed up participants at 1 week, 4 weeks, 6 months and 12 months after quit day. The primary outcome was prolonged, biochemically verified, six-month abstinence and serious and non-serious events recorded during preloading/control. **RESULTS:** We enrolled 1790 participants, 891 randomised to the control group and 899 to the preloading group. Participants smoked a mean (SD) 15 (12) cigarettes per day. 25% had a FTCD score of 3 or lower, 50% between 4 and 6, and 25% scored 7 or more. Data on cessation and adverse events are being analysed and we will present these in this session and show whether markers of cigarette dependence moderate any effects of preloading. **DISCUSSION:** This is substantially larger than previous trials and will give more precise estimates of effect and adverse events and examine moderation. We will update our previous meta-analysis and provide new and definitive evidence on the effectiveness of nicotine preloading.

FUNDING: UK National Institute for Health Research

CORRESPONDING AUTHOR: Paul Aveyard, FRCGP PhD, University of Oxford, United Kingdom

SYM23B

NICOTINE PRELOADING TRIAL: MEDIATION ANALYSIS

Peter Hajek*, Queen Mary University of London, United Kingdom

BACKGROUND: In a 2011 meta-analysis, we examined the potential mechanisms of action of nicotine preloading. The most likely mechanism is that preloading may disrupt positive and/or negative reinforcement of smoking and reduce the drive to smoke. This may in turn reduce ad lib cigarette consumption pre-quit and craving and relapse after the (?) quit day. However, there is only scant support for this happening in the eight extant studies. There is mixed evidence of effects on positive reinforcement, no apparent effect on negative reinforcement, small effects on pre-quit craving, mixed evidence on reduced cigarette consumption, and no effect on post-quit withdrawal. **METHODS:** In a new preloading trial, we randomised 1790 participants and measured potential mediators one week after starting 21mg/24 hour patch preloading or smoking as normal without patch. We included measures of positive reinforcement (enjoyment, modified Cigarette Evaluation Questionnaire, and smoking stereotypy), negative reinforcement (mCEQ and relief of withdrawal symptoms), cigarette consumption (exhaled carbon monoxide and cigarettes/day), and dependence (Fagerstrom Test for Cigarette Dependence). Baron and Kenny regression methods were used to examine whether these variables mediate the effect of preloading on abstinence at 4 weeks and 6 months. **RESULTS AND DISCUSSION:** Data are being analysed and the results will be presented at the session. The study is likely to provide new insights into whether and how preloading influences smoking cessation outcomes, presenting the first formal mediation analysis on this topic.

FUNDING: UK National Institute for Health Research

CORRESPONDING AUTHOR: Peter Hajek, PhD, Queen Mary University of London, United Kingdom



SYM23C

SATISFACTION WITH SMOKING, AND SMOKING REDUCTION, DURING PRE-QUIT TREATMENT WITH NICOTINE PATCH OR VARENICLINE

Stuart Ferguson*, University of Tasmania, Australia

BACKGROUND: There is substantial scope to improve our current stock of smoking cessation methods. Gaining a better understanding of how treatments influence abstinence may allow for better tailoring of treatments and, ultimately, better outcomes. The objectives of the current analyses were to test the effects of the pre-quit use of varenicline and patch on smoking rate and satisfaction with smoking, and to examine whether pre-quit reduction predicted quit outcomes. **METHODS:** Participants (n=213) were randomised (open-label) to receive either standard patch treatment (10wks starting from a designated quit day; SP), pre-quit patch treatment (starting 2wks prior to a quit day, followed by 10 wks post-quit; PQP) or varenicline (starting 2wks prior to quit day followed by 10 wks post-quit). Participants used modified smart-phones to monitor their smoking in real-time during the pre-quit period. [Trial Registration: Australian New Zealand Clinical Trials Registry - ACTRN12614000329662.] **RESULTS:** Participants in both the PQP and VAR groups reported significant reductions in both the satisfaction gained from smoking ($p < .001$) and their daily cigarette intake ($p < .001$) during the pre-quit period; biological markers of smoking also decreased. Participants in the SP group did not. Reduction in smoking during the pre-quit phase predicted post-quit outcomes. **DISCUSSION:** The results are consistent with hypothesis that the reduction in daily smoking typically observed during pre-quit treatment is linked to reductions in satisfaction, and that they are a result of treatment (as opposed to happening naturally as smokers approach a quit day). The results also suggest that reducing smoking prior to quitting improves the odds of quitting. Monitoring such reductions may prove a useful method of evaluating responsiveness to treatment. How this could be done, and how it could be used for tailoring treatment to individual users, will be discussed.

FUNDING: This project is supported by a researcher-initiated project grant from Pfizer (through the GRAND initiative) awarded to SGF. Additional funding was provided the Royal Hobart Hospital Research Foundation (awarded to SGF).

CORRESPONDING AUTHOR: Stuart Ferguson, PhD, University of Tasmania, Australia

SYM23D

DOES SMOKING REDUCTION WHILE ON NICOTINE PRELOADING PREDICT CESSATION? FINDINGS FROM THE PRELOADING TRIAL

Paul Aveyard*, University of Oxford, United Kingdom

BACKGROUND: Several preloading studies have reported observational evidence that smoking reduction while using nicotine preloading predicts cessation. This observation has been used in trials to examine whether people who do not 'suppress' on NRT would be better to switch to alternative medication but these have produced mixed evidence. Recently we examined whether reduction on NRT predicted cessation (Addiction, 2016). In that study, participants on NRT preloading were randomised to advice to cut down prior to a quit day or to try to smoke as normal. In the group advised to cut down, those who did so were more likely to achieve cessation. However, there was no association between cutting down and subsequent cessation in those who were advised to smoke as normal. One explanation is that cutting down predicts cessation only if people are actively trying to cut down. Ability to cut down predicts ability to stop because the same skills are needed for both. In this presentation, we use data from the largest trial of nicotine preloading to date to examine whether the initial observations are confirmed or not. **Method** We will analyse data on the association between reduction in cigarette consumption during preloading and abstinence at 4 weeks and 6 months in 899 people who used 4 weeks of nicotine preloading with a 21mg/24 hour patch. Reduction will be assessed using percentage reduction in exhaled carbon monoxide assessed at baseline and one week into preloading and by reduction in self-reported cigarette consumption. Cessation is defined as Russell standard 4-week and 6-month prolonged abstinence. We will adjust for other predictors of cessation including FCD and maximum length of previous abstinence using a multivariable regression model. **Discussion** This will be the largest study of the association between reduction during preloading and subsequent cessation. By examining this and all the available data on the association between reduction and subsequent cessation, we will provide new evidence and an overview of the strength of this

association, the mechanisms by which preloading may act, and whether this is a useful marker of response to medication or simply a manifestation of ability to quit.

FUNDING: UK National Institute for Health Research

CORRESPONDING AUTHOR: Paul Aveyard, FRCGP PhD, University of Oxford, United Kingdom

SYM24

ADVANCES IN UNDERSTANDING NICOTINE DEPENDENCE IN AFRICAN AMERICAN SMOKERS: A TRANSDISCIPLINARY PERSPECTIVE

Nikki Nollen, PhD, University of Kansas School of Medicine, KS, USA; Rachel Tyndale, PhD, University of Toronto, Canada; Adam Leventhal, PhD, University of Southern California, CA, USA

Tobacco-related health disparities are strikingly acute among African American (AA) smokers who experience significantly greater smoking attributable morbidity and mortality compared to Caucasian Americans (CA) despite lower daily cigarette consumption. Biopsychosocial factors impact tobacco use, characteristics of nicotine dependence, pharmacotherapy response, and smoking cessation outcomes. This symposium brings together leading investigators to share the most recent discoveries from innovative research including smoking cessation pharmacotherapy clinical trials, examination of genetic variations in drug metabolism and treatment response, and laboratory evaluation of psychosocial factors central to nicotine dependence. To begin this transdisciplinary discourse, Dr. Nikki Nollen will present primary outcomes from the first clinical trial designed to directly examine disparities in smoking cessation outcomes between AA and CA smokers treated with varenicline. Next, to elucidate potential mechanisms for explaining lower quit rates among AA smokers, Dr. Rachel Tyndale will discuss new data focusing on the complex role of genetic variation in drug metabolism (OCT2 and NMR) and treatment response from a second clinical trial of AA and CA smokers. Dr. Adam Leventhal will then describe novel laboratory findings evaluating biopsychosocial predictors of tobacco withdrawal in AA smokers, and will discuss the clinical implications of these findings. Finally, Dr. Jasjit Ahluwalia will integrate the results within a transdisciplinary perspective, highlighting how these genetic, psychosocial, and treatment findings enhance our understanding of nicotine dependence and tobacco use in African Americans and contribute to advancing future research and clinical treatment to reduce health disparities.

JUSTIFICATION: African Americans experience disparities in tobacco-related morbidity, mortality, and treatment response. By highlighting differences in treatment outcomes and their underlying mechanisms, this symposium provides targets for clinical research and practice for the advancement of treatment of African American smokers and the reduction of the gap in tobacco-related outcomes.

FUNDING: This research was made possible by the National Institutes of Health (S10 RR026437; NCT01314001), National Human Genome Research Institute, National Institute on Drug Abuse (R01-DA031815, Nollen; P30DA012393, Benowitz, U01-DA20830, Lerman, Tyndale), Frontiers: The Heartland Institute for Clinical and Translational Research which is supported by a CTSA grant to the University of Kansas Medical Center from National Center for Advancing Translational Science (UL1TR000001, KUMC), National Cancer Institute (P30 CA168524, KUMC; P50CA180890, Benowitz), FDA Center for Tobacco Products, Abramson Cancer Center at the University of Pennsylvania (P30 CA16520; Lerman), University of Toronto Dept of Psychiatry and Canadian Institutes of Health Research (TMH-109787, Tyndale), the Endowed Chair in Addictions for the Department of Psychiatry (R.F Tyndale), CAMH Foundation, the Canada Foundation for Innovation (#20289, #16014), and the Ontario Ministry of Research and Innovation (Tyndale) and RSG-13-163-01 (Leventhal).

CORRESPONDING AUTHOR: Lisa Sanderson Cox, PhD, University of Kansas School of Medicine, Kansas City, KS, USA



SYM24A

VARENICLINE IS LESS EFFECTIVE IN AFRICAN AMERICAN COMPARED TO CAUCASIAN AMERICAN SMOKERS: RESULTS FROM A PROSPECTIVE STRATIFIED CLINICAL TRIAL

Nikki Nollen^{*1}, Lisa Sanderson Cox¹, Matthew Mayo¹, Edward Ellerbeck¹, Taneisha Scheuermann¹, Rachel Tyndale², Neal Benowitz³, Jasjit Ahluwalia⁴, ¹University of Kansas School of Medicine, KS, USA, ²University of Toronto, ³University of California San Francisco, ⁴Academic Consultant

African Americans (AA) smoke fewer cigarettes per day than Caucasian Americans (CA) but experience greater smoking attributable morbidity and mortality. Clinical trials with AA smokers have reported lower quit rates than trials enrolling primarily CA smokers, but no rigorously designed studies have been conducted to test these differences. The current study is the first head-to-head trial designed with the primary aim of examining AA-CA disparities in quitting smoking. METHODS: Using a prospective stratified cohort design, 224 AA and 225 CA daily smokers (3-20 CPD) who were interested in quitting were stratified within race on dichotomized age (< 40, ≥ 40) and gender and enrolled in a 6-month smoking cessation intervention (56 per race, age, and gender cohort). All participants received 12 weeks of varenicline (VAR) in combination with 6 sessions of smoking cessation counseling. Outcome was salivary cotinine-verified 7-day point prevalence smoking abstinence at Week 26 (primary) and at Weeks 4 and 12 (secondary). A cut-point of 15 ng/mL differentiated smokers from nonsmokers. RESULTS: In intent-to-treat analyses imputing those lost to follow-up as smokers, AA were significantly less likely than CA to be abstinent at Week 26 (14% vs 24%, OR=0.51, 95% CI=0.32-0.83, p=0.0065) and at Weeks 4 (14% vs 31%, OR=0.37, 95% CI=0.23-0.59, p<.0001) and 12 (18% vs 31%, OR=0.48, 95% CI=0.31-0.75, p=0.0011). In the final logistic regression model examining the effect of the stratification variables on Week 26 abstinence, race (OR=0.51, 95% CI=0.32-0.83, p=0.007) and dichotomized age (OR=0.60, 95% CI=0.37-0.98, p=0.039) remained. No difference was found in the prevalence of moderate to severe VAR-related side effects (17.1% AA, 19.8% CA, p=0.20). CONCLUSIONS: AA and CA experienced similar prevalence of side effects but VAR was less effective in promoting abstinence at all time points in AA relative to CA smokers. Future planned analyses will examine demographic, smoking (e.g., menthol), treatment process (e.g., adherence), and biological (e.g., nicotine metabolism phenotype and genotype, OCT2 variants) mechanisms underlying this difference.

FUNDING: Research reported in this publication was supported by R01-DA031815 (N.L. Nollen) from the NIH, National Institute on Drug Abuse, Frontiers: The Heartland Institute for Clinical and Translational Research which is supported by a CTSA grant to the University of Kansas Medical Center from the NIH National Center for Advancing Translational Science (NCATS; grant # UL1TR000001), and by the National Cancer Institute Cancer Center Support Grant P30 CA168524. The work was also supported by P50CA180890 (N.L. Benowitz) from the National Cancer Institute and the FDA Center for Tobacco Products, P30DA012393 (N.L. Benowitz) from the National Institute on Drug Abuse, and with instrumentation and analytical chemistry support from the National Institutes of Health, S10 RR026437. We acknowledge the support of the Endowed Chair in Addictions for the Department of Psychiatry (R.F. Tyndale), and CIHR grant TMH-109787 (R. F. Tyndale).

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SYM24B

VARIATION IN NICOTINE METABOLISM AND RENAL TRANSPORT ALTER VARENICLINE TREATMENT IN AFRICAN AND CAUCASIAN SMOKERS

Rachel Tyndale^{*1}, Annie Peng¹, Andy Zhu¹, Caryn Lerman², ¹University of Toronto, Canada, ²University of Pennsylvania-Philadelphia

Hepatic enzyme CYP2A6 inactivates nicotine; its phenotypic marker, the nicotine metabolite ratio (NMR), predicts smoking cessation. Varenicline, a smoking cessation drug, is eliminated through glomerular filtration and active tubular secretion (i.e. OCT2). The aims were to examine whether genetic variation in OCT2 influences varenicline levels and to assess variation in NMR and OCT2 on week 12 end-of-treatment (EOT) abstinence on varenicline. METHODS: Week 1 salivary varenicline levels and EOT abstinence (exhaled CO≤8 ppm) were assessed treatment-seeking smokers, recruited based on baseline NMR (NCT01314001). OCT2 variants were genotyped on Illumina OmniExpressExome. Regression analyses were used to assess impact of predictors on varenicline levels and abstinence, after controlling for the effects of covariates, initially in everyone (N=283), and then

explored separately in AA (N=110) and CA (N=173). RESULTS: Among those with detectable varenicline levels (ng/mL), OCT2 rs595374 (CCvsCT+TT) genotype predicted varenicline levels (All:beta=-0.140,p=0.047;AA:beta=-0.195,p=0.06;-CA:beta=-0.087,p=0.38); the CC genotype was associated with lower varenicline levels. NMR and OCT2 rs595374 were unique predictors of abstinence, even after controlling for varenicline levels. Specifically, normal compared to slow metabolizers (All:OR=2.63,p=0.001;AA:OR=1.41,p=0.48;CA:OR=3.93,p=0.001) and CC participants compared to CT+TT (All:OR=2.07,p=0.02;AA:OR=1.79,p=0.24;-CA:OR=3.04,p=0.02) were more likely to be abstinent. Normal metabolizers with the CC genotype (33% CA, 8.2% AA), compared to all others were most likely to be abstinent (All:OR=3.87, p=0.001;AA:OR=8.12,p=0.03;CA:OR=3.92,p=0.001). CONCLUSIONS: Variation in OCT2 alters varenicline levels, which may have a larger effect in AA than CA. Further, OCT2 and NMR were associated with abstinence, likely involving mechanisms beyond varenicline levels. The factors found to improve the odds of abstinence (normal metabolism, CC genotype) are less prevalent in AA than CA (32%vs54%, 35%vs61% respectively). These findings suggest a complex role for variation in OCT2 and NMR in cessation; the degree of impact may differ between AA and CA.

FUNDING: This work and clinical trial (NCT01314001) was supported by a grant from the National Institute on Drug Abuse, the National Cancer Institute, the National Human Genome Research Institute, and the National Institute on General Medical Sciences (U01-DA20830; C.L. and R.T.), funding from the Abramson Cancer Center at the University of Pennsylvania (P30 CA16520; C.L.), a grant from the Canadian Institutes of Health Research (CIHR TMH109787), an endowed Chair in Addiction for the Department of Psychiatry (R.T.), CAMH foundation (R.T.), the Canada Foundation for Innovation (#20289 and #16014), and the Ontario Ministry of Research and Innovation (R.T.).

CORRESPONDING AUTHOR: Rachel Tyndale, PhD, University of Toronto, Canada

SYM24C

SOCIOPHARMACOLOGICAL PREDICTORS OF TOBACCO WITHDRAWAL AMONGST AFRICAN AMERICANS

Adam Leventhal^{*}, Mariel Bello, Mollie Pester, Claudia Aguirre, Madalyn Liautaud, Matthew Stone, Nicolas Goldenson, Raina Pang, Matthew Kirkpatrick, Lara Ray, University of Southern California, CA, USA

BACKGROUND: Sociopharmacological perspectives of tobacco addiction purport that social and biological contexts that stratify by race moderate the psychopharmacological effects of nicotine. Given this premise, factors that impact withdrawal in general smoker populations (e.g., sex, depression, nicotine dependence) may or may not generalize to African Americans (AAs) Social stressors disproportionately faced by AAs (e.g., discrimination, low social status, neighborhood problems) may amplify nicotine's negative reinforcing value and the aversive effects of tobacco abstinence. This laboratory study examined 3 well-documented and 3 novel social factors as predictors of tobacco withdrawal in AAs. METHOD: After a baseline visit at which putative withdrawal predictors were measured, non-treatment seeking AA smokers (N=429; ≥ 10 cig/day, 40% female, M age=49) living in the Los Angeles Metropolitan area attended two counterbalanced laboratory testing sessions (16-hr smoking abstinence vs. ad lib smoking). At both visits, participants completed self-report measures of withdrawal symptoms and a behavioral measure of willingness to delay smoking for money. RESULTS: Female sex, greater nicotine dependence, and depressive symptomatology predicted greater abstinence-induced changes in withdrawal symptoms (i.e., urges to smoke, hunger, negative mood, impulsivity, and concentration problems). Increased nicotine dependence also predicted greater abstinence-induced reductions in positive mood and ability to delay smoking. Perceived discrimination predicted greater abstinence-induced changes in urge, negative mood, impulsivity, and concentration problems. Lower subjective social status predicted abstinence-induced mood and concentration problems. Neighborhood problems did not predict withdrawal. CONCLUSION: Extant etiological models and clinical tactics for addressing tobacco withdrawal that incorporate sex, nicotine dependence level, and depression may generalize to AAs. Social stressors specific to AAs, including discrimination and low social status, warrant consideration in efforts to understand and eliminate psychopharmacological mediators of tobacco-related health disparities.

FUNDING: This research was supported by American Cancer Society Grant RSG-13-163-01.

CORRESPONDING AUTHOR: Adam Leventhal, PhD, University of Southern California, CA, USA



SYM25

THE ROLE OF RESEARCH IN MEETING FCTC COMMITMENTS TO INDIGENOUS PEOPLES: WHAT PROGRESS HAVE WE MADE

Andrew Waa, MPH, DPH, B.Soc.Sc, University of Otago - Wellington, New Zealand; David Thomas, PhD, MSc, DTM&H, MBBS, Menzies School of Health Research, Australia; Joanne D'Silva, MPH, ClearWay Minnesota, MN, USA; Heather Gifford, PhD, MPH, DPH, Whakauae Research Services, New Zealand

BACKGROUND: Indigenous peoples in countries with colonial histories are diverse, however their common experience of colonization is implicated in much higher rates of commercial tobacco use compared to their non-indigenous counterparts. Not only are such disparities unjust but they often represent violations of Indigenous rights. The 2005 Framework Convention on Tobacco Control (FCTC) recognizes the negative impacts of smoking on Indigenous peoples and the importance for governments to facilitate Indigenous participation in developing, implementing and evaluating culturally appropriate interventions. With over a decade since the FCTC came into force, it is timely to consider what progress has been made in reducing smoking prevalence among Indigenous peoples and in particular, advances in research and evidence needed to underpin action. **AIMS:** This symposium aims to increase audience understanding of Indigenous smoking disparities, causes of smoking, impacts of tobacco control policies, and effective practices for engaging with Indigenous peoples in research. **PRESENTATIONS:** Leading Indigenous and non-Indigenous researchers working with Indigenous peoples from Australia, the United States, New Zealand, and the Pacific will present research linked to the symposium aims. The symposium begins with a brief overview by Andrew Waa (NZ) and Raglan Maddox (Australia) about progress on FCTC commitments for Indigenous peoples. David Thomas (Australia) will then explore causes of smoking disparities using results from the Australian Indigenous ITC study (Talking About the Smokes). Joanne D'Silva (USA) will follow and outline an example of evaluating an intervention advancing commercial tobacco-free policies that effectively engaged with American Indian tribes. The final presentation by Heather Gifford (NZ) and El-Shadan Tautolo (NZ) provides an exemplar of culturally competent research based on the "Smoking an Informed Choice" study. The symposium concludes with a summary and audience questions to presenters facilitated by Patricia Nez Henderson, the first American Indian woman to graduate from Yale University School of Medicine.

JUSTIFICATION: The symposium will provide important information on the use of evidence to support FCTC commitments for indigenous peoples.

FUNDING: No funding has been received for the overall symposium. The paper presented by Andrew Waa and Raglan Maddox received no funding, the study presented by David Thomas was funded by the Australian Department of Health, Joanne D'Silva's study was funded by ClearWay Minnesota, and the study presented by Heather Gifford was supported by the Royal Society of New Zealand Marsden Fund.

CORRESPONDING AUTHOR: Andrew Waa, MPH, DPH, B.Soc.Sc, University of Otago, University of Otago, Wellington, New Zealand

SYM25A

FRAMEWORK CONVENTION ON TOBACCO CONTROL COMMITMENTS TO PEOPLES: HOW ARE WE DOING?

Andrew Waa¹, Raglan Maddox², ¹University of Otago - Wellington, New Zealand, ²University of Canberra

BACKGROUND: The Framework Convention on Tobacco Control (FCTC) recognizes the disproportionate harm caused by smoking and the need for governments to engage with indigenous peoples in planning, delivery, and evaluation of tobacco control interventions. This presentation provides a brief introduction to the 'indigenous' symposium by giving an overview of the FCTC in relation to indigenous peoples from countries with colonial histories and presenting a report card on progress towards key FCTC outcomes. **METHODS:** We reviewed data from FCTC country and global reports; country specific data on indigenous smoking; new data modelling indigenous smoking trends; and indigenous participation in published tobacco control research in Australia, Canada, New Zealand (NZ), the Pacific, and the United States. **RESULTS:** We found that of the FCTC parties submitting reports to WHO very few report on indigenous smoking. English speaking or higher GDP per capita countries tended to have higher indigenous smoking rates than non-English speaking or lower per capita countries. Regardless of whether or not a country is a FCTC party, high smoking indigenous smoking rates have persisted in many countries over the past decade and look set to continue. For example, recent NZ modelling has found continuing to deliver 'business as normal' tobacco

control interventions will lead to continuing smoking disparities between Māori (the indigenous peoples of NZ) and non-Māori. In terms of indigenous participation in tobacco control research, we also found that many studies had no indigenous co-authorship and many relied on cross-sectional data. **CONCLUSIONS:** The need to recognise FCTC commitments is greater than ever. In particular, collecting high quality and consistent monitoring data, implementing longitudinal studies to better understand the causes of smoking disparities, and meaningfully engaging with indigenous peoples in the development, implementation and dissemination of research, programs and policies is essential to reducing tobacco use, and consequently minimizing tobacco related morbidity and mortality for indigenous peoples.

FUNDING: No funding

CORRESPONDING AUTHOR: Andrew Waa, MPH, DPH, B.Soc.Sc, University of Otago - Wellington, New Zealand

SYM25B

UNDERSTANDING CAUSES OF DISPARITIES FOR INDIGENOUS PEOPLES: THE EXAMPLE OF THE ABORIGINAL AND TORRES STRAIT ISLANDER AUSTRALIANS AND THE TALKING ABOUT THE SMOKES PROJECT

David Thomas*, Menzies School of Health Research, Australia

SIGNIFICANCE: Aboriginal and Torres Strait Islander peoples are the Indigenous peoples of Australia. Aboriginal and Torres Strait Islander daily smoking prevalence is 39%, nearly three times that of other Australians. **METHODS:** Talking About The Smokes is an Australian national collaboration between research institutions, and Aboriginal community-controlled health services and their state and national representative bodies. It is one of the studies within the International Tobacco Control (ITC) Policy Evaluation Project, enabling comparisons with ITC Australian data to understand the causes of disparities. 2522 Aboriginal and Torres Strait Islander people in 35 locations completed baseline surveys in 2012/13, and 49% (849/1721) of the eligible baseline smokers and recent ex-smokers completed follow-up surveys a year later. **RESULTS:** At baseline we found that similar proportions of Aboriginal and Torres Strait Islander and of all Australian daily smokers want to quit, have made a quit attempt in the last year, live in smoke-free homes, and work in smoke-free workplaces. Similar proportions demonstrate knowledge of the most harmful health effects of smoking and hold negative personal attitudes towards smoking. But there are some differences. Fewer Aboriginal and Torres Strait Islander than all Australian daily smokers have ever made a quit attempt or sustained a quit attempt for at least a month. Fewer agree that there are social norms disapproving of smoking. Higher proportions of Aboriginal and Torres Strait Islander daily smokers saw a health professional in the past year and were advised to quit smoking. Compared with other daily Australian smokers, lower proportions of Aboriginal and Torres Strait Islander daily smokers had ever used any stop-smoking medicines (including nicotine replacement therapy) or used them in the past year. Even though similar proportions said that these medicines help smokers to quit. **CONCLUSIONS:** These results are being used to guide Aboriginal and Torres Strait Islander tobacco control policy and practice in Australia. Along with similar ITC Projects with Māori in New Zealand, this may be a useful model for other Indigenous peoples.

FUNDING: Talking About The Smokes was funded by the Australian Department of Health.

CORRESPONDING AUTHOR: David Thomas, PhD, MSc, DTM&H, MBBS, Menzies School of Health Research, Australia

SYM25C

THE TRIBAL TOBACCO EDUCATION AND POLICY INITIATIVE: FINDINGS FROM A COLLABORATIVE, PARTICIPATORY EVALUATION

Joanne D'Silva¹, Sheryl Scott², Barbara Schillo¹, Nicole Villaluz¹, Jaime Martinez¹, Carol Hernandez³, Chris Matter⁴, ¹ClearWay Minnesota, MN, USA, ²Scott Consulting Partners LLC, ³Mille Lacs Band of Ojibwe - Onamia, ⁴Blue Cross and Blue Shield of Minnesota

BACKGROUND: Despite reductions in US smoking prevalence, American Indian communities remain disproportionately impacted by commercial tobacco disparities. Article 4, 2c of the WHO Framework Convention on Tobacco Control calls for the participation of American Indians in the implementation and evaluation of



tobacco control efforts. In partnership with tribes, the Tribal Tobacco Education and Policy initiative supported tribal coordinators working within sovereign governments to advance commercial tobacco-free policies while respecting important traditional tobacco teachings. An ongoing participatory evaluation addressed key evaluation questions including what types of activities facilitate policy and norm changes and can community-generated change help restore tobacco tradition while reducing commercial tobacco use? **METHODS:** Tribal coordinators participated in developing change indicators and collecting data. Annual listening sessions with the funder, staff and evaluator fostered a co-learning environment. The final concurrent mixed method design included data collected from 2010 to 2013. Data were coded as 1) generating support (i.e. engaging tribal members, nurturing relationships, developing partnerships) and 2) generating community-focused change (i.e. increasing use of traditional tobacco, creating smoke-free events, introducing policy proposals, creating smoke-free policy). **RESULTS:** Coordinators used cultural knowledge to develop community-specific strategies, while drawing on the strengths of their sovereignty and sacred tobacco traditions. Coordinators generated support for policy change by conducting culturally-relevant education, engaging community members and nurturing relationships. **CONCLUSIONS:** This participatory model resulted in norm changes, the restoration of traditional tobacco, informal policies and tribal resolutions to advance commercial tobacco-free policies on tribal lands. Findings suggest that working collaboratively with tribes in the implementation and evaluation of commercial tobacco-free policies has the potential to advance health equity for tribal communities.

FUNDING: This study was funded by ClearWay Minnesota

CORRESPONDING AUTHOR: Joanne D'Silva, MPH, ClearWay Minnesota, MN, USA

SYM25D

INDIGENOUS ENGAGEMENT IN TOBACCO CONTROL RESEARCH: MAORI AND PACIFIC YOUNG ADULT VIEWS ON SMOKING AS AN INFORMED CHOICE

Heather Gifford^{*1}, El-Shadan Tautolo², ¹Whakauae Research Services, New Zealand, ²Auckland University of Technology

BACKGROUND: Tobacco companies frame smoking as an informed choice, a strategy that holds individuals responsible for harms they incur. Few studies have tested this argument, and even fewer have examined how 'informed' indigenous smokers, or smokers from minority ethnicities are when they start smoking. Our study explored how young adult Māori and Pacific smokers interpreted "informed choice" in relation to their smoking practices and behaviour. **METHODS:** There are various international guidelines regarding the ethical conduct of research with Indigenous populations. Using the Informed Choice Study as an exemplar, we discuss some fundamental principles of Best Practice Indigenous Research. Culturally competent recruitment, data collection, and analysis strategies were utilised to conduct qualitative in-depth interviews with 20 Māori and Pacific young smoking adults aged 18-26. We used a semi-structured interview guide to explore participants' smoking initiation and each component of Chapman and Liberman's "informed choice" Framework. Interviewers undertook an intensive review of their interview transcripts and developed an initial descriptive classification that drew on the interview guide and was grounded in their own cultural knowledge and perspectives. All interviewers (Māori, Pacific and European) then met face-to-face to compare and contrast the findings across all three ethnic groups. **RESULTS:** Few participants considered themselves well-informed and none met more than the Framework's initial criteria. Most reflected on their unthinking uptake and subsequent addiction, and identified environmental factors (often specific to their own cultural values and norms) that had facilitated uptake. Nonetheless, despite this context, most agreed that they had made an informed choice to smoke. **CONCLUSIONS:** Our findings not only explain disparities in smoking among Māori, Pacific and the general New Zealand population but more importantly we underline potential interventions that could denormalise smoking and reduce its acceptability in Māori and Pacific populations.

FUNDING: This work was funded by the Royal Society of New Zealand Marsden Fund

CORRESPONDING AUTHOR: Heather Gifford, PhD, MPH, DPH, Whakauae Research Services, New Zealand

SYM26

NEW MECHANISTIC AND TRANSLATIONAL VIEWS OF THE HIPPOCAMPUS IN NICOTINE DEPENDENCE AND RELAPSE: EVIDENCE BRIDGING MOUSE AND HUMAN

Thomas Gould, PhD, Penn State University, PA, USA; F. Joseph McClernon, PhD, Duke University School of Medicine, USA; Brett Froeliger, PhD, Medical University of South Carolina, SC, USA; Jill Turner, PhD, University of South Carolina, SC, USA

This symposium is sponsored by the SRNT Basic Science Network.

Nicotine withdrawal phenotypes, such as impaired cognition and affect, directly impact relapse to smoking. Better understanding of the neural substrates driving these phenotypes could potentially lead to more successful smoking cessation strategies. Supporting data in human and animal models link hippocampal function with cognitive and affective nicotine withdrawal impairments. For example, functional imaging studies in smokers have shown that activation of this brain region can be correlated with both cognitive and affective withdrawal symptoms. However, the role of this structure in mediating these effects is less well understood. Therefore, this symposium examines the diverse roles of the hippocampus in nicotine withdrawal phenotypes. This panel is designed in a tandem format, where both human and murine basic science researchers discuss the emerging role of the hippocampus in smoking behaviors, highlight current directions to understand the mechanisms underlying these links, and discuss opportunities for translating mechanism to intervention. First, Ms. Miranda Fisher will present her current work examining how gene expression in either the dorsal or ventral hippocampus dictates nicotine withdrawal behaviors. Her studies provide persuasive evidence towards the distinct roles of gene transcription within the dorsal and ventral hippocampus separately in mediating select nicotine withdrawal phenotypes. Next, Dr. Brett Froeliger will present his work on the role of the hippocampus and medial prefrontal cortex in cognitive control over negative affective states and smoking lapse vulnerability. His studies provide evidence that dorsal hippocampal function during negative emotion regulation predicts resisting smoking during a laboratory-based analog of smoking relapse. Then, Dr. Tom Gould will present on the long-term effects of adolescent nicotine on hippocampus-dependent learning and epigenetic changes. Last, Dr. Joe McClernon will give a translational view of the hippocampus in nicotine dependence and relapse and discuss his work using personalized, smoking-related environment cues as a way to strengthen instrumental extinction and decrease environment-provoked relapse. Following the presentations, the discussant will describe how these advances in understanding hippocampal functioning in the nicotine dependent brain may impact smoking cessation outcomes.

JUSTIFICATION: This panel is designed in a tandem format, where both human and murine basic science researchers discuss the emerging role of the hippocampus in smoking behaviors in order to identify opportunities for translating mechanism to intervention.

FUNDING: NIH/NIDA (JRT: R00-DA-032681) NIH/NIDA (B.F.: R01DA033459) NIH/NIDA (J.C.: R21 DA033083; R21DA037753 and Duke Cancer Institute.) NIH/NIDA (T.J.G.: DA017949)

CORRESPONDING AUTHOR: Jill Turner, PhD, University of South Carolina, Columbia, SC, USA

SYM26A

ADOLESCENT NICOTINE EXPOSURE DISRUPTS ADULT HIPPOCAMPUS-DEPENDENT LEARNING AND ALTERS METHYLATION OF CHROMATIN-RELATED GENES IN THE DORSAL HIPPOCAMPUS

Munir Kutlu¹, Miri Gitik², Erica Holiday³, Yuan Qiaoping², Leung Ming², David Goldman², Thomas Gould^{*1}, ¹Penn State University, PA, USA, ²National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health, ³Temple University

An unfortunate hallmark of adolescence is increased initiation of smoking; this is a serious health concern. Because adolescence is a period of dramatic development, the impact of adolescent nicotine exposure on long-term health is particularly troubling. Using a mouse model of adolescent nicotine exposure, our laboratory demonstrated that chronic adolescent nicotine exposure produced long-term cognitive deficits during adulthood that did not occur with adult exposure. Thus, we examined the effects of adolescent nicotine exposure on changes in DNA methylation and gene expression in the dorsal hippocampus and the effects of choline-enriched diet on behavioral and DNA methylation. Choline was chosen as it is a



methyl donor. For methylated DNA immunoprecipitation sequencing experiments, adolescent C57BL/6J mice (PND38) were implanted with subcutaneous mini-osmotic pumps delivering saline or nicotine (12.6 mg/kg/day) for 12 days. After 12 days, pumps were removed and mice were put on a regular or choline enriched diet (9g/kg) for 30 days. All mice were then trained and tested in fear conditioning during adulthood (PND80). Immediately after testing, dorsal hippocampi were collected. Genome-wide analysis identified 463 genes with methylation altered by adolescent nicotine exposure and reversed by choline treatment; chromatin remodeling-associated gene group (87 genes) showed the highest enrichment, suggesting that DNA methylation in this gene group was most affected by adolescent nicotine and choline treatment. To assess if methylation changes expression, we selected two genes (*Bahcc1* and *Smarca2*). Learning was disrupted in the nicotine group and restored in the nicotine-choline group. In the dorsal hippocampus, *Bahcc1* and *Smarca2* had increased methylation and decreased gene expression in adulthood following adolescent nicotine treatment, choline reversed this pattern. Overall, this suggests that adolescent nicotine produces long-term cognitive deficits by altering methylation of key genes regulating chromatin remodeling process such as *Bahcc1* and *Smarca2* and choline reverses the DNA hypermethylation observed in this gene group and ameliorates cognitive deficits.

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SYM26B

A TRANSLATIONAL VIEW OF THE HIPPOCAMPUS IN NICOTINE DEPENDENCE AND RELAPSE: FROM ANIMAL MODELS TO HUMAN NEUROIMAGING TO CLINICAL INTERVENTION.

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Environments associated with cigarette smoking, and smoking reward, elicit craving and promote lapse/relapse. Animal models of "context effects" including conditioned place preference (CPP) and context-induced reinstatement (CIR) have confirmed the role of environments in drug dependence; identified critical neural substrates (e.g. dorsal hippocampus; dHPC); and point the way to interventions for treating environment-provoked relapse. However, a lack of human analogues of these animal models has hampered efforts to capitalize on the existing animal literature. In a series of studies (Conklin et al., 2010; McClernon et al., 2016), we developed methods for capturing personalized, smoking-related environment cues (i.e. personal smoking environments; PSEs) as a basis for studying drug environment effects in the laboratory. In a neuroimaging study (McClernon et al., 2016), we gave smokers digital cameras and asked them to take pictures of environments reliably associated with smoking (i.e. PSEs) or abstaining from smoking (i.e. personal nonsmoking environments; PNEs). Viewing PSEs (relative to PNEs) in an fMRI scanner uniquely and robustly increased BOLD signal in the posterior hippocampus (pHPC; analogous to dHPC in rodents) and anterior insula. Moreover, we observed that pHPC-insula functional network strength was correlated with the number of puffs smokers took in response to viewing PSEs (relative to PNEs). Our current research is focused on both further mechanistic and treatment development efforts: 1) Extinction learning is highly context dependent. I will present preliminary data from a trial seeking to strengthen instrumental extinction (and decrease environment-provoked relapse) by exposing smokers to PSEs and other smoking environments while they smoke very low nicotine content cigarettes. 2) Tobacco retail outlets (TROs) represent a special class of smoking-related environments that have been shown to increase craving. I will present preliminary data from an fMRI study seeking to understand the neural basis of TRO-provoked craving. Finally, I will discuss additional avenues by which the animal literature on context effects can promote greater understanding and better treatment of environment-provoked relapse in nicotine dependent individuals.

FUNDING: National Institute of Health (R21 DA033083; R21DA037753) and Duke Cancer Institute.

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SYM26C

CORTICOLIMBIC CIRCUITRY FUNCTION MEDIATING NEGATIVE EMOTION REGULATION IS ASSOCIATED WITH LAPSE VULNERABILITY.

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Smoking and affective function are closely intertwined and considerable research suggests that dysregulated affect is a primary factor in the maintenance of tobacco addiction. Smokers report smoking in the face of negative affect (NA) inducing situations and often report that smoking reduces NA. Furthermore, smokers report that two primary factors precipitating relapse during a quit attempt are increased NA and difficulties with cognitive control (e.g. attention, memory, filtering distraction). Although the extant mechanistic research on relapse vulnerability demonstrates tobacco addiction dysregulates neural function in brain regions subserving cognitive control and negative affective processes, relations between proactive negative emotion regulation (ER) and smoking relapse remain to be elucidated. The purpose of this study, therefore, was to utilize fMRI to examine relations between negative ER-BOLD response and smoking behavior during a laboratory-based Smoking Relapse Analog Task (SRT). Smokers (N=26) were fMRI scanned while performing a well-validated ER Task while smoking sated. During the ER Task, participants were presented with negative emotional images and instructed to either reappraise or simply attend to their content. Following fMRI, participants performed the SRT in which a monetary incentive was given incrementally for delaying smoking. Regression analyses were conducted between latency to smoke during the SRT and BOLD response during ER (reappraise minus view) within a prefrontal / subcortical ROI-mask based on a priori hypotheses (pFWE <.05). Greater negative ER-BOLD response in medial prefrontal cortex and dorsal hippocampus predicted time to delay smoking on the SRT. These results suggest that individual differences in cortic limbic circuitry function mediating negative emotion regulation may play an important role in regulating smoking behavior. Results will be discussed in the context of strategies for enhancing emotion regulation and promoting smoking cessation.

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SYM26D

NICOTINE WITHDRAWAL INDUCED BEHAVIORS ARE DIFFERENTIALLY REGULATED BY CREB ACTIVITY WITHIN THE VENTRAL AND DORSAL HIPPOCAMPUS: POSSIBLE ROLE FOR NRG3 SIGNALING

Miranda Fisher^{*1}, Jill Turner¹, ¹University of South Carolina, SC, USA

Nicotine dependence and the ability to quit smoking are influenced by genetic factors through transcriptionally driven adaptive changes. One well-characterized protein responsible for regulating both response to drugs and gene expression is the transcription factor CREB. Work from our lab indicates that hippocampal specific alterations in CREB signaling and synaptic plasticity may underlie certain nicotine withdrawal phenotypes (Turner et al., 2013a; Turner et al., 2013b). We find that selective dorsal or ventral hippocampal CREB deletion in CREBloxP animals undergoing chronic saline, nicotine, or 24h withdrawal results in differential behavioral responses to treatment. Dorsal hippocampal CREB deletion results in impairment in fear conditioning; in contrast, ventral hippocampal CREB deletion enhances fear conditioning, but also ablates withdrawal-induced anxiety within the novelty-induced hypophagia task. QPCR analysis of ventral and dorsal hippocampal gene expression following chronic treatment suggests CREB target genes associated with synaptic plasticity are differentially regulated during nicotine treatment between these two regions. A CREB target gene both implicated in synaptic plasticity and shown to drive these behavioral withdrawal effects is Neuregulin 3 (NRG3). Our electrophysiological field recordings within the ventral hippocampus show that nicotine's effects on LTP plasticity are altered by inhibition of NRG3 signaling. This suggests NRG3 may regulate neural adaptations occurring during nicotine use. Ongoing studies are evaluating the precise mechanism by which NRG3 signaling influences nicotine's effects on neuroplasticity. Results from these studies may lead to a new target for smoking cessation therapies aiming to alleviate withdrawal-induced anxiety.

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CORRESPONDING AUTHOR: Jill Turner, PhD, University of South Carolina, SC, USA

SYM27

UNDERSTANDING DIVERSE PATTERNS OF POLY-TOBACCO AND CANNABIS PRODUCT USE AMONG YOUTH AND YOUNG ADULTS: LONGITUDINAL DATA FROM FOUR TOBACCO CENTERS FOR REGULATORY SCIENCE

Grace Kong, PhD, Yale University, CT, USA; Jessica Barrington-Trimis, PhD, University of Southern California, USA; Melissa Harrell, PhD, University of Texas Health, School of Public Health, Austin Campus, TX, USA; Janet Audrain-McGovern, PhD, University of Pennsylvania, PA, USA

Recent proliferation in the availability of different types of tobacco products has corresponded with an increasing diversity in patterns of poly-product use amongst adolescents and young adults. Young populations are using both emergent (e-cigarettes, novel cigar products) and traditional (combustible cigarettes) products in a variety of progression sequences that are poorly understood. Novel cannabis products have also recently entered the marketplace—some of which have distinctive features that parallel emergent tobacco products, such as cannabis vaporizing using e-cigarette devices. This symposium aims to promote and develop an integrative understanding of poly-tobacco and cannabis product use sequences among youth and young adults. To this end, researchers from four U.S. Tobacco Centers of Regulatory Science (TCORS) present results from novel longitudinal data analyses characterizing cross-product transitions. The presentations include both individual sample and pooled multi-sample analyses, which collectively constitute responses from more than 10,000 adolescents and young adults in total. Dr. Kong will present findings from a multi-TCORS pooled adolescent cohort study evaluating risk of transition from cigars to combustible cigarette use. Dr. Barrington-Trimis will present results from a multi-TCORS pooled analysis of transitions from e-cigarette use to combustible cigarette use level and to dual e-cigarette/cigarette use. Dr. Harrell will present results from cross-lagged models to evaluate bi-directional transitions among youth from e-cigarettes to cigarettes and from cigarettes to e-cigarettes. Dr. Audrain-McGovern will present results on transitions in adolescent use of various tobacco products to use of various cannabis products. The discussant, Dr. Mermelstein, will review strategies for pooling observational research and methodological approaches for interpretation of causal relationships with an eye toward involving policy and prevention.

JUSTIFICATION: This symposium aims to promote and develop an integrative understanding of poly-tobacco and cannabis product use sequences among adolescents and young adults.

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SYM27A

CIGAR USE AND SUBSEQUENT CIGARETTE INITIATION

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INTRODUCTION: Cigarette smoking among youth is decreasing while other tobacco product use such as cigars (which includes big/little cigars, cigarillos) is increasing. However, use of other tobacco products may increase the risk for cigarette initiation. Therefore, we assessed whether cigar use among never cigarette smoking youth increases the odds of cigarette initiation. **METHODS:** We pooled data from three prospective cohort studies (N=6251) in California (Children's Health Study [CHS] 2014-15 [n=1451], the Happiness & Health Study [H&H] 2013-15 [n=3396]) and (Yale Survey 2013-14 [n=1404]) in Connecticut assessing tobacco use behaviors and perceptions. Logistic regression analyses examined whether cigar smoking among never cigarette smokers predicted cigarette initiation while controlling for demographic variables (e.g., grade, sex, race), study site, e-cigarette use, and cigarette susceptibility. **RESULTS:** Among never cigarette smokers (n=5154), 3.4% reported ever cigar smoking in Time 1. Adjusted logistic regression model showed that cigar use in Time 1 predicted cigarette initiation in Time 2 (AOR=2.54, 95% CI: 1.53-4.24); 30.3% cigar smokers who had never smoked cigarettes in Time 1 initiated cigarette smoking at Time 2, relative to 8.4%

never cigar smokers who had never smoked cigarettes at Time 1 who initiated cigarette smoking at Time 2. Among cigar smokers in Time 1, those who initiated cigarettes relative to those who did not initiate cigarettes were more likely to be female (70.0% vs. 48.7%, p<.01), White (72.0% vs. 36.9%, p<.01), and e-cigarette users (70.0% vs. 36.02%, p<.01). **CONCLUSION:** Cigar smoking among never cigarette smoking youth uniquely predicts cigarette initiation. Future studies should explore the causal pathways through which cigars may lead to cigarette smoking.

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CORRESPONDING AUTHOR: Grace Kong, PhD, Yale University, CT, USA

SYM27B

E-CIGARETTE USE AND PROGRESSION TO CIGARETTE SMOKING AND DUAL PRODUCT USE

Jessica Barrington-Trimis^{*1}, Grace Kong², Adam Leventhal¹, Tess Boley Cruz¹, Suchitra Krishnan-Sarin², Rob McConnell¹, ¹University of Southern California, USA, ²Yale University

INTRODUCTION: Among never smokers, adolescent e-cigarette use is associated with increased initiation of combustible cigarettes. However, individual studies may be underpowered to evaluate whether e-cigarette users progress beyond initiation to more regular or frequent smoking. Further, no studies have yet examined the role of e-cigarettes in transition to cigarette use only vs. dual e-cigarette/cigarette use. **METHODS:** Data were pooled from three prospective cohort studies, the Southern California Children's Health Study (CHS), the Happiness and Health Study (H&H) and the Yale Adolescent Survey Study (YASS). Data on e-cigarette use were obtained at baseline in each study, when participants were in 11th and 12th grade (CHS), 10th grade (H&H) or 9th-12th grade (YASS); follow-up data on past 30-day use of cigarettes and e-cigarettes were obtained approximately one year later (N=6258). Polytomous regression models were used to evaluate the association a) between baseline e-cigarette use and subsequent cigarette use with inclusion of an interaction term for baseline cigarette smoking, and b) between baseline tobacco use (never, e-cigarette only, cigarette only, dual use) and past 30 day single or dual use at follow-up. **RESULTS:** Among adolescents with no history of cigarette use at baseline, e-cigarette ever (vs. never) users had greater odds of subsequently initiating cigarette use (OR=4.43; 95%CI: 3.56, 5.50), but were similar with respect to days of cigarette smoking reported at follow-up. However, among baseline cigarette smokers, those who used e-cigarettes (v. never users) were more likely to report more frequent cigarette use in the past 30 days at follow-up (OR1-2days=1.95; 95%CI: 1.09, 3.47; OR3+days=3.40; 95%CI: 1.89, 6.12) relative to no past 30-day cigarette use. In models evaluating the risk of single or dual product use at follow up, e-cigarette only users had similarly increased odds of exclusive current e-cigarette (OR=7.59; 95%CI: 5.47, 10.7) and dual use (OR=8.06; 95%CI: 4.36, 14.9) at follow-up. Notably, baseline cigarette users were more likely to continue using cigarettes only, or to transition to dual use, than to switch to only e-cigarette use (p<.05). **CONCLUSION:** Use of e-cigarettes was associated with markedly increased levels of cigarette use at follow-up among baseline smokers, and any tobacco product use at baseline increased the risk of current use of all combinations of use at follow-up. Tobacco control policy aimed at both e-cigarettes and cigarettes is needed to prevent continued use of tobacco among youth.

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CORRESPONDING AUTHOR: Jessica Barrington-Trimis, PhD, University of Southern California, USA

SYM27C

E-CIGARETTE AND COMBUSTIBLE TOBACCO PRODUCT USE AMONG YOUTH: WHICH COMES FIRST?

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INTRODUCTION: Studies show adolescent e-cigarette use predicts the initiation of combustible tobacco products, like cigarettes, cigars, and hookah. However, it is unknown whether the reverse may also be true, as some would argue, given a "common vulnerability" model. Moreover, it is unclear how initiation of either tobacco product may be related to more consistent or frequent use of these products by adolescents over time. **METHODS:** Longitudinal analysis of data from the Texas Adolescent Tobacco and Marketing Surveillance System [TATAMS] (3 waves, 6

months apart, each; $n=3907$, $N=461,069$). Cross-lagged regression models were applied to examine inter-relationships between e-cigarette and combustible tobacco product use. Using this approach, each variable in the model was regressed on all variables that precede it in time. Models were adjusted for demographic factors; peer and parental influences; and sensation seeking. RESULTS: E-cigarette use predicted combustible tobacco product use over time more consistently than the reverse. For example, ever e-cigarette use at wave 1 and wave 2 predicted ever combustible product use at wave 2 ($\beta=0.113$, $p<.05$) and wave 3 ($\beta=0.058$, $p<.05$), respectively, but no predictive relationships between ever combustible product use and ever e-cigarette use were observed. For students who had never smoked a combustible tobacco product at wave 1 ($n=1858$), ever e-cigarette use at wave 1 predicted current combustible product use at wave 2 ($\beta=0.169$, $p<.05$), while current e-cigarette use at wave 2 predicted current combustible product use at wave 3 ($\beta=0.255$, $p<.05$); current combustible product use at wave 2 did not predict current e-cigarette at wave 3. Importantly, this pattern was stronger among those who were not susceptible to combustible product use at wave 1 ($n=1224$) compared to those who were ($n=567$) ($p<.05$). CONCLUSION: That e-cigarette use predicts combustible tobacco product use more significantly than the reverse is troubling, especially for those adolescents who are not cognitively susceptible to combustible product use. E-cigarettes may indeed be a "gateway" to combustible product use, the effects of which are far more damaging.

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CORRESPONDING AUTHOR: Melissa Harrell, PhD, University of Texas Health, School of Public Health, Austin Campus, TX, USA

SYM27D

ADOLESCENT MARIJUANA AND TOBACCO USE: OLD AND NEW CO-MORBIDITIES

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INTRODUCTION: The comorbidity between adolescent cigarette smoking and marijuana use is well established. While there have been declines in cigarette smoking among adolescents, the use of novel tobacco products such as electronic cigarettes and hookah is on the rise. Increases in the use of these newer tobacco products have paralleled increases in marijuana use. We sought to determine whether the well-established comorbidity between cigarette smoking and marijuana translates to newer tobacco products. METHODS: Data were derived from a prospective cohort study of adolescent substance use in Southern California ($N=3396$). Lifetime, past 6 months, and past 30 day use of combustible cigarettes, e-cigarettes, hookah and marijuana were collected at baseline (age 14 years) and two years later (age 16 years). Regression models were used to evaluate the association between baseline tobacco product use, and subsequent use of marijuana as well as the use of both tobacco and marijuana (dual use) in a sample restricted to baseline never users of marijuana ($N=2629$). Similar models were used to evaluate the association between baseline marijuana use and subsequent use of tobacco products, while adjusting for relevant covariates. RESULTS: Baseline cigarette, e-cigarette, and hookah users had twice the odds of initiating and using marijuana (past 6 months, past 30 days) at the two year follow-up. Baseline tobacco users (vs. nonusers) had increased odds of continued tobacco use, and dual use at follow-up. The odds of initiation and subsequent use of e-cigarettes, cigarettes, or hookah at follow-up were on average two and a half times higher for baseline marijuana users (vs. nonusers). Baseline marijuana users had increased odds of continued marijuana use, and dual use at follow-up. CONCLUSION: Cigarettes, e-cigarettes, and hookah increase the odds of marijuana use and dual use among adolescents. Similarly, marijuana use increases the odds of cigarette smoking, e-cigarette use, and hookah use as well as dual use. Strong tobacco and marijuana regulation policies are necessary given that both tobacco and marijuana increase the risk of dual use.

FUNDING: NIH NIDA R01-DA033296

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SYM28

PRODUCT STANDARDS FOR CIGARETTES: MODELS TO ACHIEVE MAXIMUM PUBLIC HEALTH BENEFIT

Irina Stepanov, PhD, University of Minnesota, MN, USA; Neal Benowitz, MD, University of California San Francisco, USA; Reinskje Talhout, PhD, National Institute for Public Health and the Environment, Netherlands; Jack Henningfield, PhD, Pinney Associates and The Johns Hopkins University School of Medicine, MD, USA

The Family Smoking Prevention and Tobacco Control Act provides the U.S. FDA the authority to establish tobacco product standards. Such standard could serve to reduce the abuse liability and carcinogenic potential of cigarettes by establishing maximum levels for select constituents and/or by regulating cigarette design features. Currently marketed U.S. cigarette brands demonstrate significant variability in the machine-measured levels of the main known addictive constituent nicotine and of a wide range of toxic and carcinogenic constituents. This symposium will explore the potential public health impact of three hypothetical standards: (i) setting limits for toxic and carcinogenic constituents in cigarette smoke on "per mg nicotine" basis; (ii) reducing nicotine content to non-addictive levels; and (iii) banning cigarette physical design features that increase product elasticity. Dr. Irina Stepanov will discuss a historical perspective for establishing limits for constituents on per mg nicotine basis. She will also describe the variations in per mg nicotine yields for several important smoke constituents, as well as variations in relevant exposures and cancer risk among cigarette smokers. Dr. Neal Benowitz will present rationale for nicotine reduction in cigarette smoke and will summarize the research in this area, focusing on the effect of nicotine reduction on smoking behaviors and toxicant exposures in smokers. Dr. Reinskje Talhout will focus on certain cigarette characteristics such as physical dimensions, filter type and ventilation, and paper porosity, which can either undermine or complement the constituent reduction measures by influencing smokers' sensory experience and subsequent smoking behaviors. Finally, Dr. Henningfield will moderate a discussion by a panel of experts which will include Dr. Dorothy Hatsukami (University of Minnesota), Dr. Mirjana Djordjevic (National Cancer Institute), and Dr. Ron Borland (Cancer Council Victoria). The panelists will discuss which of the presented measures or their combination, if implemented, could result in the maximum public health benefit, considering their potential effect on risk perception and taking into account the availability of other tobacco and nicotine-containing products on the market.

JUSTIFICATION: Regulation of certain cigarette characteristics, such as constituent yields, nicotine content, or physical design features, could potentially reduce addictiveness of cigarettes and lower carcinogenic exposures in smokers. The public health impact of modifying such characteristics, alone or in combination, will be discussed.

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SYM28A

ESTABLISHING LIMITS FOR CIGARETTE SMOKE CONSTITUENT LEVELS PER MILLIGRAM NICOTINE

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Regulation of the levels of harmful and potentially harmful constituents in cigarette smoke requires standardized machine testing protocols for the measurement and reporting of constituent yields. However, the historically used standard machine testing methods do not account for the complexities of smoker-cigarette interaction and are widely recognized to be inadequate for the prediction of human exposures. The World Health Organization Study Group on Tobacco Product Regulation recommended that levels of constituents be established per milligram of nicotine. This approach is a promising solution for regulatory purposes: while still based on machine testing and thus allowing for standardized comparisons among brands, it shifts away from attempts to reproduce human smoking behavior and towards characterization of product toxicity. Implementation of such approach requires clear understanding of how the constituent per milligram nicotine emissions in cigarette smoke are related to the constituent exposures in smokers, and which factors may affect this relationship. It is also important to know which of the traditionally used standard smoking machine regimens may deliver constituent per mg nicotine levels in the U.S. cigarettes that are most closely related to the smokers' exposure. Recent analyses of tobacco-specific *N*-nitrosamines (TSNA) in ma-



chine-generated smoke from a wide range of US commercial cigarettes shows significant differences in per milligram nicotine yields across U.S. cigarette brands. Cigarette design features that result in lower per-cigarette constituent yields, such as filter ventilation, increase TSNA per milligram nicotine yields. However, low-intensity smoking machine regimen (ISO) produces higher per milligram nicotine yields of TSNA than the higher-intensity conditions (Canadian Intense). Together, these results suggest that a standard limiting constituent yields per milligram nicotine may need to be accompanied by other measures that reduce cigarette 'elasticity', for instance substantially lowering nicotine levels and/or removing filter ventilation.

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SYM28B REDUCING THE NICOTINE CONTENT TO MAKE CIGARETTES LESS ADDICTIVE

Neal Benowitz*, University of California San Francisco, USA

Nicotine is highly addictive and is responsible for the maintenance of cigarette smoking. In 1994 Benowitz and Henningfield proposed the idea of federal regulation of the nicotine content of cigarettes such that the nicotine content of cigarettes would be reduced over time, resulting in lower intake of nicotine and a lower level of nicotine dependence. When nicotine levels get very low, cigarettes would be much less addictive. As a result, fewer young people who experiment with reduced nicotine content cigarettes (RNC) would become addicted adult smokers; and previously addicted smokers would find it easier to quit smoking when they choose to do so. The regulatory authority to promulgate such a public health strategy was provided by the Family Smoking Prevention and Tobacco Control Act. Several clinical trials of the effects of nicotine reduction (usual brand 10-15 mg to RNC 0.5 or less mg nicotine/cigarette) have shown that nicotine exposure declines by about 70%, there is no increase in exposure to tobacco combustion products, dependence scores decline and fewer cigarettes are smoked. However, full compliance with smoking RNC is uncommon, with most subjects smoking a few conventional cigarettes each day, presumably to augment nicotine intake. Providing non-combusted sources of nicotine in combination with nicotine reduction is likely to improve compliance and will be the subject of future studies. In summary, reduction of nicotine content of cigarettes appears to be feasible and safe. Modeling of the health impact of a successful nicotine reduction regulation policy predicts many millions of quality of life years saved over the next 50 years.

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CORRESPONDING AUTHOR: Neal Benowitz, MD, University of California San Francisco, USA

SYM28C CIGARETTE PHYSICAL DESIGN FEATURES THAT INCREASE PRODUCT ELASTICITY

Reinskje Talhout¹, Patricia Richter², Irina Stepanov³, Christina Watson², Clifford Watson², ¹National Institute for Public Health and the Environment, Netherlands, ²U.S. Centers for Disease Control and Prevention, ³University of Minnesota

Cigarette design features such as cigarette paper, filter type, filter ventilation, and cigarette dimensions significantly affect machine-measured constituent yields in cigarette smoke and have impact on product appeal, smoking behaviors, and resulting exposures in smokers. For instance, mostly filter ventilation (up to 80%), but also porous tipping paper and cigarette wrapper specifications can result in lower machine-generated constituent emissions and also lead to perceptions of lighter taste and relative safety in smokers. Furthermore, while these features may reduce the delivery of nicotine and other constituents under the fixed machine-smoking regimens, it is recognized that cigarettes are designed to be 'elastic' allowing smokers to modify their smoke intake by adapting their use behavior. Such compensatory smoking behavior, be it consciously or unconsciously, allows smokers to obtain their desired amount of nicotine and sensory appeal while smoking cigarettes with low machine-measured yields. It can also result in similar or even higher exposures to toxic and carcinogenic constituents than from less ventilated cigarettes, due to an increased toxicant to nicotine ratio. In addition, the proportion of un-ionized or 'free' nicotine, the biologically available form associat-

ed with addiction, also increases with paper porosity and filter ventilation. Among other physical design features, filter additives that selectively reduce emissions in the smoke can also modify sensory cues resulting in changes in smoking behavior. For instance, smokers take larger puffs when smoking cigarettes with charcoal filters. Finally, the length of cigarettes may also affect smokers' exposures. Nicotine filtration by the tobacco rod declines with decreasing rod lengths and narrower cigarette diameters. Measures of smoking behavior such as puff duration and volume may also depend on cigarette length, but results from different studies are not consistent. In conclusion, filter ventilation and other important design characteristics allow cigarette elasticity, increase product appeal, and may lead to higher toxicant exposures in smokers.

FUNDING: The work on summarizing the material presented in this abstract was supported by the WHO.

CORRESPONDING AUTHOR: Reinskje Talhout, PhD, National Institute for Public Health and the Environment, Netherlands

SYM28D PROMISES AND PERILS OF POTENTIAL REGULATORY OPTIONS FOR CIGARETTES

Jack Hennigfield*, Pinney Associates and The Johns Hopkins University School of Medicine, MD, USA

The need for a well-funded field of tobacco regulatory science was considered essential to guide tobacco regulation by the United States Food and Drug Administration (US FDA), and the World Health Organization (WHO) during the efforts that led to the US Family Smoking Prevention and Tobacco Control (FSPTC) Act in 2009, and the WHO Framework Convention on Tobacco Control (FCTC) in 2005. The FDA and WHO understood that the development of product standards to reduce risks would be particularly challenging; in part, because most tobacco product design and manufacturing science and the scientists themselves were within the tobacco industry. Thus, the FSPTC Act included extensive funding for FDA and the National Institutes of Health (NIH) to develop an independent science base and to cultivate a field of tobacco regulatory science. This symposium, as is the meeting of SRNT itself, rich in the fruits of efforts of WHO and FDA, and funding from FDA/NIH in particular. The concept that products that people use and ingest should meet standards to minimize risks and that consumer purchasing and use should be meaningfully informed, is fundamental in product regulation. Tobacco product regulation is especially complicated, because there is widespread agreement of the best use is no use and because most chronic users are driven to use in part by their dependencies on nicotine. There are also limitations on regulatory action such as the US law that nicotine cannot be reduced to zero and the FDA and WHO frameworks that essentially prohibit outright product ban ("prohibition"). The recognition, however that most morbidity and mortality is attributable to conventional cigarettes provides a potential path that balanced regulation could facilitate. As discussed in the 2014 US Surgeon General's Report this is to facilitate the migration of those who are unable or unwilling to completely give up tobacco to substantially less harmful products. This discussion will build on the preceding presentations considering the promises and perils of various potential regulatory options flowing from the presentations.

FUNDING: No funding

CORRESPONDING AUTHOR: Jack Hennigfield, PhD, Pinney Associates and The Johns Hopkins University School of Medicine, MD, USA

SYM29 E-CIGARETTES AND E-LIQUIDS: EVALUATING THE EFFECTS OF CONSTITUENTS

Maciej Goniewicz, PhD, Roswell Park Cancer Institute, NY, USA; Andrea King, PhD, University of Chicago, USA; Neal Benowitz, MD, University of California San Francisco, CA, USA; Suchitra Krishnan-Sarin, PhD, Yale University, CT, USA

E-cigarette use has increased exponentially among adults and youth over the past few years. Despite these trends, little is known about the influence of variations in e-cigarette features, e-liquids and their constituents (including nicotine and flavorings), on toxicology, pharmacology, behavioral or subjective indices. In this symposium, new experimental evidence will be presented on the independent and interactive effects of various constituents of e-cigarettes/liquids when used with and without nicotine. Dr. Goniewicz will examine the influence of e-cigarette prod-

uct features and constituents on cellular toxicity in bronchial epithelial cells directly exposed to e-cigarette-generated aerosols. Dr. King will examine the influence of e-cigarette devices and e-liquid concentration of vegetable glycerin on strength of e-cigarette cues. Dr. Benowitz will examine the impact of e-liquid flavors on nicotine intake and pharmacology of electronic cigarettes among adults. Dr. Krishnan-Sarin will examine the interactive effects of menthol and nicotine on subjective effects from e-cigarettes and nicotine withdrawal symptoms among youth e-cigarette users. The discussant Dr. O'Malley, will summarize and discuss the impact of these findings and provide future directions.

JUSTIFICATION: Understanding the effects of e-cigarette and e-liquid constituents is critically important to ongoing tobacco regulatory efforts

FUNDING: Research reported in this symposium was supported by NIH grants R01AA013746, 1P50CA180890-02S1, P30DA012393, P50DA036151, R01DA037446, P30 CA016056, and the Roswell Park Alliance Foundation. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the Food and Drug Administration.

CORRESPONDING AUTHOR: Suchitra Krishnan-Sarin, PhD, Yale University, New Haven, CT, USA

SYM29A

IMPACT OF VARIOUS PRODUCT CHARACTERISTICS ON POTENTIAL INHALATION TOXICITY OF ELECTRONIC NICOTINE DELIVERY DEVICES (ENDS)

Maciej Goniewicz*, Roswell Park Cancer Institute, NY, USA

SIGNIFICANCE: Electronic nicotine delivery systems (ENDS) vary greatly in size, battery power, nicotine concentration, solvent composition, and flavoring content. The extent to which various product features and ingredients impact ENDS safety and potential toxicity is currently not well-defined. We examined how ENDS characteristics affect potential acute inhalation toxicity of these products. **METHODS:** Using an air-liquid interface system, we exposed H292 bronchial epithelial cells to 55 puffs of ENDS aerosol generated with a smoking machine. We generated aerosol from: A) various models and types of ENDS and B) one ENDS product with variable 1) nicotine concentrations; 2) nicotine solvents; 3) device power and 4) flavorings. We quantified in vitro toxicological effects of ENDS using trypan blue assay (for cytotoxicity), neutral red uptake assay (for cell viability) and an interleukin-6 ELISA (IL-6, to quantify inflammatory reaction). **RESULTS:** We found that product characteristics significantly affect cytotoxicity of an ENDS aerosol. The cell mortality (%) varied from 20.0±8.6 (SD) to 67.8±7.0, and inhibition of cell viability (%) varied from 4.7±2.8 to 97.5±2.6 across tested ENDS types ($p<0.05$). Increasing device power resulted in increased toxicity of the aerosol: cell mortality decreased from 88.2±3.2 at 3.3V to 36.6±2.75 at 4.8V and inhibition of cell viability changed from 21.9±3.1 to 63.1±1.8, respectively ($p<0.05$). Aerosol generated from strawberry-flavored product was most cytotoxic, and aerosol from tobacco-flavored product was least cytotoxic (cell mortality 82.8±2.2 vs. 36.6±2.0 and inhibition of cell viability by 53.8±2.9 vs. 21.9±2.2; $p<0.05$, respectively). Exposure to aerosols did not result in significant IL-6 release. **CONCLUSIONS:** We found that various ENDS products differ with regard to their cellular toxicity in cells directly exposed to aerosols. Flavorings used in ENDS and the device power significantly affect acute cytotoxicity of generated aerosol. Future studies are needed to investigate long term effects of exposure to ENDS products among users of these products.

FUNDING: The study was supported by the National Institute on Drug Abuse of the National Institutes of Health under Award Number R01DA037446, the National Cancer Institute under Award Number P30 CA016056, and the Roswell Park Alliance Foundation. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health

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SYM29B

CUE EXPOSURE EFFECTS OF 2ND AND 3RD GENERATION E-CIGARETTES AND ROLE OF E-LIQUID VEGETABLE GLYCERIN CONCENTRATIONS

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Passive exposure to first-generation cigalikes has been shown to evoke cigarette cravings in young adult smokers. It is unknown if the increasingly popular second and third generation e-cigarette devices (vape pens or MODs) would also increase cigarette cravings. These devices have lower resemblance to traditional cigarettes and customize vaping with voltage/wattage and e-liquid options, with vegetable glycerin (VG) as the main humectant producing exhaled aerosol. We examined the cue salience of these devices in two studies: first, we determined if observing vape pen use would increase desire to smoke, and second, in an independent sample, we examined observation of MOD use (40W, 3.29 V, 0.27 Ω) comparing e-liquids with either high (73%) or low (0%) VG concentrations. The overall sample included N=127 young adult smokers (age 26.8 (mean) \pm 4.7 (SD) yrs; 46% female; 8.7 \pm 5.2 SD cigarettes/daily; 3.9 \pm 2.2 FTND; 69% past year e-cigarette use). In our paradigm, participants engaged in conversation with a study confederate who drank bottled water (control cue) and then smoked a cigarette or vaped an e-cigarette (active cues). Results showed that exposure to vape pen use significantly increased desire to smoke [β (se)=2.15(0.49), $p<.001$] to a similar magnitude of regular cigarette exposure, a known potent cue. In addition, latency to smoke was similar between participants exposed to the vape pen vs. cigarette (median interval, 12 minutes). Further, passive exposure to the high VG e-liquid MOD, which produces larger vape clouds, evoked higher smoking desire ratings compared with the low VG e-liquid MOD (cue x time, β (se)=2.93(1.04), $p<.01$). Including smoking and e-cigarette history as covariates did not alter these results. In sum, observation of second and third generation e-cigarette use appears to generalize as a conditioned cue to produce smoking desire and behavior in young adult smokers. Variation in e-liquid constituents can affect the cue strength, with larger vape clouds producing more pronounced cigarette cravings. As the popularity of these devices grows, continued understanding of the effects of passive exposures will be of increasing importance.

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CORRESPONDING AUTHOR: Andrea King, PhD, University of Chicago, USA

SYM29C

IMPACT OF E-LIQUID FLAVORS ON NICOTINE INTAKE AND PHARMACOLOGY OF ELECTRONIC CIGARETTES

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Little is known about the impact of e-liquid (EL) flavors on e-cigarette (EC) pharmacology and addictiveness. We studied the effects of EL flavors on nicotine (NI) intake, retention, and pharmacology of EC. Fourteen regular EC users participated in a 3-day inpatient crossover study with three flavors – tobacco, strawberry and usual brand e-liquids - one flavor per day, using the same tank EC. Each day consisted of a standardized session of 15 puffs followed by 4 hours of abstinence, then a 90-minute ad libitum session. The NI concentration of strawberry and tobacco EL (18 mg/ml) was higher than usual EL (mean 7.4 mg/ml). EL pH was also higher for test ELs (8.3 – 9.1) compared to usual brand EL (4.3 – 8.6). During the standardized session, participants consumed less of the strawberry and tobacco EC but inhaled more NI, and plasma NI concentrations were higher compared to usual brand. Compared to the usual e-liquid flavors, NI exposure (area under the plasma NI concentration time curve, AUC) normalized for the amount of NI systemically retained was significantly lower for the strawberry and tobacco e-liquids, indicating lower systemic bioavailability. During the ad libitum session, participants consumed significantly more of their usual EL compared to the strawberry and tobacco EL but peak NI plasma levels were not significantly different. NI exposure (AUC) was similar for strawberry and usual brands and lower for tobacco flavor, with evidence of NI titration. The usual flavors were rated as more satisfying than the strawberry and tobacco EL during both sessions. In conclusion, flavors influence NI exposure through subjective flavor liking, affect overall bioavailability of NI possibly through swallowing or pH effects, and contribute to satisfaction and reward of EC. EC users titrate their overall nicotine exposure but the extent of titration may vary across flavors. Flavors are likely to influence nicotine-related abuse liability of ECs.



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SYM29D

INTERACTIVE EFFECTS OF MENTHOL AND NICOTINE AMONG YOUTH; AN EXAMINATION USING E-CIGARETTES

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The presence of characterizing flavors, including menthol, has been linked to the appeal of tobacco products among youth. However, there is limited evidence on whether flavors are by themselves reinforcing and whether they alter subjective effects of nicotine. We conducted a study of the interactive effects of menthol and nicotine administered via e-cigarettes among youth (ages 16-20). A chemosensory pilot study (n=16) determined the optimal doses of menthol that produced low and high cooling effects. 60 non-treatment seeking e-cigarette users (50% female, 18.8±0.8 years old, baseline cotinine= 961±577) were randomized into one of three nicotine dose groups (0 mg/ml, 6 mg/ml, 12 mg/ml) and participated in three laboratory sessions during they received the nicotine dose along with one of three doses of menthol (0, 0.5%, 3.5%) via V2 e-cigarettes containing e-liquids purchased from Pace Engineering Concepts. Each session, held at least two days apart, and conducted after overnight abstinence from tobacco products, consisted of two periods. The first period (45 mins) consisted of 3 e-cigarette bouts (10 puffs with 30 secs inter-puff interval) every 10 mins, and the second period (30 mins) was an ad-lib self-administration period. During the first period we assessed changes in e-cigarette craving, taste, liking and nicotine withdrawal symptoms. For craving, there was a main effect of menthol dose (p<0.001) and a nicotine*menthol interaction (p<0.05); at 12 mg nicotine both low and high doses of menthol were rated as tasting better than no menthol. For e-cigarette liking there was a main effect of menthol dose (p<0.001) and a trend towards a nicotine*menthol interaction (p=0.06). No significant effects were observed on nicotine withdrawal symptoms. Evidence from the ad-lib period will also be presented. These preliminary results suggest that both low and high menthol doses administered via e-cigarettes are by themselves reinforcing, and that they also alter the subjective taste and liking of e-cigarettes containing nicotine.

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SYM30

IS SMOKING CESSATION CLINICAL PRACTICE HAMPERED BY OUTDATED REGULATION OF PHARMACOTHERAPIES

Ivan Berlin, Hôpital Pitié-SalpêtrièreFaculté de médecine Université Paris, France; Saul Shiffman, PhD, Pinney Associates & University of Pittsburgh, USA; Renee Bittoun, Smoking Research Unit, University of Sydney, Australia

This symposium will address the discrepancies between the evidence for the use of pharmacotherapies and the warnings and other information on the labels of our most common therapies. Evidence may be at odds with product information that is often strictly adhered to by health care providers. Common examples are the warnings against concomitant use of nicotine containing products – including smoking – while using nicotine replacement therapies (NRT) when the evidence is clear that this is not only safe and efficacious but a potential gateway to quitting in those who continue to smoke. The current best practice of optimizing smoking cessation by factoring in individual genetic variations in response to treatments is rarely addressed in product labelling. This symposium, highlighting experiences from Australia, Europe and the USA will discuss the confusion amongst tobacco treatment clinicians, health care providers and their patients regarding the evidence base and the formal instructions and prescribing information for use of phar-

macotherapies for smoking cessation. Audience participation will be encouraged in order to discuss opportunities to expedite the changes in labelling and generic information and inform health care providers of current best practice to improve the outcomes of tobacco treatment interventions.

JUSTIFICATION: This symposium and its discussion has the widespread international potential to change patient and clinician information regarding evidence-based practice in the use of cessation pharmacotherapies. This will greatly enhance efficacy of treatments.

FUNDING: No Funding

CORRESPONDING AUTHOR: Renee Bittoun, University of Sydney, Australia

SYM30A

THE CONTROVERSY BETWEEN IMPLEMENTATION OF EVIDENCE BASED KNOWLEDGE AND MEDICATION LABELING IN THE EUROPEAN UNION.

Ivan Berlin*, Hôpital Pitié-SalpêtrièreFaculté de médecine Université Paris, France

Marketing authorization of a medication in the European Union is requested by the manufacturer who submits the dossier containing all existing information, results of both preclinical and human, phase I, II and III studies and provides frequencies of adverse events. A specific part of this submission is the product monograph which contains the essential information necessary for prescribers. The medication's dossier can be submitted either to a member state or to the European Medicines Agency (EMA) situated (*still*) in London. If the EMA authorizes the medication's marketing (license) and approves the product monograph, it becomes valid in all member states. Prescription is legally based on the product monograph. Of main concern is the controversy between rapid progress of new information and the acquisition of new knowledge from research (independent or funded by the manufacturer) and the product monograph's update which should be requested by the manufacturer and approved by the EMA. This is a slow procedure. Thus, there is a major delay in implementing new research data into the labeling and consequently into clinical practice. Because product monograph's updates depend on the willingness of the manufacturer to do so, health authorities may accelerate application of updated knowledge in clinical practice by emitting evidence based guidelines whose elaboration involves researchers or prescribers with expertise in the field. Prescription according to guidelines, which are only recommendations of the medication use, is not *stricto sensu* legally protected. A major difficulty in putting together guidelines is that the best experts may have conflicts of interest. Therefore, health authorities define the level of conflict of interest above which experts cannot contribute to the elaboration of guidelines. A low threshold of conflict of interest may exclude most of the best experts, in particular in countries and fields, such as smoking cessation, where there are only a few, leading to errors in guidelines. This may result in major deviation of clinical practice with respect to best updated knowledge.

FUNDING: No Funding

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SYM30B

REGULATORY CONSTRAINTS ON NRT IN THE US

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In the United States, innovation in the approved uses of nicotine replacement therapy (NRT) for smoking cessation is at a standstill. Since NRT was approved for OTC marketing 20 years ago, only a nicotine lozenge slightly stronger than nicotine gum (approved in 1984) has been introduced, along with a number of products approved on the basis of bioequivalence, typically introducing new flavors or minor variations in form. The NRT indication – use for up to 12 weeks for smoking cessation – has also remained static and limited, and the FDA has declined to consider innovations in study designs and end-points. In 2009, the US Congress urged FDA to expand the indications for NRT. No expansions have been approved. In 2010, SRNT and the Association for the Treatment of Tobacco Use and Dependence, along with other public health parties, filed a Citizen's Petition asking FDA to remove warnings that were not supported by evidence. In 2013, the agency did modestly liberalize the label, for example, softening the warning against concomitant use with smoking or other nicotine products. The petition also asked that FDA approve expanded indications, allowing pre-quit use of NRT, use of NRT for quit-

ting by gradual reduction, use for longer than 12 weeks when needed, and use of combined NRT therapy, which many regard as the current gold standard for clinical treatment. The FDA rejected these requests, in spite of published evidence supporting the safety and efficacy of these indications, and the clinical need for more flexibility. The limited approved uses of NRT and the hurdles involved in securing new indications have severely limited the role of NRT in US smoking control. The labeling of NRT likely also promotes public misperceptions that nicotine is a major cause of smoking-related harm. The regulatory constraints on NRT seem particularly restrictive in light of the grave toll of death and disease due to smoking, and of the wide availability of non-medicinal nicotine products such as e-cigarettes.

FUNDING: No Funding

CORRESPONDING AUTHOR: Saul Shiffman, PhD, Pinney Associates & University of Pittsburgh, USA

SYM30C

IMPLEMENTING CHANGES IN PATIENT INFORMATION: THE AUSTRALIAN EXPERIENCE

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The Australian experience in smoking cessation therapy has allowed for the widespread use of pharmacotherapies for many decades, in particular nicotine replacement therapy (NRT). It is heavily subsidised by our federal government and widely available over-the-counter (OTC). It became evident to clinicians that much of the poor outcomes with usage of these products were due to discrepancies and conflicting instructions within product information (PI) materials and the contradictory evidence and best practice usage of NRT. There are costly federal regulatory requirements in order to change the PI and these costs have been a major impediment to change. The Australian Association of Smoking Cessation Professionals (AASCP) adopted a resolution at our annual meeting to directly lobby the relevant pharmaceutical companies to change their instructions by simply adding clauses such as "Follow all directions given to you by your doctor or pharmacist carefully. They may differ from the information contained in this leaflet." This has been successfully adopted by the manufacturers of NRT. We are now lobbying to include the wording "Health Care Professional".

FUNDING: No Funding

CORRESPONDING AUTHOR: Renee Bittoun, Smoking Research Unit, University of Sydney, Australia

SYM31

ROLL YOUR OWN CIGARETTES: SHINING A LIGHT ON A NEGLECTED ASPECT OF THE SMOKING EPIDEMIC

Wallace Pickworth, PhD, Battelle, Baltimore, MD, USA; David Evans, PhD, Health Service Executive, Galway, Ireland; Richard Edwards, MPH MD, University of Otago, Wellington, New Zealand; Janet Hoek, PhD, University of Otago, Dunedin, New Zealand

Roll-your-own (RYO) cigarettes (cigarettes made from loose tobacco, also sometimes called make-your-own cigarettes) are a commonly used smoked tobacco product in many jurisdictions. However, RYO smoking receives relatively little attention from researchers or tobacco control policy makers. This symposium will explore the issue of RYO cigarettes for a variety of perspectives, presenting data from several countries to examine how RYO use contributes to and sustains the smoking epidemic. We will conclude by discussing potential tobacco control responses to RYO tobacco such as differential tax increases, mandated declarations of additives in loose tobacco, marketing restrictions, standardised (dissuasive) colours or pictorial warnings for rolling papers and other RYO-related products, or even banning RYO tobacco altogether. The symposium will include four presentations. The first will synthesize data on patterns of RYO use by drawing on three studies conducted in laboratory and real world settings. Using a convenience sample of RYO and conventional smokers, this presentation will assess: users' ability to produce RYO cigarettes (rolled by hand compared to using a personal rolling machine); smoking behaviors and impacts of RYO use on nicotine levels; and exposure biomarkers and smoker satisfaction among new RYO smokers. The second presentation will describe the prevalence and patterns of RYO use among adolescents and young adults in New Zealand (NZ), a country with very high rates of RYO smoking. The third presentation will describe patterns of RYO smoking among adults in Ireland in 2014, following a period of rapidly increasing prevalence

of RYO use among smokers. Finally, we will present findings from a qualitative study exploring practices (e.g. rolling rituals) and beliefs (e.g. perceiving RYO cigarettes as more natural or less harmful) young adults who smoke RYO develop to manage unattractive RYO stereotypes. This study will also describe RYO smokers' responses to a potential RYO-targeted tobacco control intervention – dissuasively coloured rolling papers. The symposium will conclude with a discussion examining possible implications of RYO use and how the symposium presentations could inform future research and tobacco control policy.

JUSTIFICATION: The symposium will increase understanding about RYO cigarettes and demonstrate their important role in the smoking epidemic; as well as identifying and discussing some potential interventions to reduce RYO smoking and help achieve smokefree goals.

FUNDING: No funding

CORRESPONDING AUTHOR: Richard Edwards, MPH MD, University of Otago, Wellington, New Zealand

SYM31A

SMOKING OF ROLL-YOUR-OWN CIGARETTES IN THE UNITED STATES - LABORATORY STUDIES

Wallace Pickworth*, Gillian Schauer², Erica Peters¹, ¹Battelle, Baltimore, MD, USA, ²Battelle, Seattle

SIGNIFICANCE: Consumption of roll-your-own (RYO) cigarettes in the United States may be less prevalent than in western European and Commonwealth countries, but is of concern because RYO cigarettes deliver addictive levels of nicotine and other toxicants, and disproportionately appeal to lower income groups. This presentation synthesizes data on patterns of RYO use through three studies in laboratory and real world settings using convenience samples of RYO and conventional smokers. These studies compared users of traditional hand-rolled (HR) RYO cigarettes and RYO cigarettes made with a personal rolling machine and preformed cigarette tubes (Personal Machine Made, PMM). The studies explore the following facets: (1) abilities of users to produce HR and PMM RYO cigarettes, (2) impacts of HR and PMM RYO cigarettes on nicotine levels, exposure biomarkers, puff topography and smoker satisfaction, and (3) explored the ease with which factory-made smokers could transition to PMM RYO cigarettes. METHODS AND RESULTS: In the first study, RYO users were largely male (87%), Caucasian (76%) and lower income. Cigarettes made in the laboratory and home were similar, but were larger for PMM (1.0 gm) users versus HR users 0.4 Gm; PMM cigarettes were produced more rapidly (42 sec/cig) than HR (53 sec/cig). In a second laboratory study, smoking of HR and PMM RYO cigarettes caused similar and significant increases in plasma nicotine (average 16 ng/ml), exhaled CO (average 4.5 ppm), topography measures (puff volume, velocity and duration) and reduction in smoking urges. In a third study, smokers of conventional factory-made cigarette were required to make and smoke PMM cigarettes for 6 days. They rapidly and efficiently adapted to making and smoking PMM cigarettes that achieved levels of product satisfaction and nicotine exposure comparable to factory-made cigarettes. CONCLUSIONS: The findings indicate that RYO (HR and PMM) have similar impacts on biomarkers of exposure to toxicants and delivery of nicotine. The findings also demonstrate that by using commercially available PMM RYO products, experienced factory-made cigarette smokers can quickly transition to RYO smoking which leads to significant toxicant and nicotine exposure. The PMM RYO cigarette has the potential to increase the use of RYO cigarettes, and indicates how product innovation in this tobacco product type may contribute to maintaining high levels of smoking prevalence.

FUNDING: Partially supported by a grant from National Cancer Institute (1RO-1CA138973-02, Pickworth, PI)

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SYM31B

ROLL-YOUR-OWN CIGARETTES IN IRELAND: KEY PATTERNS AND TRENDS

David Evans*, Anne O'Farrell², Paul Hickey¹, ¹Health Service Executive, Galway, Ireland, ²Health Service Executive, Dublin

SIGNIFICANCE: Despite significant reductions in smoking in Ireland, prevalence rates remain 9% higher than the European average. In developing strategies to



reduce smoking prevalence, roll-your-own (RYO) cigarette consumption warrants detailed investigation. For example, in Ireland RYO cigarettes are taxed at a lower rate, than factory-made cigarettes. This may reduce the impact of tobacco tax increases on reducing smoking prevalence. However, there has been little investigation of RYO use in Ireland. This study analysed patterns and trends in RYO consumption in Ireland and examined policy implications. **METHODS:** The study utilised a monthly national telephone survey of adult (15+) smoking prevalence ($n \approx 1000$ per month). Data were weighted by age, gender, socioeconomic group (SEG) and region, using estimates from the Central Statistics Office. Data for 2014 and for 2003-2014 were analysed to determine prevalence, socio-demographic patterns, and overall trends. **RESULTS:** RYO consumption (based on cigarette brand smoked most often) increased from 3.5% of smokers in 2003 to 24.6% in 2014. A. In 2014, a higher proportion of males (31.8%) smoked RYO cigarettes than females (16.3%). RYO smoking prevalence was higher among younger smokers: the highest prevalence for smoking RYOs was 27% among smokers aged under 25 and 25-34 years. Almost half of those smoking RYO (46%) were from the lower socio-economic DE group. A larger proportion of unemployed smokers smoked RYO (39.5% compared to 21.8% for other employment categories). Key factors associated with smoking RYO cigarettes were being under 25 years ($OR = 3.3$), from a low SEG ($OR = 2.8$ after controlling for unemployment), and being male ($OR = 2.6$). **CONCLUSIONS:** Ireland has changed from a country where RYO consumption was uncommon to one where one in four smokers use this type of tobacco product. One of the reasons smokers may be switching to RYO is in response to larger tax increases in factory-made cigarettes. The findings suggest that this is more common among low income groups, where RYO use is perpetuating health inequalities. Specific RYO marketing from tobacco companies may also have promoted switching to RYO, as opposed to giving up smoking. Minimising the price differential between RYO and factory-made cigarettes, together with gender specific health promotions that target the young and people from low SEGs are needed to support the government's target of reducing smoking prevalence to 5% by 2025.

FUNDING: Surveys funded by Health Service Executive, Ireland

CORRESPONDING AUTHOR: David Evans, PhD, Health Service Executive, Galway, Ireland

SYM31C

PATTERNS OF ROLL-YOUR-OWN TOBACCO USE AMONG ADOLESCENTS AND YOUNG ADULTS IN NEW ZEALAND

Richard Edwards^{*1}, Ben Healey¹, Janet Hoek², ¹University of Otago, Wellington, New Zealand, ²University of Otago, Dunedin

SIGNIFICANCE: Roll-your-own (RYO) cigarettes are a commonly used smoked tobacco product in many jurisdictions. However, RYO smoking receives relatively little attention in research and tobacco control policy. We explored the prevalence and patterns of RYO tobacco use among adolescents and young adults in New Zealand (NZ), a country with very high rates of RYO smoking. **METHODS:** We synthesised data from an annual and biennial survey of Year 10 (14-15 years) students, and population based surveys of adults to identify prevalence of RYO use among smokers in general and population sub-groups such as Māori and Pacific peoples. We also explored reasons and beliefs associated with RYO use. **RESULTS:** In 2012-13, almost 80% of 15-19 year old smokers smoked exclusively RYO (38%) or a combination of RYO and manufactured (41%) cigarettes, over 60% of 20-24 year old smokers smoked RYO (43%) or both RYO and manufactured (23%) cigarettes. Among 14-15 year olds the proportion of regular (at least weekly) smokers that mainly used RYO tobacco was around 45-50% between 2006-2013. Compared to the overall population, RYO use was consistently greater among Māori young people who smoke, and less common among Pacific young people. In 2009, the most frequently cited reasons young people gave for smoking RYO tobacco were reduced cost, longer duration, or superior taste. A minority held erroneous beliefs that RYO were more natural and less harmful or had fewer additives. More recent data were not available. **CONCLUSIONS:** The high prevalence of RYO smoking among adolescents and young adults suggests specific interventions targeting RYO products may help reduce smoking prevalence in this key age group. Possible measures include differential tax, specific mass media campaigns or health warnings to dispel false beliefs about RYO, 'dissuasive' rolling papers, and even a complete product ban.

FUNDING: No funding.

CORRESPONDING AUTHOR: Richard Edwards, MPH MD, University of Otago, Wellington, New Zealand

SYM31D

HOW DO YOUNG ADULT ROLL-YOUR-OWN SMOKERS MANAGE NEGATIVE STEREOTYPES?

Janet Hoek^{*1}, Shelagh Ferguson¹, Erin Court¹, Karine Gallopel-Morvan², ¹University of Otago, Dunedin, New Zealand, ²EHESP, Rennes

SIGNIFICANCE: RYO tobacco use is very high among New Zealand young adult smokers, many of whom use this tobacco because it is less expensive than tailor made cigarettes. However, qualitative studies have found that RYO cigarettes evoke negative stereotypes of long-term, heavily addicted smokers that are inconsistent with the social identities young adults seek. We explored the practices and beliefs young adults develop to manage tensions created by these unattractive stereotypes and examined an intervention that could discourage RYO use. **METHODS:** We conducted 20 in-depth interviews with New Zealand young adult RYO users aged between 18 and 30 years. The interview guide explored participants' RYO initiation and progression, and rolling practices; we used an elicitation exercise to probe reactions to dissuasively coloured rolling paper. We undertook a thematic analysis of the transcripts. **RESULTS:** We identified three key themes: the first examined how participants established RYO tobacco's superiority, including perceptions of greater "naturalness" and reduced harm. The second explored creation of individual and social rolling rituals where they constructed cigarettes they constructed as artisanal creations that held more value than tailor made cigarettes. The final theme documented participants' general dislike of dissuasive rolling papers, which disrupted the value their rituals created. **CONCLUSIONS:** Young adults create rolling rituals and draw on mistaken beliefs that RYO tobacco is more natural and less harmful to dispel negative RYO stereotypes and elevate RYO use. Introducing dissuasively-coloured paper alongside standardised packaging could disrupt reduced-harm connotations. However, if many RYO users erroneously regard it as less harmful, policy makers may also be justified in banning this form of tobacco.

FUNDING: Ministry of Health, New Zealand

CORRESPONDING AUTHOR: Janet Hoek, PhD, University of Otago, Dunedin, New Zealand

SYM32

ATTITUDES AND PERCEPTIONS TOWARD A REDUCED NICOTINE PRODUCT STANDARD FOR CIGARETTES

Lauren Pacek, PhD, Duke University Medical Center, NC, USA; Rachel Cassidy, PhD, Brown University, USA; Melissa Mercincavage, PhD, University of Pennsylvania, PA, USA; Rachel Denlinger-Apte, MPH, Brown University, RI, USA

Implementing a reduced nicotine product standard for cigarettes is a promising regulatory strategy for decreasing tobacco-related morbidity and mortality. Research has shown that use of reduced nicotine content (RNC) cigarettes reduces smoking rates, dependence and carcinogen exposure, and may encourage cessation. Little information is available, however, regarding consumer responses to this regulatory action or to RNC cigarettes themselves, such as perceptions of product risks and benefits. Understanding smokers' perceptions of a reduced nicotine product standard for cigarettes may help regulatory agencies determine policy feasibility, anticipate challenges with public opinions, and develop effective communication strategies to educate the public. In this symposium we will present current research on smokers' perceptions of RNC cigarettes using data acquired from multiple studies utilizing various populations of smokers and methodological designs, including clinical trials and laboratory studies. In the first talk, Lauren Pacek will discuss how perceived nicotine content of RNC cigarettes affects perceptions of health risks and smoking-related outcomes, using data collected from adult daily smokers who participated in a 6-week, multi-site, randomized controlled trial. Rachel Cassidy will then present experimental data examining adolescent smokers' risk perceptions of and subjective responses to RNC cigarettes following initial exposure. Melissa Mercincavage will then examine perceptions of health risks of using RNC cigarettes among smokers who have never tried these products, as well as predictors of these risk perceptions, using data from two laboratory-based studies. Rachel Denlinger-Apte will then present experimental data on the perceived acceptability and feasibility of a national nicotine reduction policy among adult smokers who used RNC cigarettes under double-blind conditions for 6 weeks. Finally, Dorothy Hatsukami will discuss implications for future research and policy efforts. This symposium will present experimental findings that have timely tobacco control policy implications, and will be of broad interest to SRNT members.

JUSTIFICATION: Findings from the presented research have the potential to inform policy decisions regarding regulation of cigarette nicotine content, and by extension, may impact public health.

FUNDING: Supported by U54DA031659 (data collection only), T32AI007392, K01CA189300, P50CA179546, R01CA180929.

CORRESPONDING AUTHOR: Melissa Mercincavage, PhD, University of Pennsylvania, Philadelphia, PA, USA

SYM32A

PERCEIVED NICOTINE CONTENT OF REDUCED NICOTINE CONTENT CIGARETTES AND MENTHOL STATUS AS CORRELATES OF PERCEIVED HEALTH RISKS

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Reducing the nicotine content of cigarettes may have beneficial effects. However, a number of smokers misperceive nicotine as having a significant role in smoking-related morbidity. Thus, it is important to investigate whether perceived nicotine content of reduced nicotine content cigarettes is associated with perceived health risks and smoking-related outcomes. To investigate this, we utilized data from an RCT in general population smokers that was conducted at 10 U.S. sites (2013-2014). Participants were assigned to smoke SPECTRUM research cigarettes with one of 6 nicotine contents (0.4mg of nicotine/gram of tobacco–15.8mg/g) for 6 weeks. Participants (n=697) reported the nicotine level they believed to be in their research cigarette (very low-very high) and completed the Perceived Health Risk scale, that involves rating perceived disease risk (lung cancer, emphysema, bronchitis, other cancers, heart disease, stroke) associated with research cigarettes. Linear regression analyses were used. Overall, 7.7% perceived high-very high, 25.7% perceived moderate, 34.1% perceived low, and 32.4% perceived very low nicotine content in their assigned study cigarettes. Perceived, but not actual, nicotine content was related to perceived disease risk; this association was moderated by menthol status. Perceived very low nicotine content was associated with lower perceived health risks among both menthol and non-menthol smokers, while perceived moderate and low nicotine content were associated with lower perceived health risks among menthol smokers only. Misperceptions about nicotine are a concern regarding the implementation of a nicotine reduction policy in the United States or other countries, as well as for interest in and uptake of products like nicotine replacement therapy and e-cigarettes. Findings inform the need for public messaging that clarify the persistent harms of reduced nicotine combusted tobacco products, particularly in the context of menthol cigarettes.

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SYM32B

EFFECTS OF NICOTINE DOSE IN CIGARETTES ON PERCEIVED HEALTH RISK AND SUBJECTIVE RESPONSE IN ADOLESCENT SMOKERS

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Dramatically reducing the level of nicotine in cigarettes may make them less addictive, and this regulatory strategy may ultimately improve public health. However, to date very low nicotine content (VLNC) cigarettes have not been studied thoroughly in adolescents. The aim of the current study was to determine the effects of nicotine dose on adolescent perceptions of risk for nicotine addiction and subjective responses to smoking. Adolescent daily smokers (ages 15-19, n=50), abstained from smoking overnight and completed the Perceived Health Risk Scale and the Cigarette Evaluation Scale (CES) following ad lib smoking of one research cigarette (15.8, 5.2, 1.3 and 0.4 mg/g of tobacco) in a series of four laboratory sessions. Sessions were counterbalanced within subject, with double blind presentation; although participants were told that the cigarettes may contain less nicotine

than typical cigarettes. Paired t-tests revealed that adolescents believed their risk of developing addiction to be significantly lower for all doses of study cigarettes relative to their usual brand (all p's .05). Mean scores on CES subscales for Smoking Satisfaction and Psychological Reward indicated relative dissatisfaction with all doses. Overall, these data indicate that adolescents perceived all study cigarettes to carry a lower risk of addiction than their usual brand, but to have a moderate risk of nicotine addiction overall. Subjectively, adolescents did not rate VLNC cigarettes as very satisfying, and this was true across all nicotine doses despite large differences in nicotine yield. This information will help regulatory agencies evaluate the feasibility of a nicotine reduction policy and how it may affect adolescent smokers.

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SYM32C

IDENTIFYING THEMES OF RISK PERCEPTION IN SMOKERS WHO HAVE NEVER USED REDUCED NICOTINE CIGARETTES

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Examining risk perceptions of using low nicotine cigarettes among smokers who have never used these products prior to federal regulation may help anticipate consumer attitudes in the absence of appropriate education, and identify themes where information could be embedded into product advertising to better inform consumers. We evaluated low nicotine cigarette risk perceptions among a sample of 337 non-treatment-seeking, daily smokers (64.5% male) participating in the baseline session of one of two unrelated, ongoing experimental health communication studies of cigarette packaging (n = 240) and warning labels (n = 97). The aims of this study were to 1) determine which false perceptions are most pervasive and 2) identify predictors of these perceptions. Risk perceptions were assessed using a 10-item scale; each item provided a statement about the harm of using low nicotine cigarettes relative to either regular or high nicotine content cigarettes. A series of multinomial logistic regression models were used to predict risk perceptions based on demographic (e.g., age, gender) and smoking history characteristics (e.g., dependence, CPD). Overall, the majority of smokers rated the perceptions that low nicotine cigarettes are less likely to cause cancer, safer, healthier, or have fewer chemicals than regular cigarettes as untrue. Considerable variability existed, however, for perceptions that low nicotine cigarettes are less addictive, have less tar, and make it easier to quit than regular cigarettes (e.g., only 38.7% rated the perception that low nicotine cigarettes have less tar than regular cigarettes as untrue, while nearly half indicated they were unsure). Within these perceptions, compared to women, men were 50-66% less likely to rate these perceptions as untrue vs. unsure (p's <.01-.05). If a federal nicotine reduction policy occurs, findings suggest that educational campaigns should contain corrective statements related to these products' addictiveness, constituents, and quitting effects to most effectively address false beliefs. Further, sex differences in understanding risks of low nicotine cigarettes should be considered in such campaigns.

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SYM32D

ACCEPTABILITY OF A REDUCED NICOTINE PRODUCT STANDARD FOR CIGARETTES AMONG SMOKERS PROVIDED WITH REDUCED NICOTINE CIGARETTES FOR SIX WEEKS

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The United States' Food and Drug Administration and the signatories of World Health Organization Framework Convention on Tobacco Control have regulatory authority over tobacco products, including reduced nicotine (NIC) product standards for cigarettes. While this regulatory approach is viewed favorably by smok-



ers who have not used these products, little is known about the acceptability of this policy among people who have smoked reduced nicotine cigarettes (RNC) for an extended time. A recent clinical trial found that 6-week exposure to RNC reduced NIC exposure and dependence, and increased quit attempts. For this secondary analysis, we examined participants' support for a NIC reduction policy. Participants ($n=773$, 43% female, 15.5 cigarettes per day, not currently trying to quit) were asked if they would "support or oppose a law that reduced the amount of nicotine in cigarettes, to make cigarettes less addictive." Logistic regression analyses were used to assess whether support was affected by gender, race, educational attainment, menthol status, age, NIC dependence, interest in quitting in the next 6 months, randomization to high vs. low NIC cigarettes, and perceived cigarette condition (high vs low NIC). At week 6, 416 subjects (54%) supported the policy, 179 (23%) opposed and 177 (23%) responded "Don't know." Support was highest among females ($OR=2.19$; 95%CI=1.47,3.27), those interested in quitting smoking ($OR=2.97$; 95% CI=1.86,4.74) and older smokers (OR for 5-year age difference=1.16; 95%CI=1.07,1.25). All other covariates, including assigned cigarette condition and perceived NIC content, were not significantly associated with support. This is the first trial to assess the acceptability of a NIC reduction policy in people with extended exposure to RNC. These data provide further evidence that smokers, especially those interested in quitting, would support a NIC reduction policy. Additionally, support for the policy was not affected by use or perceptions of the RNC. Educational campaigns highlighting the potential public health benefits of a NIC reduction policy will be necessary given that 23% of subjects did not have an opinion for or against the policy.

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SYM33

NICOTINE ADDICTION AND WITHDRAWAL: INTEGRATING GENETIC, PHENOTYPIC, AND PHARMACOLOGIC FINDINGS

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Although nicotine dependence (ND) is moderately heritable, there have been few replicated genetic variants identified. Further, variation that has replicably been associated with ND accounts for very little of the variance in ND risk. Integrative approaches based on refined phenotypes, population genetic differences, and mechanisms underlying genetic associations may be useful in increasing our understanding of the basis of ND risk. This symposium examines multiple factors that could enhance gene finding and variant detection in ND. Gelernter et al. conducted a GWAS of nicotine withdrawal symptoms in 4,389 European-American (EA) and 3,632 African American (AA) smokers that identified a genomewide significant (GWS) association mapped to the protocadherin (PCDH) gene cluster on chr. 5. In an independent sample of smokers, nicotine infusion showed that individuals with the risk allele of an associated SNP experienced greater alleviation of their smoking urge. Kranzler et al. conducted a GWAS of FTND score in 5,053 EAs and 5,321 AAs that showed GWS findings for a 300-kb region on chr. 14. Using the most statistically significant polymorphism (rs375683464, an indel, $p=7.85E-09$) for the analysis of the FTND items showed that four were significantly associated with genotype. However, controlling for the most significant item ("time to first cigarette," a proxy for withdrawal following abstinence) rendered the other items non-significant. Tyndale et al. conducted a GWAS of the nicotine metabolite ratio (NMR) in 931 EA and 505 AA treatment-seeking smokers. After adjusting for NMR covariates, 169 chr. 19 markers in EAs and 53 chr. 19 markers in AAs were GWS. Because >60% of these hits were unique to AAs and most were within or near CYP2A6, novel genetic regulation or activity of CYP2A6 in AAs could contribute to population differences in ND. De Biasi et al. examined the mechanism by which chr. 15 SNPs, including the missense SNP rs16969968 in *CHRNA5*, are associated with heavier smoking. They found that the activity of VTA neurons chronically exposed to nicotine is modulated by the presence of alpha5 subunits and variation in the gene encoding them profoundly affects VTA neuroplasticity following nicotine withdrawal. In addition, mutated alpha5-containing receptors produced deficits in DA release measured by *in vivo* microdialysis. Lerman will discuss these studies in the context of an integrated approach to studying the genetics of ND and nicotine withdrawal.

JUSTIFICATION: The identification of specific genetic variants that contribute to risk of nicotine dependence could help with the development of specific interventions to prevent smoking and medications and other interventions to treat nicotine dependence, including personalized or precision treatments.

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SYM33A

GENETICS OF NICOTINE WITHDRAWAL SYMPTOMS

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Over the course of a decade and a half, our research group has collected extensive phenotype data on >10,000 individuals, African American (AA) and European American (EA) in roughly equal numbers, collected as affecteds or controls for a series of studies on drug and alcohol dependence genetics. Most of these subjects have been genomewide association study (GWAS)-genotyped. Although nicotine dependence was not a primary focus for these studies, the sample has proven to be highly informative for nicotine dependence and related traits. We have previously published a GWAS on FTND and one of us will update these findings for the present session. The detailed assessment, by Semi-Structured Assessment for Drug Dependence and Alcoholism (SSADDA), has also allowed the generation of sub-traits of interest, useful in refining our understanding of the genetics of components of nicotine dependence. Here, we focus on nicotine withdrawal symptoms, which contribute to relapse in smokers. To investigate the molecular basis for this phenomenon, we conducted a genome-wide association study of DSM-IV nicotine withdrawal in a sample of smokers drawn from our GWAS sample. A meta-analysis of the nicotine withdrawal trait including both EAs and AAs ($n = 8,021$) identified a genomewide significant association mapped to the protocadherin (PCDH)-alpha, -beta and -gamma gene cluster on chromosome 5. We then studied associated SNP rs31746 in an independent sample of smokers who participated in an intravenous nicotine infusion study. After nicotine infusion, overnight abstinent smokers with the withdrawal risk allele experienced greater alleviation of their urges to smoke. Additionally, we determined that rs31746 maps to a long-range neuron-specific enhancer element shown previously to regulate PCDH-alpha, -beta and -gamma gene expression. Using Braincloud mRNA expression data, we demonstrated an association between rs31746 and PCDH-beta8 mRNA expression in frontal cortex tissue. These data support the conclusion that PCDH-alpha, -beta and -gamma gene cluster regulatory variation influences the severity of nicotine withdrawal.

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SYM33B

GENOMEWIDE ASSOCIATION ANALYSIS FOR FTND SCORE SHOWS CHR. 14 SIGNAL IS ATTRIBUTABLE TO TIME TO FIRST MORNING CIGARETTE

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In a genome-wide association study (GWAS) of Fagerström Test for Nicotine Dependence (FTND) scores in >7,000 subjects from the Yale-Penn sample and the Study of Addiction: Genetics and Environment (SAGE), we reported multiple genomewide significant SNPs in an extensive region on chr 14 in the African-American (AA) part of the sample (Gelernter et al. 2014). We repeated that analysis in an augmented sample comprised of 5,053 exposed European Americans (EAs) and 5,321 exposed AAs to determine which FTND items accounted for the association

signal. The Yale-Penn sample was genotyped on the Illumina HumanOmni1-Quad v1.0 or Human Core Exome chips. SAGE data were accessed from dbGaP. Genotypes were imputed using 1000 Genomes data, phase 3 release. We regressed FTND score on imputed allele dosage, sex, age, and the first 5 principal components within each population, including only individuals who endorsed lifetime exposure to cigarette smoking. There were no genomewide significant findings in the EA part of the sample. In the AA part of the sample, inverse variance weighted meta-analysis revealed genomewide significant findings for a 300-kb region on chr 14. We selected the most statistically significant polymorphism (rs375683464, an indel, $p=7.85E-09$) for the item analysis, in which genotype group and the FTND items "time to first cigarette" and "number of cigarettes smoked/day" were dichotomized. Logistic regression analysis examining the effects of the 6 FTND items on genotype revealed that 4 items were significantly associated with genotype: time to first cigarette, smoking where forbidden, number of cigarettes, and smoking more within the first hour of waking. Time to first cigarette was the most significant predictor ($OR=1.68$, $95\%CI=1.26-2.24$, $Wald=12.48$, $p=4.1 \times 10^{-4}$) and when controlled for in a subsequent analysis, the other FTND items were no longer significant predictors. These findings are consistent with our prior GWAS, which identified a large region on chr 14 that was associated with nicotine dependence in AAs and support the notion that the time to the first cigarette in the morning is the key element of the nicotine dependence measured by the FTND.

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SYM33C

CHRNA5 CRITICALLY REGULATES NICOTINE'S INFLUENCE OVER THE DOPAMINERGIC SYSTEM

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Nicotine dependence is influenced by chromosome 15q25.1 single nucleotide polymorphisms (SNPs), including the missense SNP rs16969968 that alters function of the $\alpha 5$ nicotinic acetylcholine receptor (encoded by CHRNA5), and non-coding SNPs that regulate CHRNA5 mRNA expression. Besides being associated with compulsive heavy smoking, CHRNA5 risk alleles correlate with increased lung cancer incidence, increased risk of COPD and coronary artery disease, and delayed smoking cessation. Disruption of signaling through $\alpha 5$ -containing nicotinic receptors (nAChRs) mitigates nicotine withdrawal symptoms and permits consumption of high nicotine concentrations by affecting the ventral tegmental area and the medial habenula/interpeduncular nucleus circuits. To further understand how CHRNA5 gene variation affects dopaminergic function, we examined ACh-gated nAChR currents in VTA neurons and nicotine-induced dopamine release in the Nucleus Accumbens. We found that the effects of chronic nicotine exposure on VTA neurons are modulated by the presence of the $\alpha 5$ subunit and that CHRNA5 gene variation profoundly affects VTA neuroplasticity following nicotine withdrawal. In addition, we will demonstrate that mutated $\alpha 5$ produces deficits in DA release measured by in vivo microdialysis. Overall, our data point to mechanisms through which the CHRNA5 polymorphism can affect smoking behavior in humans.

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SYM33D

IDENTIFICATION OF NOVEL GENETIC FACTORS ASSOCIATED WITH CYP2A6, NICOTINE METABOLITE RATIO AND SMOKING CESSATION OUTCOMES IN AFRICAN AND CAUCASIAN AMERICAN SMOKERS

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CYP2A6 is the major nicotine-inactivating enzyme. CYP2A6 activity, measured by the nicotine metabolite ratio (NMR; 3'-hydroxycotinine/cotinine), is highly heritable (~80%) and because CYP2A6 is the major nicotine metabolizing pathway, the NMR correlates with total nicotine clearance. Thus, clearance, CYP2A6, and/or

NMR influence the rate of nicotine metabolic inactivation and subsequently numerous smoking behaviours, including cigarettes/day, intensity, time to first cigarette, duration of smoking, response to smoking cessation pharmacotherapies and tobacco related illness including lung cancer. The average NMR varies by ethnicity, with African Americans (AA) having lower NMR versus Caucasians; this is likely due to AA having more genetic variants in CYP2A6. Comparatively less is known in AA regarding the genetic influences on NMR. We conducted a genome-wide association study of NMR in Caucasian (N=931) and AA (N=505) treatment-seeking smokers (NCT01314001). Additive genetic models adjusting for NMR covariates (e.g., sex, age, BMI) were used. In Caucasians, 169 significant (P30 hits on chromosome 19 associated specifically with NMR in AA, but not Caucasian smokers, suggesting there could be novel genetic regulation of CYP2A6 expression and/or activity in AA. This in turn may contribute to inter-ethnic variability in the rates of nicotine metabolism, smoking behaviours, and tobacco-related disease risk.

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SYM34

EMERGING METHODS FOR CHARACTERIZATION OF NEW AND MANIPULATED TOBACCO PRODUCTS

Emmanuel Mongodin, PhD, University of Maryland School of Medicine, MD, USA; Edward Bernat, PhD, University of Maryland Department of Psychology, USA; Marielle Brinkman, BS, Battelle Public Health Center for Tobacco Research, OH, USA; Hyoshin Kim, PhD, Battelle Public Health Center for Tobacco Products, WA, USA

There is a proliferation of tobacco and nicotine products marketed in the United States and around the world. In the U.S., the Family Smoking Prevention and Tobacco Control Act gives the U.S. Food and Drug Administration authority to regulate the manufacture, distribution and marketing of tobacco products. For effective regulation, new and manipulated tobacco products must be fully characterized. An important theme of a program of characterization is that tobacco products have the highest brand loyalty of any consumer product: a pack-a-day smoker takes into his/her body between 70,000 and 100,000 puffs per year. Biomarkers of exposure studies typically require relatively long-term studies, but brand loyal consumers will generally not comply with long protocols requiring use of non-preferred brands. We therefore use unique biomarkers resulting from single laboratory use of products, using "boost" measures, resulting from before and after single use of products, thus avoiding non-compliance issues. This presentation will report on four emerging methods to acutely characterize new and manipulated tobacco products: (1) potential for toxicity, (2) consumer acceptance and likelihood of adoption, (3) implications of flavors and sweeteners and, (4) the microbiome of the product and that of the users of the product. The sum of the parts will report a new paradigm for understanding the public health impact of new and manipulated tobacco products.

JUSTIFICATION: The methods will assist the NIH and FDA to evaluate the potential public health implications of marketing various tobacco products

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SYM34A

THE CIGARETTE MICROBIOTA IS INFLUENCED BY BRAND, MENTHOLATION AND STORAGE CONDITIONS: IMPLICATIONS FOR POTENTIAL EXPOSURE TO TOBACCO-SPECIFIC NITROSAMINES AND BACTERIAL PATHOGENS

Emmanuel Mongodin^{*1}, Amy Sapkota², ¹University of Maryland School of Medicine, MD, USA, ²University of Maryland School of Public Health, Maryland Institute for Applied Environmental Science

Complex bacterial communities that inhabit cigarettes may play a critical role in the generation of carcinogenic tobacco-specific nitrosamines (TSNAs) and in the health effects associated with cigarette smoking. However, the cigarette-associated microbiota and its dynamics have been largely left unexplored. Therefore, we conducted time-series experiments with five commercially-available brands of cigarettes that were either commercially-mentholated, custom-mentholated, user-mentholated or non-mentholated. Cigarettes were incubated for two weeks under three different temperature and relative humidity conditions to mimic pocket, refrigerator or room storage conditions. Metagenomic DNA was extracted, and the V3-V4 region of the 16S rRNA gene was PCR-amplified and sequenced using Illumina MiSeq. A subset of samples was also analyzed via liquid chromatography with tandem mass spectrometry for two TSNAs: N'-nitrosonornicotine (NNN) and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK). Across all brands, bacterial communities were dominated by members of the *Pseudomonas*, *Pantoea*, and *Bacillus* genera, with levels of *Pseudomonas* relatively constant regardless of storage condition. Between-sample comparisons using beta diversity analyses revealed bacterial composition differences by brand, mentholation state, as well as manufacturer's lots. Core bacterial operational taxonomic units (OTUs) were identified in all samples and included *Bacillus pumilus*, *Rhizobium* sp., *Sphingomonas* sp., unknown *Enterobacteriaceae*, *Pantoea* sp., *Pseudomonas* sp., as well as the opportunistic pathogens *Pseudomonas oryzae* and *Pseudomonas putida*. Specific OTUs were detected as significantly altered in relative abundance between days 0 and 14, influenced by brand and storage condition. OTUs were associated with significant increases between day 0 and day 14 in NNN levels observed in user- and commercially-mentholated brands. These data suggest that manufacturing, manipulations (i.e. mentholation) and storage conditions directly impact the cigarette microbiota as well as levels of TSNAs, which may have implications for exposure to both bacterial pathogens and TSNAs among cigarette users.

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SYM34B

EMERGING ELECTROENCEPHALOGRAPHIC/EVENT-RELATED POTENTIAL METHODS: POTENTIAL FOR EVALUATING NEW AND MANIPULATED TOBACCO PRODUCTS

Edward Bernat^{*}, University of Maryland Department of Psychology, USA

EEG/ERP measures have proven useful for indexing differential effects of tobacco product characteristics, and emerging time-frequency (TF) signal processing approaches offer a number of advantages with the potential to further advance work in this area. Primary TF approaches will be first introduced, including demonstrations of how these approaches can isolate processes which are not readily observed in traditional time-domain approaches. Next, these TF approaches will be applied to index changes in brain processing (N=31) during a common oddball task, before and after consuming smokeless products to satiation. For demonstration, products were manipulated in a 2 (nicotine, no-nicotine) x 2 (wintergreen flavor, unflavored) within-subjects design. Time-frequency decomposition of the ERP signals provided measures of EEG frequency activity during task target responding. These were: delta (0-3 Hz), theta (4-7 Hz), alpha (8-12 Hz), and gamma (30-50 Hz). Delta activity, evidenced significant differences in visual processing areas for both flavor and nicotine, suggesting changes in visual attention and engagement in the task. Theta activity was significantly related to both flavor and nicotine. Theta activity was consistent with the N2 component, and is widely understood to index orienting and novelty processing with sources in the anterior cingulate cortex (ACC). Alpha and gamma

measures summed activity across the 1 second ERP window, as effects did not vary significantly during this time. Alpha activity was related to nicotine and not flavor, with decreases observed for nicotine relative to no-nicotine. Alpha has been shown to index inhibitory activity, such that when engagement in the task increases, alpha decreases. Gamma activity was associated with flavor and not nicotine, although the pattern was more complex. Here early gamma activity (0-250 ms) evidenced an increase in amplitude, and late (500-1000 ms) decreases in amplitude, for flavor relative to unflavored. These procedures allow objective measures of cognitive responses to new and manipulated tobacco products.

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SYM34C

USING NOVEL TECHNIQUES TO IDENTIFY HARMFUL EXPOSURES FROM TOBACCO PRODUCTS

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In terms of U.S. regulation, a tobacco product's potential for harm is defined by its direct effects, such as delivery of carcinogens, toxicants, and other chemicals to the user, together with indirect effects, such as its potential to facilitate initiation, impede cessation, or increase intensity of use. Although tobacco product emissions and content are important components of a product's overall toxicity, combining these data with user behavior and resulting human exposures is critical to understanding the difference in harm among the many tobacco product types and brands available. We employed a suite of real-time chemical and physical monitoring techniques to collect data on biomarkers of exposure before and immediately after use of tobacco products. Using an established boost paradigm, cross-over trials, and conventional and novel product characterization techniques, we measured acute exposures to toxicants from new and manipulated tobacco products, including e-cigarettes, little cigars, cigarillos, waterpipes and smokeless tobacco. Constituents measured include representative carcinogens and respiratory, cardiovascular, reproductive, and developmental toxicants taken from the U.S. Food and Drug Administration's harmful and potentially harmful constituent (HPHC) list, and sweet flavor additives that enhance product appeal. Novel analytical techniques applied to combustible tobacco smoke and e-cigarette aerosol include continuous, simultaneous monitoring of particle/aerosol size distribution and volatile organic compounds, and two dimensional chromatography time-of-flight mass spectrometry to separate complex flavor profiles into their discrete chemical identities. To better understand the nanotoxicity of tobacco product emissions, semi- and non-volatile organic and inorganic compounds were quantified separately in nano- and submicron-sized particulate matter. For smokeless tobacco products, we employed a salivary boost paradigm and product characterization methods to quantify sweet chemical content and HPHC dose from the use of 13 different products, including polymer discs, lozenges, sachets, and moist snuff used by subjects in three cross-over trials.

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SYM34D

SWEET FLAVORS IN ELECTRONIC CIGARETTES

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Initial data indicate that e-cigarette (e-cig) flavors perceived as sweet are appealing to young adults and smokers trying to quit combustible cigarette smoking; however, it is not known if sweet e-cig flavors influence nicotine initiation, maintenance, and cessation. There are also few data on the identity and amounts of chemicals



in e-liquids and vapors perceived as sweet. The goal of this interdisciplinary study was to examine the extent to which the perception of sweet and other flavors is associated with liking and disliking of flavored e-cigs and to characterize the chemical components of sweet flavors. Thirty one participants vaped six commercially available blu e-cig flavors: Classic Tobacco (CT), Magnificent Menthol (MM), Cherry Crush (CC), Vivid Vanilla (VV), Piña Colada (PC), and Peach Schnapps (PS). For each flavor, participants rated liking/disliking on the Labeled Hedonic Scale and perceived intensities of sweetness, coolness, bitterness, and harshness on the generalized version of the Labeled Magnitude Scale. The two flavors identified as most sweet and the one least sweet were analyzed using GCxGC-TOFMS to determine the chemical identities and concentrations of the components associated with sweetness in the e-cig mainstream aerosol and varying nicotine levels of the e-liquid. Results showed that PC and PS were perceived as sweetest and liked the most; CT was perceived as least sweet and liked the least. Liking was positively correlated with sweetness for PS and PC; and with coolness for MM, CT, and VV. In contrast, harshness was negatively correlated with liking. Eleven compounds found consistently in PC and PS and not in CT (or at very low levels) were selected for quantification. These included ethyl vanillin, diacetyl, γ -octalactone, and other chemicals described as having sweet and fruity characteristics. Levels of these compounds varied by flavor, and amounts of some compounds were found to increase in e-liquids as the nicotine level increased. These results suggest that flavors play an important role in e-cig preference, and provide a link between psychophysical perceptions and the chemical identity of sweetness in e-cig use.

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CORRESPONDING AUTHOR: Hyoshin Kim, PhD, Battelle Public Health Center for Tobacco Products, WA, USA

SYM35

INNOVATIVE BRAIN STIMULATION TECHNIQUES FOR TREATING TOBACCO DEPENDENCE

Andreas Fallgatter, MD, University of Tübingen, Germany; Christine Sheffer, PhD, City University of New York School of Medicine, USA; Xingbao Li, MD, and Colleen Hanlon, PhD, Medical University of South Carolina, SC, USA; Sarah Snider, PhD, Virginia Tech Carilion Research Institute, VA, USA

In the past decade, advances in pre-clinical and clinical neuroimaging have significantly expanded our knowledge of the neuronal circuitry of tobacco addiction. Brain stimulation techniques are now being used to selectively enhance or attenuate activity in key regions of this neuronal circuitry that affect important characteristics of tobacco dependence including craving, delay discounting, the valuation of cigarettes, cigarette consumption, and nicotine dependence. This symposium will introduce Transcranial Magnetic Stimulation (TMS) as an exciting, innovative, prospective option in the treatment of tobacco dependence. We will present a review of the empirical and conceptual rationale for the approach followed by the findings from recently completed studies. Dr. Hanlon will present an overview of the conceptual, functional, neurochemical, and anatomical mechanisms of selectively enhancing or attenuating neuronal circuitry in the treatment of tobacco dependence as well as discuss the theoretical and empirical rationale for selection of targeted brain sites. Dr. Snider will present findings from a randomized clinical trial (RCT) that examined the effects of 5 consecutive days (6 sessions per day) of continuous theta burst stimulation (cTBS) of the ventromedial prefrontal cortex-striatum circuit on the valuation of cigarettes, delay discounting, and craving. Dr. Li will present findings from a RCT that examined the effects of 10 sessions of 10Hz TMS of the left dorsolateral prefrontal cortex (DLPFC) on cigarette craving and cigarette consumption. Dr. Sheffer will present findings from a RCT that examined the feasibility and limited efficacy of combining 8 sessions of 20 Hz TMS of the left DLPFC with self-help relapse prevention. Dr. Fallgatter will present findings from a RCT that examined the efficacy of combining 4 sessions of intermittent theta burst stimulation (iTBS) of the right DLPFC with cognitive-behavioral treatment for tobacco dependence. Dr. Bickel will serve as the discussant. He will synthesize the findings from the presentations; assess the safety, feasibility, and scalability; evaluate potential efficacy; address key public health issues; and make recommendations for future research.

JUSTIFICATION: This topic focuses on improving existing treatments for tobacco dependence and thus has significant translational applications to the clinical understanding and treatment of tobacco dependence.

FUNDING: R21CA178813-01; R21DA041610; R21DA036752; and Virginia Tech Carilion Research Institute

CORRESPONDING AUTHOR: Christine Sheffer, PhD, Roswell Park Cancer Institute, Buffalo, NY, USA

SYM35A

CAN TRANSCRANIAL MAGNETIC STIMULATION BE USED TO ENHANCE COGNITIVE BEHAVIORAL THERAPY FOR SMOKING CESSATION?

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Smoking is a leading cause of death and disease world-wide. Smoking cessation significantly decreases disease incidence and increases life expectancy. Most smokers express a desire to quit and many make quit attempts every year, but few are successful. Unaided quit attempts are often ineffective; only 5% of those that attempt have maintained abstinence from smoking one year later and relapse rates from evidence-based treatments for tobacco dependence are still very high. Cognitive-behavioral therapy (CBT) for relapse prevention is an evidence-based treatment for tobacco dependence that greatly increases smokers odds of attaining long-term abstinence from smoking, but 70-80% of smokers who receive intensive evidence-based CBT for tobacco dependence will relapse. Methods to enhance the effectiveness of CBT and other evidence-based treatments for tobacco dependence would improve treatment outcomes. High frequency repetitive Transcranial Magnetic Stimulation (rTMS) of the dorso lateral prefrontal cortex has been shown to decrease craving for tobacco as well as decrease cigarette consumption among smokers motivated to quit. Intermittent Theta Burst Stimulation (iTBS) is an rTMS approach that is administered at lower intensities and shorter intervals than rTMS and might provide a more tolerable option than rTMS with the same effects. We examined the effects of 4 sessions of iTBS of the right dorsolateral prefrontal cortex combined with CBT for relapse prevention on the experience of craving and abstinence from smoking. Participants (n = 74) were randomly assigned to active (n = 38) or sham (n = 36) iTBS and participated in six weeks of CBT with a quit date scheduled between the second and third week of treatment. CBT was accompanied by iTBS during the third through sixth CBT sessions. Outcomes were assessed by telephone 3, 6, and 12 months after treatment. Continuous abstinence was assessed. No characteristic differences were found between the active and sham groups. A significant difference in abstinence rates was found 3 months after treatment [OR 2.60 (CI: 1.15, 5.86, p<.05)], but no differences were found 6 months [OR 1.20 (.52, 2.78)] and 12 months [OR 2.21 (.82, 6.01)] after treatment. No differences were found between conditions for the experience of craving. This preliminary evidence suggests that combining iTBS with CBT for tobacco dependence can potentially improve short-term treatment outcomes. More research is needed to extend the effectiveness of this approach.

FUNDING: No funding

CORRESPONDING AUTHOR: Andreas Fallgatter, MD, University of Tübingen, Germany

SYM35B

THE FEASIBILITY OF ENHANCING SMOKING RELAPSE PREVENTION WITH TRANSCRANIAL MAGNETIC STIMULATION

Christine Sheffer^{*1}, Warren Bickel², Thomas Brandon³, Christopher Franck², Luana Panissidi⁴, Syed Abdali¹, Sara Lunden¹, Neelam Prashad¹, Antonio Mantovani¹, ¹City University of New York School of Medicine, USA, ²Virginia Tech Carilion Research Institute, ³Moffitt Cancer Center, ⁴City University of New York Medical School

Most smokers relapse shortly after they attempt to quit smoking. They choose the immediate reward of smoking over larger, delayed rewards such as better health and longer life. Delay discounting is the degree to which one discounts or de-values delayed rewards. Lower discounting rates are associated with greater odds of long-term abstinence from smoking. The left dorso-lateral prefrontal cortex (DLPFC) exerts inhibitory control over influences from limbic regions. Choosing to smoke after making a decision to quit potentially presents a situation where the left DLPFC is insufficiently activated to exert an inhibitory influence on the urge to smoke. Preliminary evidence suggests that one session of high frequency repetitive Transcranial Magnetic Stimulation (rTMS) of the left DLPFC briefly decreases



discounting rates, craving for cigarettes, and cigarette consumption, as well as increases learning by facilitating long-term synaptic potentiation. We hypothesized that combining multiple sessions of high frequency rTMS of the left DLPFC with an evidence-based, self-help relapse prevention intervention would decrease discounting rates over time and demonstrate potential efficacy as a treatment for tobacco dependence, but little is known about the feasibility of this approach. We conducted a feasibility study in which smokers (active n=16, sham n=13), abstinent from smoking for 24 hours, were randomized to 8 sessions of active or sham 20 Hz rTMS of the left DLPFC and followed for 3 months. Participants received 16 minutes of stimulation per session [900 pulses of 20 Hz rTMS at 110% of the Motor Threshold; 45 20-pulse trains of 1 second duration with an inter-train interval of 20 seconds]. We examined multiple feasibility measures and conducted limited efficacy testing. The sham/blind was effective; no differences between conditions were found in the number of sessions attended, the perceived acceptability of treatment, the comparability to medications, and in levels of motivation and self-efficacy, anxiety, mood, and impulsiveness throughout the treatment and follow-up period. rTMS decreased delay discounting of \$100 ($F(1, 25.4) = 4.14, p=.052$) and \$1000 ($F(1, 25.2) = 8.42, p=.008$) throughout the treatment and follow-up period and reduced the relative risk (RR) of relapse 3 fold (RR 0.29, CI 0.10-0.76, Likelihood ratio χ^2 with 1 df = 6.40, $p=.01$). Combining high frequency rTMS of the left DLPFC with self-help relapse prevention is feasible and demonstrates potential efficacy. Larger trials are needed to determine the efficacy of this approach.

FUNDING: R21 CA178813-01

CORRESPONDING AUTHOR: Christine Sheffer, PhD, City University of New York School of Medicine, USA

SYM35C

TRANSCRANIAL MAGNETIC STIMULATION FOR SMOKING CESSATION: A DOUBLE-BLIND, SHAM-CONTROLLED, RANDOMIZED TRIAL

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Worldwide, nearly one billion adults now smoke tobacco. Our previous study demonstrated that one session of high frequency repetitive Transcranial Magnetic Stimulation (rTMS) of the left dorsolateral prefrontal cortex (DLPFC) reduced the experience of cue-elicited craving for smoking among nicotine dependent smokers. We hypothesized that multiple sessions high frequency rTMS would reduce cue-elicited craving and cigarette consumption over a longer period of time as well as increase smoking abstinence rates. Participants (n=42) who smoked at least 10 cigarettes per day and were motivated to quit smoking were randomized to receive 10 sessions of active or sham 10Hz rTMS of the left DLPFC. Participants received 15 minutes of stimulation per session [3000 pulses of 10 Hz rTMS at 100% of the Motor Threshold; 60 10-pulse trains of 1 second for 5 seconds, with an inter-train interval of 10 seconds]. The number of cigarettes smoked per day, carbon monoxide (CO) level in the exhaled breath, nicotine dependence level as measured by the Fagerstrom Test for Nicotine Dependence, and cue craving as measured by the Questionnaire of Smoking Urges and the Self-Administered Tobacco Craving Questionnaire were evaluated during the treatment and follow-up period. Thirty-eight participants (90% of those enrolled) were included in the final data analysis. Active rTMS significantly reduced cigarette consumption ($F(12, 451) = 13.37, p < 0.000$) and decreased CO level in participants' exhaled breath ($F(9, 360) = 2.216, p = 0.021$) as well as decreased long-term cue craving ($F(1, 168) = 10.589, p = 0.001$) and immediate cue craving ($F(1, 762) = 18.45, p < 0.000$). Participants who received active rTMS stopped smoking on the target quit date at a higher rate than participants who received sham rTMS (5/21 active versus 1/17 sham). These short-term abstinence results were biochemically confirmed with CO levels from exhaled breath. The effects of rTMS were initiated during the second week of stimulation and were maintained throughout the 1-month follow-up period. These findings add to the growing evidence that high frequency rTMS can reduce cigarette consumption, decrease cue-elicited craving for smoking and perhaps increase abstinence rates. These findings suggest that the treatment effects of rTMS might be enhanced with a greater number of rTMS sessions. Larger trials are needed to examine the long-term efficacy of this approach for smoking cessation.

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SYM35D

TRANSLATING BASIC SCIENCE KNOWLEDGE OF NEURAL CIRCUITS TO TREATMENT OPTIONS FOR TOBACCO DEPENDENCE

Colleen Hanlon, PhD, Medical University of South Carolina, USA

In the past decade, advances in pre-clinical and clinical neuroimaging have significantly expanded our knowledge of the neuronal circuitry of tobacco addiction. Brain stimulation techniques are now being used to selectively enhance or attenuate activity in key regions of this neuronal circuitry that affect important characteristics of tobacco dependence including craving, delay discounting, the valuation of cigarettes, cigarette consumption, and nicotine dependence. This introductory presentation will provide an overview of the conceptual, functional, neurochemical, and anatomical mechanisms of selectively enhancing or attenuating neuronal circuitry in the treatment of tobacco dependence as well as a review of the theoretical and empirical rationale for selection of targeted brain sites. Dr. Hanlon will then introduce Transcranial Magnetic Stimulation (TMS) as an exciting, innovative, prospective option in the treatment of tobacco dependence. Repetitive TMS is FDA cleared for the treatment of depression. There are over 700 TMS machines in the United States at present and emerging insurance reimbursement. TMS is now being actively pursued as a treatment for tobacco dependence, with several multi-site clinical trials underway, and a growing number of primary research publications. It is becoming increasingly important for us, as a field, to have a comprehensive understanding of the neurobiological basis for the effects of TMS on characteristics of tobacco dependence. The effects of high versus low frequency TMS as well as intermittent theta burst stimulation (iTBS) and continuous theta burst stimulation (cTBS) will be discussed. Optimal choices in terms of brain site, intensity, duration, frequency, and patient population also will be discussed. For instance, while many of the efforts to treat nicotine dependence have focused on increasing activity in the DLPFC, evidence suggests that decreasing activity in the ventromedial prefrontal cortex and ventral striatum might also be feasible and fruitful. This introductory presentation will provide an empirical and conceptual framework for understanding the 4 study presentations that follow.

FUNDING: No funding.

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SYM35E

CONTINUOUS THETA BURST TMS AS A TOOL TO CHANGE DECISION-MAKING IN SMOKERS

Sarah Snider^{*1}, PhD, Colleen Hanlon², PhD, Jeff Stein¹, PhD, Warren Bickel¹, PhD, ¹Virginia Tech Carilion Research Institute, USA, ²Medical University of South Carolina, USA

Reinforcer pathology is defined as the interaction between commodity over-valuation and excessive preference for an immediate choice over a delayed one. Cigarette smokers exhibit this pathology as high demand for cigarettes in combination with high rates of discounting of future rewards. One mechanism behind reinforcer pathology might be an imbalance in the relative control of the competing neuro-behavioral decision systems wherein, of the two frontal-striatal circuits involved, the relative control of the executive decision system (e.g., dorso lateral prefrontal cortex/striatum) is lower than the relative control of the impulsive decision system (e.g., ventromedial prefrontal cortex/striatum). From this perspective, we used Transcranial Magnetic Stimulation (TMS) to attenuate activity in the ventromedial prefrontal cortex-striatum circuit. We used continuous theta burst stimulation (cTBS) to stimulate the ventromedial prefrontal cortex to reduce the relative control of the limbic system (i.e., impulsive decision system) and potentially, reduce reinforcer pathology. We hypothesized that cTBS of the ventromedial prefrontal cortex would reduce the valuation of cigarettes, decrease delay discounting, and reduce craving among smokers. A total of 18 participants (n=11 active; n=7) who were approximately 12-hours deprived from smoking prior to undergoing stimulation, underwent five consecutive days of cTBS (6 sessions per day, 110% motor threshold). All participants completed a battery of behavioral assessments and tasks at each session, and a craving task inside an fMRI scanner during the first and last session. The results indicate that five consecutive days of cTBS prevented deprivation-induced increased cigarette demand and decreased delay discounting. Active cTBS also reduced activation of brain regions involved in craving. These findings suggest that cTBS of the ventromedial prefrontal cortex is a strong candidate for future investigation into non-invasive tools to disrupt cigarette smoking-related reinforcer pathology.

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SYM36

UNDERSTANDING AND INTERVENING ON ALCOHOL USE IN SMOKERS WHO DRINK HEAVILY

Amy Cohn, PhD, Schroeder Institute for Tobacco Research and Policy Studies at Truth Initiative, DC, USA; Lisa Fucito, PhD, Yale School of Medicine, USA; Christopher Kahler, PhD, Brown University School of Public Health, RI, USA; Stephanie O'Malley, PhD, Yale School of Medicine, Connecticut Mental Health Center, CT, USA

Smokers drink more heavily than non-smokers and are more likely to have an alcohol use disorder. Smokers who drink heavily and those with an alcohol use disorder have relatively low rates of successful smoking cessation, and alcohol use is often implicated in smoking relapse. This symposium presents novel data that addresses (a) how alcohol use may promote smoking in heavy drinkers who are interested in quitting smoking, (b) how behavioral interventions can address both alcohol and smoking concurrently, and (c) the efficacy of pharmacotherapies for affecting alcohol use and smoking cessation concomitantly. Dr. Cohn will present data from ecological momentary assessment that examines whether alcohol use in the evening increases the likelihood that temptations to smoke earlier in the day will ultimately result in later smoking. Dr. Fucito will present results from a pilot randomized clinical trial of a behavioral intervention designed to provide motivational enhancement and cognitive behavioral therapy for both alcohol use and smoking in heavy drinking smokers seeking cessation treatment. Dr. Kahler will present results of a randomized clinical trial testing the efficacy of naltrexone for drinking reduction and smoking cessation in a sample of at-risk and problem drinkers seeking smoking cessation treatment. Finally, Dr. O'Malley will present results of a randomized clinical trial testing the efficacy of varenicline in the treatment of alcohol use disorder, which also examines the effects of varenicline on smoking cessation in this context. Dr. Selby will provide a discussion of the symposium highlighting how this research can inform treatment of the substantial portion of smokers who drink heavily.

JUSTIFICATION: This symposium contributes directly to understanding how treatment for smoking cessation and alcohol use disorder can concomitantly address both smoking and alcohol use.

FUNDING: R01AA017181, R01AA020388, R01AA020389, K23AA020000, K05AA014715, R03CA175870

CORRESPONDING AUTHOR: Christopher Kahler, PhD, Brown University School of Public Health, Providence, RI, USA

SYM36A

DAILY FLUCTUATIONS IN SMOKING TEMPTATION AND THE IMPACT OF ALCOHOL USE ON THE TEMPTATION-SMOKING CONNECTION IN HEAVY DRINKING SMOKERS: RESULTS FROM AN IVR STUDY

Amy Cohn^{*1}, Hoda Elmasry¹, Stephen Armeli², Sarah Ehli¹, Thomas Brandon³, ¹Schroeder Institute for Tobacco Research and Policy Studies at Truth Initiative, DC, USA, ²Fareleigh Dickson University, ³University of South Florida

Smoking temptation (ST) is an important correlate and predictor of smoking cessation success. Heavy drinking is a significant risk factor for smoking relapse and is correlated with lower desire to quit smoking and high ST. It is likely that ST fluctuates over days, or even hours, as smokers encounter smoking triggers, such as alcohol use. This study used twice daily random interactive voice response (IVR) assessments, in the morning and evening, to examine the extent to which ST fluctuates within-days, and day-to-day in 84 heavy drinking smokers (93% with an alcohol use disorder) who were motivated to quit smoking in the next 6-months. We also examined whether the link between daily ST and smoking behavior was moderated by daily alcohol consumption. Participants drank heavily (6+ drinks) on 49% of the drinking day; and the majority (91%) of heavy drinking episodes occurred in the evening. Multi-level random effects models showed that, over the course of 28-days, individuals experienced significant day-to-day fluctuations in their ratings of ST that occurred both in the morning ($b = 17.36$; $SE = 0.72$) and at night ($b = 17.21$, $SE = .83$; $ps < .0001$). Smoking, but not drinking, significantly

decreased over the 28-day IVR period. Lagged models showed a significant interaction of morning ST x evening drinking predicting evening smoking ($b = .004$, $SE = .001$, $p < .05$), such that the association between morning ST and evening cigarette smoking was stronger for respondents who drank more in the evening. Temptation in the previous report predicted elevated temptation in subsequent reports, regardless of smoking or drinking. Evening temptation to smoke was also higher on days in which participants reported greater negative affect in the morning. Daily variations in temptation suggest important points for "real-time" intervention for heavy drinking smokers. Further, because the link between morning temptation to evening smoking was stronger for those who drank more heavily at night, smokers who experience greater ST in the morning should be vigilant to refrain from drinking in the evening if they want to reduce their risk of smoking.

FUNDING: R03CA175870

CORRESPONDING AUTHOR: Amy Cohn, PhD, Schroeder Institute for Tobacco Research and Policy Studies at Truth Initiative, DC, USA

SYM36B

AN INTEGRATED BEHAVIORAL INTERVENTION FOR HEAVY-DRINKING SMOKERS: RESULTS FROM A RANDOMIZED PILOT STUDY

Lisa Fucito^{*}, Tess Hanrahan, Kathleen Carroll, Srinivas Muvvala, Stephanie O'Malley, Yale School of Medicine, USA

Smokers who drink heavily are less successful quitting smoking compared to smokers who drink moderately and have greater difficulty reducing their drinking than non-smokers. Despite these risks, smoking cessation treatment is not typically provided concurrently with alcohol treatment. The goal of this ongoing study was to evaluate the preliminary efficacy of an integrated tobacco and alcohol behavioral intervention in heavy-drinking smokers seeking smoking cessation treatment (N=22; 11 women, 11 men). Participants were randomly assigned to receive either an integrated tobacco and alcohol behavioral intervention (INT) or a tobacco only behavioral intervention (TOB) for 12 weeks. INT included: (1) MI techniques along with personalized feedback on smoking, alcohol use, and health indices and (2) CBT techniques that addressed stimulus control and habit replacement for both smoking and alcohol along with skills for managing negative affect. TOB included MI and CBT techniques but only tobacco use was the focus of treatment. All participants also received 12 weeks of varenicline. Participants were: mostly Caucasian (82%), 38.1±10.4 years old, smoking 17.2±9.2 cigarettes daily. Most (68%) had a lifetime alcohol use disorder (27% current). Both conditions reported similar 7-day point prevalence smoking quit rates at the end of treatment (INT=64%; TOB=55%). At 6-months, there was a significant effect of condition for men. Among men, INT quit rates (83%) were significantly higher than TOB quit rates (20%) ($p = .02$). There was a significant 3-way interaction of time, condition, and sex on drinks per drinking day from baseline to 6-months ($p = .01$). Men in INT significantly reduced their drinking over time. We then tested if the likelihood of achieving smoking abstinence at 6-months was related to the likelihood of having reduced one's drinking. This association was significant for men ($p = .02$). The results suggest that a comprehensive behavioral intervention plus varenicline results in high smoking quit rates among heavy-drinking smokers overall and integrating tobacco and alcohol treatment may be especially beneficial for reducing both smoking and drinking in men.

FUNDING: K23 AA020000, K05 AA014715

CORRESPONDING AUTHOR: Lisa Fucito, PhD, Yale School of Medicine, USA

SYM36C

A DOUBLE-BLIND RANDOMIZED PLACEBO-CONTROLLED TRIAL OF ORAL NALTREXONE FOR HEAVY DRINKING SMOKERS SEEKING SMOKING CESSATION TREATMENT

Christopher Kahler^{*1}, Patricia Cioe¹, Golfo Tzilos², Nichea Spillane³, Lorenzo Leggio⁴, Susan Ramsey⁵, Richard Brown⁶, Stephanie O'Malley⁷, ¹Brown University School of Public Health, RI, USA, ²University of Michigan, ³University of Rhode Island, ⁴National Institute on Alcohol Abuse and Alcoholism and National Institute on Drug Abuse, ⁵Alpert Medical School of Brown University, ⁶University of Texas School of Nursing, ⁷Yale School of Medicine

Naltrexone has not been shown effective as a pharmacotherapy for smoking cessation. However, post hoc analyses of two randomized clinical trials suggest that,



among smokers who drink heavily, naltrexone may reduce alcohol use during a quit smoking attempt, with one study suggesting it may increase smoking abstinence. To date, no studies have been conducted specifically to evaluate naltrexone for smoking cessation and drinking reduction in heavy drinkers seeking smoking cessation treatment. Also, no studies have tested naltrexone in the context of behavioral interventions that simultaneously address smoking and heavy drinking. We conducted a double-blind randomized placebo-controlled trial to evaluate the efficacy of 50-mg oral naltrexone for reducing alcohol use during a quit smoking attempt and for increasing smoking abstinence. In addition to study medication (naltrexone or matched placebo), participants received nicotine patch and a behavioral intervention targeting both alcohol and smoking. Participants were 150 smokers (41.3% female, 74.2% White, 28.0% with current alcohol dependence) who reported drinking heavily (≥ 4 drinks per occasion for women; ≥ 5 drinks for men) at least once per month. Results showed that heavy drinking days and average drinks per week were significantly reduced by at least 50% from baseline at the 8-, 16-, and 26-week follow-ups. However, the effect of naltrexone vs. placebo was minimal and nonsignificant for both percent heavy drinking days ($B = -.04$, CI 95% [-0.30, 0.22], $p = .76$) and drinks per week ($B = -.09$, CI 95% [-0.35, 0.18], $p = .54$). Point-prevalence smoking abstinence ranged from 37.0% at 2 weeks post quit date to 12.0% at 6 months post quit date. The effect of naltrexone vs. placebo on smoking abstinence was minimal and nonsignificant ($OR = .83$, CI 95% [0.39, 1.75], $p = .62$). Results suggest heavy drinking smokers who receive a combined behavioral intervention targeting both alcohol and smoking show substantial reductions in drinking that are largely independent of smoking outcomes. Naltrexone does not appear to have benefit when added to a combined behavioral intervention and nicotine patch for smoking cessation.

FUNDING: R01AA017181

CORRESPONDING AUTHOR: Christopher Kahler, PhD, Brown University School of Public Health, RI, USA

SYM36D

VARENICLINE EFFECTS ON ALCOHOL DRINKING, SMOKING, AND EXPLICIT AND IMPLICIT COGNITIVE-MOTIVATION PROCESSES IN ALCOHOL DEPENDENT SMOKERS SEEKING ALCOHOL TREATMENT

Stephanie O'Malley^{1,2}, Alan Zweben³, Lisa Fucito¹, Ralitzia Gueorguieva¹, Srinivas Muvvala¹, Janna Cousijn⁴, Reinout Wiers⁴, ¹Yale School of Medicine, ²Connecticut Mental Health Center, CT, USA, ³Columbia School of Social Work, ⁴University of Amsterdam

PURPOSE: Varenicline is approved for smoking cessation and promising data from preclinical, human laboratory studies and clinical trials suggest that it can also reduce drinking. Integrating smoking cessation and alcohol pharmacotherapy methods, we conducted a trial of the efficacy of varenicline for alcohol dependent smokers seeking alcoholism treatment. **METHODS:** 131 alcohol dependent smokers participated in a 16-week randomized, double-blind, placebo controlled trial of varenicline titrated to 2 mg for the treatment of alcohol drinking conducted at Yale and Columbia. During the first 4-weeks, participants received study medication but were not asked to change their drinking. In the remaining 12 weeks, participants were encouraged to change their drinking while medication adherence was promoted. Smoking cessation was not a focus of behavioral treatment. Implicit approach memory associations and approach action tendencies were evaluated with the Implicit Alcohol Association Test and the Approach Avoidance Task for alcohol, cigarette and neutral cues. **RESULTS:** 92 men and 39 women were randomized. At intake, the sample reported heavy drinking (5+/4+ for males/females) on 42.6% (sd = 37.6) of days on average. A significant interaction of gender and treatment ($p = 0.04$) indicated that varenicline reduced the percentage of heavy drinking days during the last 8 weeks of the study for men but not women. Smoking abstinence confirmed by cotinine levels < 6 ng/mL for the final month of treatment was significantly higher in the varenicline treated group (12.5% versus 0%), irrespective of gender ($p = .003$). Explicit self-reported measures of tobacco craving, but not alcohol craving were lower for those on varenicline. **CONCLUSIONS:** Varenicline, a partial nicotine agonist, may be of benefit for reducing heavy drinking in male smokers seeking treatment for alcohol dependence. Although varenicline promoted smoking cessation among both male and female alcohol dependent smokers who received alcoholism counseling, quit rates were low. Future research should investigate the efficacy of varenicline in combination with a behavioral treatment addressing both alcohol and smoking.

FUNDING: R01AA020388, R01AA020389, K23AA020000, K05AA014715. Pfizer donated study medications.

CORRESPONDING AUTHOR: Stephanie O'Malley, PhD, Yale School of Medicine, Connecticut Mental Health Center, CT, USA

SYM37

PSYCHO-SOCIAL INTERVENTIONS FOR SMOKING CESSATION IN PREGNANCY; AN SRNT-EUROPE SYMPOSIUM

Felix Naughton, University of Cambridge, United Kingdom; Linda Bauld, University of Stirling and UK Centre for Tobacco and Alcohol Studies, United Kingdom; Noémi Berlin, University of Edinburgh, United Kingdom; Sue Cooper, University of Nottingham, United Kingdom

This symposium is submitted on behalf of members of SRNT Europe and is supported by the SRNT-E Board.

Reducing smoking in pregnancy is a policy priority for EU member states and many other countries. Progress has been made in many jurisdictions but in less affluent groups rates of smoking in pregnancy remain high, above one in four in many parts of Europe. This stems in part from a lack of effective available treatment options for pregnant smokers that are easily accessible and acceptable to women. Nicotine replacement therapy is available on prescription and provided in some member states but existing research evidence from trials in the UK, France and elsewhere suggests that it is not effective. Psycho-social interventions, comprising counselling, motivational interviewing, social support and/or incentives do, however, show promise. The most recent Cochrane review on this topic (Chamberlain et al, 2013) reviewed findings from 86 trials and suggested that these types of interventions can have positive outcomes, reducing preterm births by 18%, for example. However, more research is needed to demonstrate which psycho-social interventions are most effective for which women in which circumstances and, importantly, how uptake can be improved. This symposium brings together leading smoking in pregnancy researchers who are all actively involved in current research on behavioural interventions for smoking cessation and presents new data from a series of recent studies in the UK and France.

JUSTIFICATION: This symposium will outline evidence to inform the design and delivery of effective psycho-social interventions for smoking cessation in pregnancy

FUNDING: National Institute for Health Research Health Technology Assessment Programme (UK), UK Clinical Research Collaboration, Ministry of Health (France).

CORRESPONDING AUTHOR: Linda Bauld, University of Stirling, United Kingdom

SYM37A

SMOKING CESSATION INTERVENTIONS IN PREGNANCY AND POST-PARTUM: HOW INTERESTED ARE WOMEN IN ACCESSING SUPPORT AND USING SERVICES?

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BACKGROUND: Limited research exists on interest in and use of smoking cessation support in pregnancy and after delivery. A cohort of women in the UK participated in research to examine these issues. **METHODS:** Three cross-sectional surveys from a longitudinal cohort of pregnant smokers and recent quitters recruited in Nottinghamshire, UK (N=850). Data were collected at 8-26 weeks gestation (wave 1), 34-36 weeks gestation (wave 2) and 3 months postpartum (wave 3). Use of cessation interventions, interest in support and belief and behaviour measures were collected at all waves. Data were analysed descriptively and multiple regression used to identify predictors of support interest and use. **RESULTS:** At wave 1 and 2, just under half of smokers and one-in-ten quitters were interested in cessation support, with one-third of smokers still interested postpartum (wave 1: smokers 44.0%, ex-smokers 8.9%; wave 2: smokers 44.7%, ex-smokers 9.7%; wave 3: smokers 32.5%, ex-smokers 4.7%). The type of support of most interest to smokers in wave 1 was one to one behavioural support (41.7%) whereas a self-help booklet was of most interest in wave 2 (49.0%) and remained so postpartum. Fewer than half of smokers (43.2%) reported discussing cessation with a midwife at wave 1, dropping to one-quarter (26.8%) between waves 1 and 2. Equivalent cessation service access rates were 9.4% (wave 1) and 12.9% (waves 1-2). Lower confidence in stopping smoking on one's own, quitting motivation and having discussed stopping with a health professional (a family doctor, nurse or midwife) independently predicted ($ps < 0.05$) support interest and use of cessation



services. CONCLUSIONS: At any time in pregnancy, findings suggest about half of pregnant smokers are interested in cessation support, including one-to-one and self-help.

FUNDING: National Institutes for Health Research, UK

CORRESPONDING AUTHOR: Felix Naughton, University of Cambridge, United Kingdom

SYM37B

BARRIERS AND FACILITATORS TO SMOKING CESSATION DURING PREGNANCY AND ACCESSING PSYCHO-SOCIAL INTERVENTIONS: THE VIEWS OF PREGNANT WOMEN, THEIR PARTNERS AND HEALTH PROFESSIONALS IN THE UK

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BACKGROUND: While many women quit smoking in pregnancy, others continue to smoke. Identifying and overcoming barriers to women's motivation to stop smoking, and equally importantly barriers to service access is challenging. A deeper understanding of what helps and hinders women to quit is key to developing innovative interventions to support cessation, including behavioural interventions that are acceptable and appealing to users. **Aims:** This study aimed to identify and explore barriers and facilitators that can contribute to changes in smoking behaviour during and immediately following pregnancy, including views on existing behavioural interventions. This was achieved by considering how these are perceived by pregnant women, their partners, family and friends, and accounted for by healthcare professionals in their approach to facilitating smoking cessation. **METHODS:** Interviews with 121 individuals were conducted across two sites in England and Scotland in 2014: 41 interviews with pregnant smokers (26) and quitters (15) and follow-up post-partum interviews with 10 of these women, 32 interviews with partners/family & friends of pregnant women, and 28 interviews with 48 healthcare professionals. Synthesis of data was conducted using meta-ethnography and analysis was guided by the Social Ecological Framework. **RESULTS:** The themes central to cessation in pregnancy at an individual level were the perception of risk to the baby, self-efficacy, and smoking as a way of coping with stress. At an interpersonal level, partners' emotional and practical support, and smoking behaviour were important. At an organisational level, referral pathways, service image, the type of advice received, flexibility in support, relationships with healthcare professionals and CO monitoring were important. Individual, face to face behavioural interventions were preferred over other forms and flexibility regarding the timing and location of appointments was important. Support from a trained adviser on a regular basis was seen as helpful. Financial incentives for either attendance or achieving cessation goals was appealing and acceptable to most groups in the study. **CONCLUSIONS:** Effective interventions for smoking cessation in pregnancy must take account of the interplay between the individual, interpersonal and environmental aspects of women's lives. Pregnant women who smoke should ideally be involved in developing or refining interventions.

FUNDING: National Institutes for Health Research, UK

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SYM37C

WILLINGNESS TO ACCEPT FINANCIAL INCENTIVES FOR SMOKING CESSATION IN PREGNANCY: A COMPARISON FRANCE-UNITED KINGDOM

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BACKGROUND AND AIMS: In the last years, substantial amount of research have been interested in using financial incentives (FI) to increase abstinence rate among pregnant smokers (PS). If demonstrated effective, FI would be proposed as part of health care to help pregnant smokers quit. Public acceptability is required as such interventions are publicly funded and because it guarantees its successful dissemination from research into health care. However, concerns remain about the acceptability of such interventions in the general population. We aimed to assess the acceptability by the general public of FI to help PS quit and to compare it be-

tween France and the United Kingdom, countries with different cultural and social backgrounds. **METHOD:** A survey about the acceptability of FI for helping PS quit in France was run in January 2015. To make valid comparisons, we replicated the questionnaire used by Hoddinot et al. (2014) (translated, back translated). The UK survey involved 1144 respondents, the French one 1254. The samples were stratified according to quota method on gender, age, region and the agglomeration size. Both surveys used a 5 point Likert agreement scale. **RESULTS:** Significant differences between the French and the UK responders occurred. More French than British respondents agreed with using FI for smoking cessation in pregnancy; more British respondents were neutral toward FI. French responders have chosen significantly higher amounts of FI than the British. More French than British respondents approved that health services pay for FI. In both populations, more older people and females did not agree with FI than young and males; FI was more accepted by low than high educated people and by smokers who have tried to quit compared to non-smokers or current smokers. **CONCLUSION:** In addition to the relevance of acceptability in the general population of FI among PS, it is to bear in mind that between-countries differences exist. Differences between the representative samples of French and British individuals demonstrate that implementation of FI policies should not be transferable from one country to another.

FUNDING: The French survey data collection was funded by the grant MA05 001050 of the French Ministry of Health. The UK data was collected as part of a grant from the National Institute for Health Research. None of the authors were funded for the work presented.

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SYM37D

SMOKING CESSATION SUPPORT FOR PREGNANT WOMEN: A SURVEY OF ENGLISH STOP SMOKING SERVICES

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BACKGROUND: Finding effective ways to help pregnant women quit smoking and to remain abstinent in the long term is a public health priority. In the UK, NHS Stop Smoking Services for pregnant women (SSSP) offer free, evidence-based behavioural support and nicotine replacement therapy (NRT). Routine referrals for pregnant smokers to SSSP are recommended by UK guidance. Although psycho-social support is effective, trials show that standard dose NRT does not aid cessation in pregnancy, and higher doses might be needed. Outside of pregnancy, e-cigarettes (EC) are now the most popular aid to smoking cessation, but little is known about use by pregnant women. Most women relapse postpartum. To explore if these issues might influence support provided by SSSP we conducted a survey to investigate: what kinds of support SSSP offer to pregnant smokers (including psycho-social support); how prevalent EC use is in women using SSSP and how SSSP respond to EC use in pregnancy; what support SSSP offer to avoid postpartum relapse. **METHODS:** Managers of English SSSP were sent an invitation email containing a unique link to an online survey. Survey items related to the period 1 April 2014 to 31 March 2015. Email and telephone reminders were sent to non-respondents. Survey topics included: scope of service, support and treatment offered for smoking cessation, EC use in pregnancy, postpartum support. **RESULTS:** We sent surveys to 106 SSSP and received 72 replies (68%). Most (85%) offered dual therapy NRT (a combination of long and short acting NRT) with behavioural support to aid cessation, and reported that 70% of women chose this type of support. Psycho-social support was usually offered face-to-face in a clinic (93%) and/or women's homes (72%). Just 2.2% of women accessing SSSP were recorded as using EC. Most SSSP did not recommend use of EC in pregnancy irrespective of clinical circumstances, but still supported women who used them. Only 18% had an EC policy for pregnancy. Around 60% of SSSP routinely contact postpartum women who quit during pregnancy to help to prevent return to smoking. **CONCLUSION:** Most SSSP routinely provide face to face support for women to stop smoking. In addition, the majority offer dual NRT, but do not recommend pregnant women use ECs. There is potential for providing more postpartum support.

FUNDING: National Institute for Health Research, UK

CORRESPONDING AUTHOR: Sue Cooper, University of Nottingham, United Kingdom



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PODIUM PRESENTATION 1

PAPER SESSION 1: NOVEL FINDINGS FROM CLINICAL TRIALS

PA1-1

EFFECTIVENESS OF INTENSIVE PRACTICE NURSE COUNSELLING VERSUS BRIEF GENERAL PRACTITIONER ADVICE IN COMBINATION WITH VARENICLINE FOR SMOKING CESSATION: A RANDOMISED PRAGMATIC TRIAL IN PRIMARY CARE

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SIGNIFICANCE: Clinical guidelines recommend the combination of behavioural support and pharmacotherapy for smoking cessation. Previous research has shown that more intensive counselling can lead to more quitters. In the context of primary care, intensive counselling by a practice nurse may therefore be more effective than brief advice by a general practitioner. However, it is unknown whether intensive counselling is also more effective when it is combined with pharmacotherapy. **METHODS:** We conducted a pragmatic randomised controlled trial in Dutch primary healthcare centres. In total, 295 adult daily smoking patients were randomly allocated to intensive individual counselling by a practice nurse (N=146) or brief advice (usual care) by their general practitioner (N=149). All patients received 12 weeks open-label varenicline. The primary outcome was defined as prolonged abstinence from week 9 to 26 after behavioural treatment initiation, biochemically validated by exhaled carbon monoxide. Secondary outcomes included abstinence from week 9 to 52 and good dosing adherence (>80% days taken). **RESULTS:** Abstinence rates in the practice nurse vs. general practitioner groups were 32.2% (N=48) vs. 39.0% (N=57; odds ratio (OR)=0.78; 95% confidence interval (CI)=0.46-1.13) from week 9-26 and 25.5% (N=38) vs. 28.8% (N=42; OR=0.93, 95%CI=0.53-1.63) from week 9-52, respectively. Good dosing adherence was significantly lower in the practice nurse (41.3%, N=50) than in the general practitioner group (56.2%, N=68; OR=0.44, 95%CI=0.25-0.79), and costs per quitter were higher: €1230 vs. €818. **CONCLUSIONS:** Intensive smoking cessation counselling by a practice nurse does not seem to improve abstinence rates compared with brief general practitioner advice in patients who are treated with pharmacotherapy. Therefore, smoking cessation with the PN should be re-valued. However, overall high long-term cessation rates can be achieved in primary care.

Trial registration: Dutch Trial Register NTR3067;

Trial protocol: <http://www.sciencedirect.com/science/article/pii/S1551714415000294>

FUNDING: This was an investigator-initiated trial and funded by a collaboration of Eindhoven Corporation of Primary Health Care Centres (SGE), Pfizer (grant number GPIHP_RG_2010014T1330) and Research School CAPHRI. SGE had no involvement in the data collection, analysis, and interpretation of data. Pfizer had no involvement in the study design, data collection, analysis and interpretation of data, in the writing of the report nor the decision to submit the article. Pfizer supplied the varenicline during the trial.

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PA1-2

REAL WORLD EFFECTIVENESS OF VARENICLINE AND BUPROPION FOR SMOKING CESSATION: AN INTERNET-BASED RANDOMIZED CONTROLLED TRIAL (MATCH)

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BACKGROUND AND OBJECTIVES: Both bupropion (BUP) and varenicline (VAR) are effective for smoking cessation with end of treatment abstinence up to 50%. However, their use is limited by high cost, poor accessibility and concern regarding adverse effects. The purpose of this study was to evaluate the short and long-term effectiveness of bupropion and varenicline for smoking cessation in treatment seeking smokers in real-world settings. **METHODS:** An internet-based randomized controlled trial was employed to recruit eligible participants for 12 weeks supply of either BUP (SR 150 mg) or VAR (1mg). Follow-up surveys were conducted at weeks 4, 8 and 12 as well as 6 months and 12 months where self-reported quit and 7-Day Point Prevalence Abstinence were reported. Nicotine Metabolite Ratio (NMR) was determined through analysis of saliva samples obtained at baseline. Saliva samples were collected again at 4 weeks to assess medication adherence and at 6 and 12 months to confirm self-reported abstinence. **RESULTS:** The recruitment target is 1,000 randomized 1:1 to BUP or VAR. To date there are 835 participants enrolled (n=437 for VAR and n= 398 for BUP). Intent-to-treat (ITT) quit rates were higher for VAR (44%) than BUP (28%) at end of treatment (EOT). VAR showed superior predictive ability for smoking cessation at EOT than BUP (OR 3.1; 95% CI: 1.3-7.3) for Slow Metabolizers (SM; NMR ≤ 0.31) (n=118) whereas quit rates at EOT of the two medication groups showed no significant difference in Normal Metabolizers (NM; NMR > 0.31) (n=383) (OR 1.4; 95% CI: 0.9-2.2). Within treatment comparisons showed no significant relationship between NMR and quit outcome. At EOT, no significant treatment by NMR relationship was found (OR 0.46; 95% CI: 0.2-1.2). **CONCLUSIONS:** Real-world ITT quit rates using BUP and VAR are comparable to ones seen in clinical trials. Thus, this novel approach of pharmacotherapy delivery could be used to increase smoking cessation treatment accessibility. Contrary to published findings, NMR had opposite effects on quit rates observed with varenicline possibly due to methodological differences. Meanwhile, bupropion is equally efficacious for both metabolizer groups.

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PA1-3

CARDIOVASCULAR SAFETY OF VARENICLINE, BUPROPION AND NICOTINE PATCH: A DOUBLE-BLIND, RANDOMIZED, PLACEBO-CONTROLLED CLINICAL TRIAL

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Cardiovascular adverse events (CVE) caused by smoking cessation medications have been of concern. Cardiovascular safety (CVS) of first line cessation medications was studied in a multicenter, international, randomized trial of smokers with and without a history of psychiatric disorders. Treatments included varenicline (VAR) (1 mg 2X/day), bupropion (BUP) (150 mg 2X/day), transdermal nicotine patch (TNP) (21 mg with taper), and placebo (PLA), given in a triple-dummy design for 12 weeks, with a 12 week non-treatment follow-up (N=8058). 6168 smokers completed 12 weeks of treatment. A subset (N=4595), who completed the parent study, participated in a 28-week extension to collect additional CVS data. At baseline, Framingham 10 yr risk score was high (>20%) in 8.0%, medium (10-20%) in 21.7% and low (<10%) in 70.3% of participants. The primary endpoint was time to a major CVE (MACE) - CV death, non-fatal myocardial infarction, or non-fatal stroke during treatment (EOT). Secondary analyses included MACE to last dose of drug plus 30 days (30 FU) and to end of 52 week study (EOS), and MACE+, which

added worsening peripheral vascular disease, coronary revascularization or hospitalization for unstable angina. None of the time-to-event analyses for MACE or MACE+ were significant for any treatment versus placebo, and almost all hazard ratios were <1, i.e. favored active treatment. The overall incidence (%) of MACE was 0.05, 0.05, and 0.15 for VAR; 0.10, 0.10, and 0.45 for BUP; 0.05, 0.10, and 0.30 for TNP; 0.20, 0.20, and 0.40 for PLA at EOT, 30 FU and EOS, respectively. The overall incidence of MACE+ was 0.25, 0.25, and 0.50 for VAR; 0.20, 0.20, and 0.75 for BUP; 0.10, 0.15, and 0.49 for TNP; 0.25, 0.35, and 0.60 for PLA at EOT, 30 FU and EOS, respectively. The incidence of CVE while on any medication did not differ significantly from placebo. CV deaths were 1 in VAR, 2 in BUP and 2 in PLA groups. Our study provides evidence that VAR, BUP, and TNP are not associated with increased risk of CVE in smokers treated for 12 weeks and followed for up to 1 year compared to placebo. However, given the relatively low number of CVE our analysis cannot entirely preclude an association.

FUNDING: Pfizer

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PA1-4

ASSOCIATION OF ELECTRONIC CIGARETTE USE WITH SMOKING CESSATION AMONG SMOKERS WHO PLAN TO QUIT AFTER HOSPITAL DISCHARGE: A LONGITUDINAL ANALYSIS

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BACKGROUND: Many adult smokers report using e-cigarettes (e-cigs) to quit smoking, but whether using e-cigs alters smoking cessation success among smokers trying to quit is debated. Few studies were longitudinal, included only smokers trying to quit, and adjusted for multiple confounders. We tested the association of e-cig use with subsequent smoking cessation among a cohort of smokers who planned to quit after a hospitalization. **METHODS:** Analysis of data from a 3-site RCT that in 2013-2014 enrolled hospitalized cigarette smokers who planned to quit post-discharge. All patients received cessation counseling and medication recommendations in hospital. INT patients also received cessation assistance (free medication and automated phone calls) for 3 mo post-discharge. CTL patients received usual care. E-cig use was self-reported at 1 and 3 mo. Biochemically-validated smoking cessation (allowing for e-cig but not tobacco use) was assessed at 6 mo. Multivariable regression analyses tested the association of past 30-day e-cig use at 1 or 3 mo (i.e., during treatment period) with smoking cessation at 6 mo, adjusting for factors associated with e-cig use and cessation. **RESULTS:** E-cig use in the past 30 days at 1 or 3 mo was reported by 254 (26%) of 993 patients, more often by CTL than INT patients (29% vs 23%, $p=.03$). Past 30d e-cig use was associated with less cessation at 6 mo (10% vs 24%, AOR=0.42, 95%CI, 0.26-0.68, $p=.0004$) after adjustment for site, age, sex, race, cig/d, time to first cigarette, prior e-cig use, alcohol use, smoking-related disease, and cessation medication or counseling use after discharge. In stratified analyses, the effect was larger among INT patients (AOR=0.21, 95%CI, 0.09-0.50, $p=.0003$) than among CTL patients, in whom the association was not statistically significant (AOR=0.64, 95%CI, 0.34-1.20, $p=.17$). Results were similar in sensitivity analyses using alternate measures of e-cig use after discharge. **CONCLUSION:** Recently-hospitalized smokers who planned to quit and used e-cigs post-discharge had lower long-term quit rates than those not using e-cigs. E-cig use had a particularly negative effect on smokers in the INT group, who were given easy access to cessation counseling and medication.

FUNDING: NIIH/NHLBI grant #R01-HL11821

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PA1-5

THE NATURALISTIC UPTAKE AND IMPACT OF E-CIGARETTES: RESULTS FROM A PILOT RANDOMIZED TRIAL

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BACKGROUND: Most studies of e-cigarettes and smoking are cross-sectional or cohort studies of self-selected users. Two existing randomized trials that link e-cigarettes to changes in smoking focused on prescribed e-cigarette use, either to cut down or quit smoking. The literature lacks studies that are both randomized and naturalistic, allowing smokers to self-determine if and how they use e-cigarettes, and the longitudinal impact of that use on smoking behavior. **METHODS:** Within a small pilot trial, adult smokers (60% female; mean age 42 yrs) were provided e-cigarette samples (BluCig) to try as they wished ($n=46$) or were not provided samples ($n=22$), for 3 weeks. Following this sampling period, all participants were followed for 3 additional months. **RESULTS:** All e-cigarette participants used e-cigarette at least once. During 21 days of sampling period, participants used an average of 16.2 days (SD=6.3), and 39% used daily throughout. Among e-cigarette participants, 41% independently purchased additional product, vs. 14% in control group (OR=4.5). Greater income ($p=.02$) and greater dependence ($p=.04$) were each associated with increased days of e-cigarette use. Across most mCEQ measures (satisfaction, reward, aversion, enjoyment, craving reduction), conventional and e-cigs were rated similarly. Over the entire study period, cessation-related outcomes were higher among smokers in the e-cigarette group, compared to those in the control, for: a) incidence of quit attempts (44% vs. 23%; OR=2.6), b) floating abstinence; i.e., any 7-day period of non-smoking at any time during study (15% vs. 5%; OR=3.8), and c) point prevalence abstinence at 3 months (7% vs. 5%; OR=1.5), but none of these outcomes reached statistical significance. There was a significant time x group interaction for cigarettes smoked per day (CPD; $p=.01$). CPD decreased 38% during sampling weeks among e-cigarette participants vs. 0% in control, corroborated by 17% (vs. 3%) reduction in carbon monoxide. Cotine remained consistent across groups and time. **CONCLUSIONS:** Despite use of a 1st generation product, results suggest that naturalistic uptake of e-cigarettes is strong and palatable, with partial substitution of smoking. Though cessation-related outcomes were statistically non-significant, effect sizes are strong and consistent with prior literature, suggestive that e-cigarette use may promote cigarette abstinence. *Correspondence: Matthew Carpenter, PhD: carpente@muscd.edu.*

FUNDING: Funding through NIDA R21DA037407 (PI: Carpenter).

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PA1-6

YOGA AS A COMPLEMENTARY THERAPY IN COGNITIVE BEHAVIORAL SMOKING CESSATION: A RANDOMIZED CLINICAL TRIAL

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OBJECTIVE: Several medications are effective for helping smokers quit, but most smokers do not use medications due to concerns about side effects, medical contraindications, and the perceived desirability of a chemical-free quit. Effective non-pharmacological interventions are needed. Yoga may offer benefits (i.e., stress reduction, improved mindfulness) that have implications for smoking cessation. *BreathEasy* is the first rigorous, large-scale study funded by the U.S. National Institutes of Health (National Center for Complementary and Integrative Health: NCCIH) to examine the effects of yoga as a complementary therapy for quitting smoking. **METHODS:** Eligible adults ($n=227$) who smoked < 5 cigarettes per day were randomly assigned to 8 weeks (1 hour, twice weekly) of either Iyengar yoga or a wellness class (attention control). All participants were also given a 1-hour smoking cessation program based in cognitive behavioral therapy once weekly for 8 weeks. Almost half of all callers were ineligible; most often for medical conditions that would interfere with their ability to participate (39.5%), scheduling conflicts (24.7%) and obesity (body mass index >40, 8.3%). Data collection was blind to randomization assignment. All data were externally audited for quality control. **RESULTS:** At enrollment participants (average age 46.2, 90.4% white, 56% female, 13% racial/ethnic minority) smoked 16.7 cigarettes per day (SD=7.8), and were moderately nicotine dependent (Fagerstrom=4.9, SD=2.1). Overall participants randomized to the yoga study arm attended 68.7% of classes offered, while those



in the Wellness arm attended 69.0% of offered classes. 85.4% of all randomized participants completed the 8-week intervention. CONCLUSIONS: Analysis of primary outcome data will be presented including comparisons between yoga and wellness arms for 7-day point prevalence abstinence and change in smoking rates at week 8 and 6-month follow up, and mediational analysis of factors that may be predictive of quitting (such as motivation, confidence, mindfulness). These analyses are embargoed by NCCIH until December 2016 when all data collection on the final 6-month follow up will be completed.

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PAPER SESSION 2: SECONDHAND EXPOSURE ASSESSMENT

PA2-1

SECONDHAND SMOKE EXPOSURE AMONG THOSE WHO SHOULD NOT BE EXPOSED: A U.S. NATIONAL ESTIMATE

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BACKGROUND: Patients with cancer, cardiovascular disease (CVD), and respiratory disease are susceptible groups for health consequences associated with exposure to secondhand smoke (SHS). National figures regarding the prevalence and time-trend of SHS exposure among these patients have not been established in the US.

OBJECTIVES: This study aimed to examine the prevalence and time-trends of SHS exposure among nonsmoking patients with cancer, CVD, and respiratory disease. METHODS: Data were obtained from the 2001-2012 National Health and Nutrition Examination Survey and analyses were conducted using SAS version 9.3. We included in the analysis all nonsmoking participants (self-reported verified by serum cotinine level <10 ng/mL) who are >20 years old and reported having been told by a doctor that they had cancer ($n=2,168$), CVD (congestive heart failure, coronary heart disease, angina, heart attack, or stroke; $n=2,701$), or respiratory disease (asthma, chronic bronchitis, or emphysema; $n=2,503$). SHS exposure was defined as having a serum cotinine level of >0.015 and <10 ng/mL. Prevalence rates and 95% confidence intervals and weighted linear regression of prevalence on year for trend analysis were performed with adjustments made for the complex survey design. RESULTS: Overall, SHS exposure rate was the highest among patients with respiratory disease (73.8% [95% CI=66.5-74.8]), followed by patients with CVD (70.6% [68.1-73.1]), and patients with cancer (65% [68.2-71.9]). From 2001 to 2012, exposure decreased the most among CVD patients (22.4%), followed by cancer patients (16%), and patients with respiratory disease (14%). CONCLUSION: Although exposure to SHS represents significant health concerns for these patients, a large number of them are exposed. The modest decline in SHS exposure among these vulnerable groups indicates that this problem has not received adequate attention. Population policies and clinical interventions to control SHS exposure among these patients are a public health priority. Health care providers are encouraged to systematically screen for SHS exposure and advise patients to avoid exposure until better evidence-based interventions emerge.

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PA2-2

SECONDHAND SMOKE EXPOSURE AMONG A VULNERABLE POPULATION OF ADOLESCENTS

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SIGNIFICANCE: Second hand smoke (SHS) exposure in children is a substantial cause of respiratory/ear infections, asthma, and increases the likelihood that the child will become a smoker. Exposure testing in children is feasible when built into blood lead testing during hospital clinic well visits, and could be feasibly added into adolescents' clinic visits through routine urine collections. SHS exposure is measured in plasma, urine or saliva with the biomarker cotinine (COT); the major metabolite of nicotine. Previous research in adolescents indicates rates of tobacco exposure at 87%, with 52% having levels consistent with SHS, and African Americans (AA) having the highest COT values overall. Little is known in this population about sources of exposure to tobacco smoke, specifically which environments or groups present most opportunity for SHS exposure. METHODS: The current study measured the prevalence of tobacco exposure in a population of vulnerable adolescents using COT and surveyed for sources of exposure. Participants were 150 12-21 year olds (57% female; 71% Hispanic) from an urban, county hospital. RESULTS: Urines were collected for COT assays, finding that 69% of the sample was exposed to some level of tobacco smoke; 11% at active smoking, 34%

SHS exposure and 55% light SHS or third hand smoke exposure. AAs trended to have the highest COT levels compared to other racial/ethnic groups. The most common source of exposure was a public area (endorsed by 88% of participants) followed by where they live (42%). COT levels were significantly higher ($p=0.007$) for those without a home smoking ban. A linear regression predicted cotinine levels by sources of exposure; exposure in a public area was the strongest predictor of cotinine ($B=0.19$, $p=0.05$). CONCLUSIONS: The majority of the sample was exposed to some level of tobacco smoke, supporting the need for routine testing of exposure in a hospital clinic setting. Public areas were the most common environment of exposure and significantly predicted cotinine levels above and beyond home exposure. Interventions to reduce SHS exposure in this population should encourage behaviors that avoid exposure in public.

FUNDING: Flight Attendant Medical Research Institute

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PA2-3

SECOND HAND SMOKE EXPOSURE AMONG PREGNANT WOMEN IN ARGENTINA. ROLE OF HEALTH CARE PROFESSIONALS

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BACKGROUND: Secondhand smoking (SHS) exposure during pregnancy is associated with complications for the pregnant women, the fetus and the baby that can be very severe. The World Health Organization recommends that health care professionals screen for this exposure at each prenatal visit. The objective of this paper is to assess secondhand smoking exposure during pregnancy in Argentina and the role of health care professionals who care for pregnant women in screening this exposure and preventing it. METHODS: Data were collected from October 2011 to May 2012 as part of a cluster randomized-controlled trial and prior to implementing a brief smoking cessation counseling intervention in prenatal clinics. During the first 48 hours after delivery, we surveyed 1863 pregnant women who had completed their prenatal care visits at one of the 10 participating hospitals and associated clinics in the suburbs of Buenos Aires. Women were surveyed using a validated questionnaire about tobacco use and SHS exposure at home, at work and indoors in general during pregnancy. Women were also asked if they received provider screening for SHS exposure and whether their prenatal care providers advised about the harms of SHS to themselves or to their unborn baby. RESULTS: Overall, 47% of pregnant women were exposed to secondhand smoke indoors, 27.3 % were exposed at work and, among those who worked, 19.6% were exposed at work. Smokers had a higher risk of being exposed at home (OR: 2.21; IC95%1.94-2.52), and were also more likely to have a partner who smoked (OR: 1.78; IC95%1.54-2.06). About half of the pregnant women said that a health care professional asked them about second hand smoke exposure and advised them not to get exposed to avoid pregnancy complications and health problems for the newborn in at least one prenatal care visit, without significant differences between smokers and non smokers. CONCLUSIONS: Second hand smoke exposure in Argentina is high during pregnancy and health care professionals are not taking advantage of the prenatal care visits to routinely ask about secondhand exposure and recommend avoiding being exposed to SHS and implement 100% smoke free homes.

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PA2-4

USING AIR-QUALITY FEEDBACK TO FACILITATE SMOKE-FREE HOMES

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Exposure to second-hand smoke (SHS) in early life damages lifelong health. The Scottish Government has an ambitious target of reducing the proportion of children exposed to SHS at home by 50% by 2020. Recent work has suggested that pro-

viding personalised data on the adverse effect of smoking on household air quality can motivate parents recruited from all communities to change household smoking behaviour. What remains to be determined is whether this intervention is effective in mothers who smoke and who live in the most deprived communities where children's SHS exposure is highest. 120 women involved in the NHS Lanarkshire First Steps Programme for vulnerable, disadvantaged, first-time mothers, who lived in a household where smoking occurred, were recruited to the study. Mothers were randomised to receive either standard NHS advice about SHS (Group A) or this advice coupled to personalised feedback (Group B) of measurements of airborne fine particulate (PM_{2.5}) – a marker of SHS concentrations – within their homes. The intervention was delivered by First Steps workers. SHS concentrations were assessed using a Dylos DC1700 Air Quality Monitor for up to 6 days at baseline, and 1-month and 6-months post-intervention. 117 participants completed baseline measurements, 59 in Group A and 58 in Group B. Median (IQR) PM_{2.5} concentrations at baseline were Group A 34.6 (16.3-93.9); Group B 33.4 (16.1-75.2) mg/m³ showing no statistical difference between the groups ($p=0.42$). After excluding participants who did not complete the 1-month follow up, and those with <24hours of data, the median (IQR) difference between 1-month and baseline PM_{2.5} measurements for Group A ($n=50$) was 3.8 (39.1,-8.4); Group B ($n=50$) was 0.1 (11.8,-14.7) mg/m³ with no statistical difference between the groups ($p=0.76$). Data from the 6-month follow-up measurements will also be presented. Findings from qualitative interviews with 21 participants will be presented to explore the barriers and facilitators of behavioural change. In this group of disadvantaged mothers providing air quality feedback produced no overall change in household SHS concentrations one-month after the intervention. These results contrast with previous studies and may reflect the difficulties in achieving behavioural change within the often challenging home-life experienced by mothers dealing with multiple issues of deprivation. Finding effective methods of enabling parents to reduce smoking at home is a key challenge if Scotland is to achieve a 50% reduction in children exposed to SHS at home by 2020.

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PA2-5

EFFECTS OF HOOKAH SMOKING ON INDOOR AIR QUALITY IN HOMES

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SIGNIFICANCE: Hookahs (water pipes) are rapidly increasing in popularity worldwide. Evidence suggests that although perceived as safer than cigarette smoke, hookah smoke may be as, or even more, dangerous as cigarette smoke. To date, air quality in homes of hookah smokers has not been assessed. We report the results of a study that assessed indoor air quality in homes where hookahs were smoked and compared the air quality in these homes to that in homes where cigarettes but not hookahs were smoked, and in homes where no smoking (hookah or cigarettes) occurred. METHODS: Air samples from 33 homes - 11 where only hookah-smoking occurred, 12 with only cigarettes, and 10 with no smoking - were collected to analyze concentrations of particulate matter (PM_{2.5}), black carbon, elemental and organic carbon, and carbon monoxide (CO). Air quality was assessed both in rooms where smoking occurred and in an adjacent room. RESULTS: Both hookah and cigarette smoking impaired home air quality. The rooms in which hookahs were smoked showed the highest concentrations for all pollutants. CO was significantly greater in the rooms where hookahs were smoked than in the cigarette-smoking rooms and the non-smoking households ($p < 0.05$). In addition, CO levels in the rooms adjacent to where hookah was smoked were 2.5 to 4 fold greater than those in both the smoking and non-smoking rooms of the cigarette homes ($p < 0.05$). PM_{2.5} levels were also elevated in hookah homes compared to cigarette and non-smoking homes, although not significantly different. CONCLUSION: This study, the first of its kind, demonstrates potentially hazardous levels of home air pollution in rooms where hookahs are being smoked as well as in adjacent rooms. These levels were greater than those in cigarette smoking homes, raising concerns about potential negative health effects on all individuals living in homes where hookahs are smoked.



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PA2-6

SECONDHAND AND THIRDHAND EXPOSURE TO NICOTINE FROM ELECTRONIC CIGARETTES

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BACKGROUND: Indoor use of electronic cigarettes (e-cigarettes) is highly controversial, as passive exposure to toxicants introduced from these devices has not been studied in detail. Nicotine released by e-cigarettes is transferred to bystanders through direct inhalation or deposition of aerosol exhaled by e-cigarette users. The purpose of this study was to determine the amount of aerosol and nicotine exhaled by users of various e-cigarette products. **MATERIALS AND METHODS:** Eighteen daily cigarette smokers were recruited to smoke conventional cigarettes *ad lib* during an initial visit. Each participant returned six times, using a different e-cigarette product each subsequent visit. All smoking and vaping took place in a dedicated exposure chamber. Every session was video recorded in order to analyze the puffing behavior of each participant. $PM_{2.5}$ data was collected using a TSI SidePak during the exposure period. Airborne nicotine concentration was determined by GC-MS after collection using sampling pumps and XAD4 sorbent tubes. Surface-bound nicotine was also sampled before and immediately following each visit. **RESULTS:** Participant puffing behavior and exhaled aerosol levels varied by e-product type. Disposable e-cigarettes emitted the highest level of particulate matter during vaping sessions and e-Pipe devices produced the largest $PM_{2.5}$ emissions after vaping. $PM_{2.5}$ levels collected during e-cigarette vaping were consistently lower than what was observed during tobacco smoking. Average $PM_{2.5}$ level increased after the vaping session, suggesting that aerosol exhaled from e-cigarettes lingered in the room. Surface analysis showed that conventional cigarettes deposited approximately ten times the amount of nicotine on floor surfaces within the exposure room versus electronic cigarettes. **CONCLUSIONS:** Tobacco smoking introduced higher levels of nicotine and particulate matter into the indoor environment than e-cigarette vaping. However, aerosol exhaled from e-cigarettes was retained in the chamber longer than conventional tobacco smoke. E-cigarettes seem to be a significant source of airborne and surface contaminants.

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PAPER SESSION 3: CORRELATES OF NOVEL PRODUCT USE

PA3-1

WHAT FACTORS ARE ASSOCIATED WITH SMOKERS USING OR STOPPING E-CIGARETTE USE?

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AIMS: While some smokers use e-cigarettes and stop smoking, a substantial proportion use e-cigarettes concurrently with smoking (often referred to as dual users) and other smokers only try or use them and then discontinue use. The aim was to assess motivation to stop smoking and other factors associated with e-cigarette experience and discontinuation among smokers. **METHODS:** A secondary analysis of cross-sectional online survey data of 1,489 smokers from a GB population-based sample. Associations between smokers' e-cigarette experience (never user, past trier, past user, and current dual user) and motivation to stop smoking were assessed. Multivariable logistic regressions were used to assess associations of current dual use versus any past e-cigarette use (past triers/past users) among smokers, with a number of measures (motivation to stop smoking, reasons for use, age, gender, social grade, heaviness of smoking, and type of the first e-cigarette used). Reasons given for discontinuing use were also assessed among past triers and past users. **RESULTS:** Current dual users were more motivated to stop smoking than smokers who had never tried (OR=0.46, 95% CI: 0.29 to 0.71), tried (OR=0.62, 95% CI: 0.39 to 0.97) or used e-cigarettes in the past (OR=0.51, 95% CI: 0.29 to 0.91). In addition to higher motivation to stop smoking, compared with past triers/users, current dual users were less dependent (OR=0.61, 95% CI: 0.41 to 0.91), less likely not to know what e-cigarette they first used (OR=0.30, 95% CI: 0.10-0.92), more likely to be over 25 years old, and give reasons for using e-cigarettes other than just wanting to try them. The most common reasons for discontinuing e-cigarettes were that they did not feel like smoking, did not help with cravings, or respondents had just wanted to try them. **CONCLUSION:** Among smokers, using e-cigarettes for curiosity purposes is associated with discontinuing use. Ongoing e-cigarette use is associated with other reasons for use, heightened motivation to stop smoking and lower dependence on smoking.

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PA3-2

THE SOCIAL ENVIRONMENT AND FUTURE USE OF CIGARETTES AND E-CIGARETTES

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BACKGROUND: The social environment (e.g., friends' use and approval of use of tobacco product) has been strongly associated with e-cigarette and cigarette use in cross-sectional studies. However, it is unclear whether youth begin using e-cigarettes and then seek out peer groups using them, or whether peer e-cigarette use may then impact subsequent initiation of use. With the growing popularity of e-cigarettes and resulting changes to the tobacco social environment, including potential renormalization of smoking-like behaviors, prospective data are needed to assess the role of the social environment on cigarette and e-cigarette initiation. **METHODS:** The current analysis uses prospective data from the Southern California Children's Health Study (CHS) to evaluate whether a favorable cigarette and e-cigarette social environment is associated with increased risk of initiation of cigarette and e-cigarette use. Data were collected at baseline in spring 2014 and at follow-up approximately 1.5 years later. Analyses were restricted to baseline never users of either cigarettes (N=1180) or e-cigarettes (N=1082) in models evaluating the risk of cigarette or e-cigarette initiation, respectively. **RESULTS:**

Among adolescents with no history of e-cigarette use at baseline, greater odds of e-cigarette initiation were observed for those who had more friends using e-cigarettes (3-4 friends v. 0 friends; OR=4.95, 95% CI: 2.36-10.4), or whose friends would react friendly toward e-cigarette use (OR=2.02, 95% CI: 1.50-2.71). These associations were independent of individual use of either cigarettes or hookah at baseline. Higher odds of cigarette initiation were reported among those whose friends would react friendly toward cigarette (OR=1.65; 95% CI: 1.16, 2.34) or e-cigarette (OR=1.56; 95% CI: 1.10, 2.19) use. CONCLUSIONS: A tobacco-friendly peer social environment increased the likelihood of subsequent e-cigarette and cigarette initiation among non-users of each tobacco product at baseline. Further studies are needed to understand how the social use of one tobacco product may influence the use of others.

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PA3-3

WHY DO YOUTH AND YOUNG ADULTS USE E-CIGARETTES? MOTIVATIONS AND EXPECTANCIES

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There is evidence suggesting the potential for e-cigarettes (e-cigs) to serve as cessation tools, while information also exists about possible risks from the devices. The purpose of this study is to better understand beliefs about the outcome of using e-cigs, or e-cig expectancies, among youth and young adults with varying levels of e-cig use. Online surveys among 1,554 youth and young adults ages 15-24 measured e-cig use and expectancies. E-cig users were placed on a continuum based on their level of use. Non-users were identified as either closed (never users of tobacco or e-cigs) or at-risk (never e-cig use but ever or current tobacco users). E-cig users ranged from low-involvement (used e-cigs <4 times in past 30 days) to low level experimenters (ever used combustible tobacco; used e-cigs >4 times in past 30 days), high level experimenters (current combustible tobacco user; used e-cigs <10 times in past 30 days), and heavy users (current combustible tobacco user; used e-cigs >10 times in lifetime and >4 times in past 30 days). E-cig expectancies items covered six themes: perceived reduced harm, flavors/tastes, social acceptability, convenience, new technology, and options for quitting. Three in five youth and young adults were classified as non-e-cig users, with 32% classified as closed and 27% as at risk. Forty percent used e-cigs: 10% were low-involvement, 8% were low level experimenters, 12% were high level experimenters, and 10% were heavy users. Three e-cig user subgroups (low-involvement and low and high level experimenters) were motivated by perceived reduced harm and flavors. Low involvement users were also motivated by social acceptability (52%) and convenience (37%). Low level experimenters were drawn to new technology (24%) and tastes (42%). Heavy users desired an affordable option to help in quitting cigarettes (36%). Most youth expect e-cigs to negatively impact their overall health, but they have the impression that e-cigs are not as harmful or as addictive as other nicotine/tobacco alternatives. Users are attracted to e-cigs by their flavors. This information will be used to inform messaging around e-cigs among young people.

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PA3-4

PREDICTING CIGARETTE INITIATION AMONG YOUNG ADULTS: A SURVIVAL ANALYSIS EXAMINING THE INFLUENCE OF E-CIGARETTE USE

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SIGNIFICANCE: Studies indicate that electronic nicotine delivery systems (ENDS) use predicts subsequent cigarette initiation, but these are limited by small samples and/or a focus on adolescents. Little is known about ENDS use in cigarette initiation during young adulthood, a period characterized by tobacco use transitions. This study examined if 1) ENDS use predicted young adults' cigarette initiation

over a 1.5 year period and 2) initiation was consistent across exclusive ENDS users and dual users of ENDS and other tobacco products. METHOD: Data are from a 4-wave 24-college study in Texas. Wave 1 data were collected in Nov 2014-Feb 2015 and every six months thereafter. To examine cigarette initiation, only students who reported never using cigarettes at wave 1 were included (N=2561). Students were 18-25 year olds ($m=19.7$; $sd=1.61$); 67.7% female; 31.8% non-Hispanic white, 27.4% Hispanic, and 40.8% another race/ethnicity. Multilevel discrete-time survival analysis, accounting for school clustering, was used to assess the two study questions. The dependent variable, ever cigarette use, was assessed at each wave. The independent variables, assessed at wave 1, included ever ENDS use, socio-demographics, home tobacco use, friend cigarette use, cigarette use susceptibility, and other tobacco use (0=used no other tobacco products; 1=used at least one product other than ENDS). A two-way interaction between wave 1 ENDS use and other tobacco use was tested to determine if initiation varied across exclusive ENDS users and dual users. RESULTS: 11% of students reported cigarette initiation by wave 4: 20.2% of wave 1 ENDS users; 8.5% on non-ENDS users. Wave 1 ENDS use predicted cigarette initiation over the 4 waves, over and above all covariates (OR=1.36; CI=1.01-1.83). However, a significant two-way interaction ($p<.05$) qualified the main effect: ENDS use predicted cigarette initiation among exclusive ENDS users (OR=2.26; CI=1.35-3.76), but not dual users (OR=1.13; CI=.81-1.13) CONCLUSION: Findings are consistent with adolescent research, but also extend it by showing that ENDS use, not concurrent use of other products, contributes to cigarette initiation among young adults.

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PA3-5

RESULTS FROM AN E-CIGARETTE PREVENTION PILOT TEST IN 25 USA MIDDLE SCHOOLS WITH 1371 STUDENTS: CATCH MY BREATH PROGRAM

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SIGNIFICANCE: Given exponential incidence in E-cigarettes among American youth, a rapid response is needed to inform students, parents, and schools about nicotine addiction, and other potential health hazards. At issue is the balance between recent reductions in combustible prevalence compared against increases in e-cigarette prevalence beyond that of combustible smoking. Because of e-cigarettes, a larger number of adolescents are at risk for nicotine addiction, and converting combustible tobacco. E-cigarettes also carry risks beyond nicotine addiction, albeit with a lower risk profile than combustible tobacco. Therefore, carefully informing parents, teachers and children about e-cigarettes is an important public health challenge. METHODS: The CATCH My Breath program was designed and pilot tested in spring 2016 for 6th, 7th, and 8th grade students (age 10-13), in 35 US middle schools, in 7 states. It was developed using Social Cognitive Theory, and was based on: a) the MN Smoking Prevention Program, b) empirical evidence describing potent intervention methods from cigarette smoking prevention trials, and c) with experienced curriculum writers and middle school teachers. The finished program is peer-facilitated and includes six 30 minute classroom lessons focusing on: norm leveling and social desirability of teen E-cigarette use, media literacy, social inoculation refusal skills, knowledge, attitudes, and beliefs. CATCH My Breath is delivered on a web-based platform, and also includes social media to encourage further interaction between teachers, parents, and students. RESULTS: In Phase (1) 15 experienced middle school teachers critiqued the program; in Phase (2) 23 teachers taught the program and provided detailed feedback, and 1,371 students provided feedback. Results from teachers include: a) high teacher agreement on cultural appropriateness (91%), confidence teaching the program (91%), sufficient e-cigarette background information (86%), and reported peer leadership success (73%). Results from students include: a) 68% liked the lessons. b) 86% felt less likely to use an e-cigarette; 86% increased what they know about e-cigarettes, 70% discussed what they learned with family and friends. In Phase (3), the program will be refined based on the pilot test and prepared for more formal evaluation. DISCUSSION: CATCH My Breath is a theory-based best practice program to prevent e-cigarette use for middle school aged youth. Pilot study results indicate feasibility, are favorable and show no unintended negative consequences.



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PA3-6

SUSCEPTIBILITY MEDIATES THE ASSOCIATION BETWEEN PSYCHOSOCIAL FACTORS AND YOUTHS' SUBSEQUENT HOOKAH INITIATION

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SIGNIFICANCE: Tobacco product use has diversified in recent years, including increases in alternative tobacco products. The etiology of hookah initiation is not well studied in youth. This study examined if susceptibility to hookah use mediates the relationships between various psychosocial factors and subsequent initiation of hookah in a sample of Texas middle school and high school students. **METHODS:** Participants were a subset of middle school and high school students involved in a longitudinal cohort study in Texas (52% male; 28% white/other, 54% Hispanic, 18% African-American). To study initiation, only participants reporting never use of hookah at wave 1 were included in this study ($n=2,380$, $N=440,073$). Wave 1 data collection occurred in fall 2014 and Wave 2 six months thereafter. The hypothesized mediated model was tested using path analysis and Mplus 7.3. Psychosocial factors (hookah harm perceptions, social acceptability of hookah, perceived prevalence of hookah, and whether one would date someone who uses hookah) were measured at wave 1; the susceptibility mediator was measured at wave 1; and ever use of hookah at wave 2 was the outcome variable. Wave 1 sociodemographic covariates were also included in the model. These data are weighted to be generalizable to 6th, 8th, and 10th grade students in the 4 largest metropolitan areas in Texas. **RESULTS:** The hypothesized mediated model had an excellent fit (Chi-Square = 16.707 ($df=12$), $p=0.161$; RMSEA=0.013, CFI=.989). Consistent with our hypotheses, each psychosocial factor was associated with susceptibility ($p<.01$ for all paths), which in turn predicted subsequent ever use of hookah six months later ($p<.0001$). Tests of indirect effects confirmed that susceptibility mediated the relationship between each psychosocial factor and ever use ($p<.05$ for each effect). **CONCLUSIONS:** Findings highlight the need to study the etiology of hookah initiation. Social normative beliefs and harm perceptions are important constructs in this causal model predicting hookah initiation in middle school and high school students and are critical areas of focus for interventions in this population.

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PODIUM PRESENTATION 2

PAPER SESSION 4: TREATMENT IN SMOKERS WITH COMORBIDITIES

PA4-1

A SMOKING CESSATION TRIAL IN PEOPLE LIVING WITH HIV (PLWH) IN SOUTH AFRICA

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BACKGROUND: Evidence is scarce on smoking cessation strategies among PLWH in South Africa who are at high risk of cardiovascular and pulmonary comorbidities. We conducted a randomized trial of intensive anti-smoking counseling versus counseling and nicotine replacement therapy (NRT) patches and gum among PLWH in Klerksdorp, South Africa. **METHODS:** PLWH who were urinary cotinine confirmed, self-reported smokers interested in quitting were randomized to: (1) Counseling at Day 0, 2 weeks, 4 weeks, 2-months, 3-months and 6-months; (2) Counseling+NRT where participants received additionally 10 weeks of patches and gum. Primary outcome was biochemically verified smoking cessation at 6 months via carbon monoxide (CO) breath test and urine cotinine (SmokeScreen®, or NicAlert for TB patients receiving isoniazid). A participant was considered a non-smoker at 6-month follow-up visit if CO_{ET} parts per million (ppm) and SmokeScreen <0.4µg/ml or NicAlert<30 ng/mL. Participants not evaluated at 6-months were considered smokers. **Results:** Between March 2014 and January 2016, 561 PLWH were enrolled (281 to Counseling and 280 to Counseling+NRT. Randomization suggested no discernible differences between arms based on demographics and smoking history. Median age was 37 years (Interquartile range (IQR): 31-46); 22% female; 66% unemployed; 46% receiving antiretroviral therapy. Median age first started regular smoking was 17 years (IQR:15-20); median number of cigarettes smoked per day was 10 (IQR:5-15); 70% reported alcohol use; 21(4%) currently receiving TB treatment at randomization. 62% reported trying to stop smoking at least once in the past year. No difference in smoking cessation between arms was detected at 6 months; 14.6% for Counseling vs 16.4% for Counseling+NRT, $p=0.64$). However, 15.5% of all participants had quit smoking at 6 months. **CONCLUSION:** NRT did not increase smoking cessation compared to counseling alone in this trial among PWLH. However, over 15% of the participants had quit smoking at 6 months, suggesting that either strategy can have success in this population. We plan to test cost efficient alternative cessation strategies to this at-risk population.

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PA4-2

EFFECTIVENESS OF A CLINICAL PRACTICE CHANGE INTERVENTION IN INCREASING THE PROVISION OF TREATMENT FOR SMOKING IN INPATIENT PSYCHIATRIC FACILITIES: AN IMPLEMENTATION TRIAL

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SIGNIFICANCE: Despite clinical practice guidelines recommending the routine provision of smoking treatment to smokers in inpatient psychiatric facilities, the prevalence of treatment provision is low. The aim of this study was to examine the effectiveness of a clinical practice change intervention in increasing the recorded provision of treatment for smoking in inpatient psychiatric facilities. **METHODS:** We undertook an interrupted time series analysis of smoking treatment provision before, during and after a clinical practice change intervention to increase clinical

recorded provision of smoking treatment for all hospital discharges (aged >18 years, N = 4175) over a 19 month period in two inpatient adult psychiatric facilities in New South Wales, Australia. Systematic medical record audit and segmented logistic regression was used to determine differences in proportions for each outcome measure between the 'pre-', 'during' and 'post-intervention' periods. **RESULTS:** The prevalence of all five outcome measures increased significantly between the pre and post-intervention periods, including: smoking status (36.43% to 51.95%; unadjusted odds ratio [OR] = 2.83, 99% Confidence Interval [CI]: 1.47 to 5.44); nicotine dependence status (4.74% to 11.04%; OR = 109.67, 99%CI: 35.35 to 340.22); brief advice to quit (0.85% to 8.81%; OR = 97.43, 99%CI: 30.99 to 306.30); provision of Nicotine Replacement Therapy (8.06% to 26.25%; OR = 21.29, 99%CI: 8.95 to 50.62); and provision of smoking treatment on discharge (8.82% to 13.45%, OR=3.22; 99%CI: 1.25 to 8.32). **CONCLUSIONS:** The clinical practice change intervention increased the recorded provision of treatment for smoking. The intervention offers a mechanism for psychiatric facilities to increase the provision of smoking treatment in accordance with clinical guidelines.

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PA4-3

HELPING CANCER PATIENTS QUIT SMOKING BY IMPROVING THEIR RISK COMMUNICATION: A RANDOMIZED CONTROLLED TRIAL

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BACKGROUND AND OBJECTIVES: Quitting smoking after being diagnosed with cancer could reduce the risk of disease advancement, minimize adverse treatment-related effects, improve prognosis, and enhance the quality of life. Nevertheless, many patients continue smoking after the diagnosis of cancer. We tested the effectiveness of a smoking cessation intervention using risk communication approach to help cancer patients quit smoking. **METHODS:** A randomized controlled trial was conducted on 528 patients who continued smoking and had medical follow-up at the out-patient clinics of the five major acute hospitals in Hong Kong, with 268 randomly assigned into the experimental and 260 into the control group. Subjects in the experimental group received health warnings of smoking based on a specially designed leaflet and patient-centred counselling from a nurse counselor with emphasis on risk perceptions of smoking to cancer prognosis. Subjects in the control group received only usual care. All were followed up by telephone at 1week, 1 month, 3 months, 6 months and 12 months to assess smoking status. **FINDINGS:** About 72.9% of cancer patients were in the pre-contemplation stage of quitting at baseline. On average, they smoked 13 cigarettes per day for more than 42 years with moderate nicotine dependence. The average age of the patients was 58.9 and more than 80% of them were male. No significant differences were found in 6-month (15.7% vs 16.5%; $p=0.78$) and 12-month (14.9% vs 20.4%; $p=0.10$) self-reported 7-day point-prevalence smoking abstinence between the intervention and control group. However, difference was observed in self-reported 6-month smoking reduction by at least 50%: 16.8% of patients in the intervention group and 12.3% in the control group reported reduced smoking at 6 months (Odds Ratio 1.44; 95% CI 0.89-2.35; $p=0.14$). **CONCLUSION:** This risk communication intervention was not effective for quitting but did increase smoking reduction in cancer patients. Very few smoking cessation programs target cancer patients, and very few healthcare professionals help this vulnerable group to quit smoking. Further trials on more effective smoking cessation interventions are needed.

FUNDING: Health and Medical Research Fund, Hong Kong Food and Health Bureau

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PA4-4

BRIEF INTERVENTION TO PROMOTE SMOKING CESSATION AND IMPROVE GLYCEMIC CONTROL IN SMOKERS WITH TYPE 2 DIABETES: A RANDOMIZED CONTROLLED TRIAL

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BACKGROUND AND OBJECTIVES: Providing brief advice on smoking cessation is a part of standard care for smokers with diabetes mellitus (DM) but the effectiveness of such interventions need to be vigorously tested. Preventing multiple high-risk behaviors is an important focus in diabetes treatment. We aimed to examine the effects of a brief stage-matched smoking cessation intervention in promoting smoking abstinence and improving glycemic control for smokers with type 2 DM in Hong Kong. **METHODS:** A large randomized controlled trial was conducted on 557 type 2 DM smokers randomized into an intervention group (n=283) who received brief individualized face-to-face stage-matched smoking cessation counseling (20-minute) by trained nurses and a diabetes-specific smoking cessation leaflet, or a control group (n=274) who had only usual care. All patients were followed up at 1week, 1month, 3months, 6months and 12months via telephone to assess their smoking status. **FINDINGS:** More than 70% of the subjects were in the pre-contemplation stage of quitting. On average, they smoked 14 cigarettes daily for more than 37 years. The average age of the patients was 55 and more than 80% of them were male. Similar 7-day point-prevalence smoking abstinence (9.2% versus 13.9%; $p = 0.08$) and HbA1c levels (7.95% [63 mmol/mol] versus 8.05% [64 mmol/mol], $p = 0.49$) at 12 months were observed in both groups. There was no significant difference found for the self-reported reduction rate at 12 months between intervention and control group (14.8% vs 14.6%, $p=0.94$). **CONCLUSION:** This brief stage-matched smoking cessation intervention was not effective for quitting and glycemic control in type 2 DM smokers. However, these patients are the vulnerable group to receive assistance for smoking cessation from healthcare professionals. There are not many smoking cessation programs target type 2 DM patients so further trials are necessary to investigate an effective smoking cessation intervention to help this group.

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PA4-5

CARDIOVASCULAR AND NEUROPSYCHIATRIC RISKS OF VARENICLINE IN SMOKERS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A RETROSPECTIVE COHORT STUDY USING A NATIONAL GENERAL PRACTICE DATABASE

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SIGNIFICANCE: Varenicline is a pharmacotherapy for aiding smoking cessation with proven long-term efficacy in smokers with chronic obstructive pulmonary disease (COPD). Its use is however limited by ongoing concerns about possible associated risks of serious adverse cardiovascular and neuropsychiatric events. The aim of the current study was to investigate whether use of varenicline is associated with such events in smokers with COPD. **METHODS:** In a retrospective cohort study, we used data from 14,350 COPD patients included in the validated QResearch® database, which holds data from 753 National Health Service general practices across England. We identified patients who received a prescription of nicotine replacement therapy (NRT; N=10,426; reference group), bupropion (N=350), or varenicline (N=3,574) in the period between January 2007 and June 2012. Patients were followed-up for six months to compare incident cardiovascular (ischemic heart disease, cerebral infarction, heart failure, peripheral vascular disease, and cardiac arrhythmia) and neuropsychiatric (depression and self-harm) events using Cox proportional hazards models, adjusted for potential confounders. Propensity score analyses were used as an additional approach to account for potential confounding by indication. We also modelled the effects of potential

unmeasured confounders. **RESULTS:** Neither bupropion nor varenicline showed an increased risk of any cardiovascular or neuropsychiatric event compared with NRT. Varenicline was associated with a significantly reduced risk of heart failure (HR=0.56, 95%CI=0.34-0.92) and depression (HR=0.73, 95%CI=0.613-0.86). Similar results were obtained from the propensity score analyses. Modelling of unmeasured confounding provided additional evidence that an increased risk of adverse events in users of varenicline was very unlikely. **CONCLUSIONS:** In smokers with COPD, varenicline does not appear to be associated with an increased risk of documented cardiovascular events, depression, or self-harm when compared with NRT. Adverse events that do not come to attention of general practitioners cannot be excluded.

Protocol: <http://bmjopen.bmj.com/content/4/8/e005281>

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PA4-6

DOES DISEASE PROGRESSION POTENTIATE THE EFFECTS OF POLYTOBACCO USE? A CHARACTERIZATION OF INTENTION TO QUIT AMONG NEWLY DIAGNOSED HIV SEROPOSITIVE SMOKERS

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OBJECTIVES: Little research has examined the mechanisms by which HIV disease progression may impact intention to quit among people living with HIV/AIDS (PLWHA). HIV disease progression's impact upon intention to quit may differ between monocigarette and polytobacco users. The aim of this secondary analysis was to describe, over time, the relationship between HIV disease progression and intention to quit among these two groups of tobacco users. **METHODS:** Participants completed a baseline assessment at the initiation of their HIV care and four follow-up assessments at three month intervals (3, 6, 9, & 12-months). Assessments included biochemically verified (carbon monoxide) smoking status and audio computer assisted self-interviews. Independent variables included time from HIV diagnosis, disease progression, and tobacco product use. Covariates included demographics, behavioral, and psychosocial factors. Linear mixed modeling (LMM) was used to evaluate the association of the independent variables and covariates with the primary outcome, intention to quit. **RESULTS:** Participants (n=383) were 73.1% male, 67.3% black/African American, and had a mean (SD) age of 38.7 (10.6) years. Most participants reported acquiring HIV through sexual contact, 42.6% heterosexual and 37.1% homosexual. Data were stratified by disease progression and tobacco product use (mono vs. poly) into four subsets. Bivariate analyses revealed significantly greater symptom burden among polytobacco users ($p = .0013$). Results from LMM indicated that intention to quit was predicted by a three-way interaction between time from HIV diagnosis, disease progression, and tobacco product use ($\beta = -.0939$, $p = .0347$). Overall, progressive HIV was associated with greater intention to quit. However, this relationship differed over time in the two tobacco use groups. **CONCLUSION:** Findings suggest time from HIV diagnosis, disease progression, and tobacco product use (mono vs. poly) to be determinants of intention to quit among PLWHA. Future studies should consider tailoring the timing of cessation interventions based on an individual's tobacco use and disease progression characteristics.

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PAPER SESSION 5: TAX AND PRICE POLICY

PA5-1

6 YEARS, 15 COUNTRIES, 30 MILLION LIVES: LESSONS ON TOBACCO TAXATION FROM THE BLOOMBERG INITIATIVE

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The Bloomberg Initiative to Reduce Tobacco Use, launched in 2007 with a focus on 15 low- and middle-income countries representing two-thirds of the world's smokers, has advanced tobacco control globally. Tobacco excise taxes however were firmly in the ambit of fiscal policy. Technical and advocacy projects have sought to simplify tobacco tax design and raising taxes and prices. This review compares the actual progress of tax policy to best practice recommendations formulated at the start of the Initiative. Additionally, average increases in cigarette prices and in the share of tobacco tax in final price in the 15 countries is compared to progress in the rest of the world as a whole. METHODS: Price increases and tax share changes in 15 countries over three rounds of data collected in by the World Health Organization (2008, 2010, 2014) were compared to 170 control countries within a panel regression framework with controls for regions, and income levels. Each country's tobacco tax structure and 6-year progress was reviewed. Tobacco-specific price indices were sourced to independently track the impact of taxes on cigarette retail price trends. RESULTS: As a group, the 15 "Bloomberg Initiative" focus countries saw a statistically significant increase the share of excise tax in final price between 2010 and 2014 relative to the rest of the world. Real price increases themselves were not significantly different from other countries over the reference period. 3 countries – Mexico and Egypt in 2010 and the Philippines in 2013 saw pack prices rise significantly immediately after large tax reforms. Rising specific taxes in Poland, and a series of strategic tax increases in Turkey sustained continued price hikes in those 2 countries. CONCLUSIONS: Tax increases have occurred nearly annually in many instances, including India's and Pakistan's tiered taxes, Bangladesh's price-dependent taxes and Ukraine's and Russia's mixed tax systems. These increases, however, mainly helped governments catch up to or slightly exceed average inflation in a predictable way - without radically redesigning tobacco taxes. Tax increases have been thwarted in countries dominated by a significant government stake in a cigarette manufacturing monopoly, by reliance on *ad valorem* taxes, or by a tobacco industry known to possess significant domestic political clout. Across the 15 countries, progress on taxation has been discontinuous and timed to political opportunities, reflecting challenges and opportunities posed when multiple non-revenue objectives compete in tax-setting.

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PA5-2

TAXATION, DISPARITIES, AND REDUCTIONS IN SMOKING IN THE U.S., 2001-2011

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SIGNIFICANCE: Smoking disparities in the U.S. are pervasive and persistent. Tobacco control policies may reduce or exacerbate these disparities. This study evaluated differential impacts of state-level cigarette price on disparities in reductions in smoking by race/ethnicity, education, and income. METHODS: We used data on adults 25 years and older from the 2001-2002, 2003, 2006-2007, and 2010-2011 waves of the Tobacco Use Supplement to the Current Population Survey (TUS-CPS) (N=818,369). Controlling for fixed effects for state and year, we examined the relationship between cigarette price and changes in current smoking, cigarettes per day (cpd), and cessation by race/ethnicity, education, and income. Two-part models were used for current smoking and cigarettes per day, and linear probability models were used for cessation. Price was measured using data from the Tax Burden on Tobacco, as well as a calculated price from TUS-CPS self-reports. Analyses were age-stratified (i.e., 25-39 years, 40-54 years, 55 years and older). RESULTS: Overall, higher price was associated with a decrease in current smoking, but was not associated with a change in cpd or cessation. Regarding race/ethnicity, few differences were found in the relationship of price with current smoking; however, among younger age groups, cpd decreased less with higher

price among Blacks and Hispanics compared to non-Hispanic Whites. Also among younger age groups, current smoking and cpd decreased most with higher prices among those from lower versus higher education groups. Similar results were found for cpd and income. Regarding cessation, there were few differences in the relationship between price and cessation by race/ethnicity. Among adults aged 25-39 and 55 or older, higher price was more strongly associated with cessation for those with higher compared to lower education. Similar patterns were seen for income among the youngest adults. CONCLUSIONS: Although taxation remains a cornerstone of tobacco control policy, increased understanding of heterogeneity in tobacco price sensitivity is needed to inform future policy development and evaluation.

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PA5-3

UNDERSTANDING TOBACCO INDUSTRY PRICING AND WHETHER IT UNDERMINES TOBACCO TAX POLICIES

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SIGNIFICANCE: Previous research, dating only to 2010, shows tobacco companies have undermined potential public health gains from tobacco taxation in the UK by failing to fully pass tax increases on the cheapest factory made cigarettes (FM) onto consumers. The availability of cheap products undermines quit success. This study updates previous work and expands it to roll your own tobacco (RYO). METHODS: A review of industry and retail literature informed the allocation of RYO and FM products to price segments. 2008 to 2016 UK Nielsen data were used to explore market share by FM/RYO and price segment, real price trends using CPI indexation, and the extent to which tax increases were transferred to consumers and whether this differs by price segment. Weighted average prices were calculated for segments and pack types. RESULTS: RYO tobacco has begun to be segmented into premium, mid-price and value segments. The market share of RYO mid-price and value segments has increased from 6% to 15% and 1% to 6% of the combined FM and RYO market respectively. FM cigarettes were categorised into premium, economy and ultra low price (ULP). The market share of ULP cigarettes increased from 9% to 39% between 2008-2016 despite the number of cigarettes per ULP pack decreasing such that 99% of ULP packs now contain <20 sticks. Simultaneous declines in market share of premium RYO and premium and economy FM were seen. More expensive tobacco products saw greater absolute increases in real prices: price increases per stick were 13p (FM premium), 12p (FM economy), 10p (FM ULP), 5p (RYO premium and mid price) and 4p (RYO value). The smallest packs (RYO 10g and 12.5g and FM 10 cigarette packs) saw smallest increases in real prices (£1.03) compared with £1.90 for most larger packs. CONCLUSIONS: Tobacco companies have further widened the price gap between their most and least expensive products and thus the opportunities for downtrading. This has occurred in part by reducing pack sizes. 60% of the UK tobacco sales now comprise ULP FM, mid-price or value RYO. Our research provides new evidence of the importance of banning smaller pack sizes and adjusting tax structures to narrow the price gap both within and between RYO and FM products.

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PA5-4

EVALUATION OF NEW YORK CITY'S CIGAR PRICING AND PACKAGING LAW

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BACKGROUND: Cigars sold at low prices and in small quantity packs may be especially appealing to price-sensitive populations, including youth. In 2014, New York City (NYC) implemented a cigar pricing and packaging law requiring that little cigars be sold in packs of at least 20, that little cigars be sold for at least \$10.50 per pack of 20, and that cigars (large cigars and cigarillos) be sold in packs of at least 4 unless they cost more than \$3 each. Empirical evidence about the process, outcomes, and unintended consequences of this type of non-tax pricing and packaging policy is limited. **METHODS:** We reviewed enforcement records to determine the percentage of retailer inspections resulting in a cigar law violation. We analyzed retail scanner sales data to estimate noncompliant sales and total sales of cigar products before and after the law went into effect, in NYC and a multi-county proximal comparison area. **RESULTS:** The rate of violations of the NYC cigar law was 8.5% among tobacco retailers, and sales of noncompliant cigar products reached near-zero levels following the law's implementation. The total volume of little cigar sales decreased by 38% after the law went into effect ($p < 0.01$). In contrast, sales of cigars spiked initially, but did not significantly change after the law's implementation. Cigars sold in packs of 4 or more increased significantly at the time of implementation ($p < 0.01$), with cigars sold in packs of 4 or more accounting for 41% of cigar sales in NYC before implementation of the law and 96% of sales following enforcement of the law. **CONCLUSIONS:** NYC's cigar pricing and packaging law is associated with decreased sales of little cigars, but did not have the intended effect on sales of other cigars. Cigar sales shifted to higher-quantity packs that were not subject to the law's pricing restrictions. Although the law was intended to reduce sales and consumption of cigar products, the apparent packaging loophole diminished the law's intended effect.

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PA5-5

E-CIGARETTE USE AMONG ADULTS IN THE UNITED STATES: SHOULD WE ENCOURAGE E-CIGARETTES TAXATION?

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SIGNIFICANCE: Use of e-cigarettes is increasing dramatically in the United States (US). Despite the US Food and Drug Administration's deeming rule for e-cigarette regulation, US states can impose their own regulations including taxation. No consensus exists on how to tax e-cigarettes and some researchers speculated that existing cigarette taxes can interact with e-cigarette use. Limited data exists on state level differences of e-cigarette use and its associated correlates on a national level. Our purpose is to examine the current prevalence of use of e-cigarettes by state, and the socio-demographic correlates of such use. **METHODS:** Using data from the 2012-2014 National Adult Tobacco Survey, we assessed the prevalence estimates US adults (18 and older) e-cigarette awareness and use, and cigarettes use. Descriptive statistics and multivariate logistic regression were performed to determine prevalence of e-cigarette and cigarette use nationally and at the state level, as well as to assess associations between socio-demographic factors and e-cigarette use and estimate OR and 95% CI. We also examined the correlation between existing excise cigarette taxes by state and cigarette and e-cigarette use. **RESULTS:** 79% reported ever hearing about e-cigarettes, among them 14.1% reported experimentation, and among those 29.8% reported past 30-day use, with prevalence varying by state. Highest prevalence was found in New Mexico (9%) while lowest prevalence was found in Delaware (1.3%). Adults living in the West were at increased risk for e-cigarette use (OR=1.3; 95% CI: 1.1-1.5), as were adults aged 18-24 (OR=2.3; 95% CI: 1.7-3.0), and adults who smoked cigarettes. Adults living in the West were at less risk for e-cigarette use (OR=0.8; 95% CI: 0.7-1.0), as were adults aged 18-24 (OR=0.6; 95% CI: 0.5-0.8), and adults who smoked cigarettes. A significant negative correlation (Spearman Coeffi-

cient's rho= -0.556, $p < .001$) exists between state level cigarette excise taxes and current state-wide cigarette smoking, but with not current state-wide e-cigarette prevalence. **CONCLUSION:** Factors associated with e-cigarette use seem to be different than those associated with cigarettes. Continuing to monitor the prevalence and correlates associated with e-cigarette use is critical to informing not only excise tax regulations and other policies, but also to developing a baseline of use with which to assess the impact of impending federal and state level tobacco regulatory actions.

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PA5-6

ESTIMATED COST PER QUITTER FOR SMOKERS USING A SMOKING CESSATION SERVICE IN ENGLAND

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SIGNIFICANCE: In the United Kingdom (UK), support is available to cigarette smokers wishing to quit through a number of accredited smoking cessation services, operating according to National Institute for Healthcare and Excellence (NICE) guidelines. The financial cost of this service in terms of expenditure per smoker who quits is not as yet well understood. Estimates therein can contribute to cost-benefit analysis and help to identify areas in which expenditure can be optimised. **METHODS:** Data recorded by a smoking cessation service in England (Quit-51) were investigated in order to estimate the mean cost per quitter (CPQ) for those using this service, firstly in terms of an overall average and secondly in respect of various subgroups of the service clientele, specifically men/women, age group, pharmacotherapy prescribed and degree of nicotine dependence. Average costs were calculated based on (i) time spent with an adviser (ii) pharmacotherapy prescribed. Approximate 95% confidence intervals (CI) around these means were derived by means of a bootstrap procedure involving resampling of the data. The above figures were calculated at both 4 weeks (Carbon Monoxide - validated) and 12 weeks (self-reported only). **RESULTS:** In total, 14,057 records were available from 8 National Health Service (NHS) Trusts over the period March 2013 to January 2016 for analysis of quit at 4 weeks. The overall mean cost per quit at this timescale was estimated at £131.70 (95% CI = £129.70 to £133.90). The difference between men (mean CPQ = £130) and women (£133.20) was not great but of borderline statistical significance with reference to the respective confidence intervals as was the difference between clients using NRT (mean CPQ = £132.80) and Varenicline (£128.50). The projected average cost was similar for most age groups with the exception of teenagers for whom this figure was high (mean CPQ = £173.10, 95% CI = £159.70 to £188.50). **CONCLUSIONS:** These preliminary analyses of observational smoking cessation data afford an insight into the real-life benefits relative to the costs of running such a service as well as identifying subgroups where the costs vary.

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SRNT NOTES

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PODIUM PRESENTATION 3

PAPER SESSION 6: NICOTINE AND ANIMAL MODELS

PA6-1

DEVELOPMENTAL NICOTINE EXPOSURE INDUCES PERSISTENT ALTERATIONS IN ACCUMBENS GLUTAMATERGIC CIRCUITRY

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SIGNIFICANCE: Developmental nicotine exposure (DNE) is used to model human smoking during pregnancy, and has been shown to cause alterations in glutamate receptors and neuronal function. Additionally, DNE increases nicotine (NIC) self-administration in adult female rats, indicating that developmental exposure to NIC produces neurobehavioral alterations that persist to adulthood. To further elucidate the potential role of DNE on NIC addiction vulnerability in adulthood, we used RT-qPCR to investigate mRNA expression of proteins known to be involved in NIC-induced changes in synaptic physiology within the nucleus accumbens (NAc). These proteins include glutamate receptors (AMPA and NMDA) and transporters (GLT-1). **METHODS:** Pregnant female Sprague Dawley rats were implanted with an osmotic minipump (Alzet) on gestational day 5, containing either 6 mg/kg/day NIC tartrate or saline. The pump delivered NIC throughout gestation and 1-week post-parturition. At postnatal day (PND) 7 and 60, pups were anesthetized and decapitated. For PND 7, whole striatum was collected; for PND 60, NAc core, shell, and dorsal striatum punches were collected. **RESULTS:** Preliminary results from PND 60 NAc core tissue samples demonstrate upregulation of mRNAs of NMDA receptor subunits GluN2A and GluN2B and AMPA receptor subunits GluA1 and GluA2, as well as increased expression of the activity-related immediate early gene Arc. DNE-induced alterations of GluN2A and GluN2B mRNA expression suggests a return to or continuation of developmental conditions, as GluN2B is typically replaced by GluN2A with maturation. As well, DNE decreased GLT-1 mRNA, consistent with results from adult rats withdrawn from drugs of abuse including cocaine, heroin, and nicotine, and potentially indicative of increased addiction vulnerability. **CONCLUSIONS:** Taken together, these results are consistent with enhanced glutamatergic signaling and synaptic plasticity found during withdrawal from NIC self-administration in adult rats. These results illustrate the ability of DNE to persistently alter glutamatergic signaling and synaptic plasticity into early adulthood, which likely increases NIC addiction vulnerability.

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PA6-2

TRANSGENERATIONAL EFFECTS OF PATERNAL NICOTINE EXPOSURE ON FEAR RESPONSE AND CHOLINERGIC FUNCTION

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Tobacco use remains to be the leading cause of preventable death in the US leading to various negative health consequences such as various cancers. In addition, a relationship has been established between smoking and psychological problems such as anxiety and stress disorders. Moreover, recently, studies have shown that the effects of nicotine use may be transgenerationally transmitted through epigenetic modifications. In the present study, we examined the effects of paternal nicotine exposure on fear learning in subsequent generations in order to understand the potential transgenerational influence of nicotine exposure on fear-related symptoms in anxiety and stress disorders. Specifically, male adult C57BL6/J mice received either chronic nicotine (28 days, 12.6 mg/kg/d) or chronic saline exposure. Then, the male and female offspring of nicotine (Nic-Sired) and saline (Sal-Sired) exposed mice were tested in contextual and cued fear conditioning. Our results demonstrated that paternal nicotine exposure resulted in enhanced cued and contextual fear learning in the subsequent generations (F1 and F2) compared to Sal-Sired mice and this effect was reversed when F1 generation, but

not F2 generation, mice received acute nicotine injections. Furthermore, Nic-Sired mice also showed more pronounced spontaneous recovery of fear when re-tested following extinction. We further found that although paternal nicotine exposure enhanced fear learning, non-emotional learning was not affected in Nic-Sired mice as they exhibited normal memory function in the Novel Object Recognition paradigm. In addition, paternal nicotine exposure did not alter performance in the elevated plus maze and open field tasks excluding the possible confounding effects of anxiety and locomotor activity. Finally, we examined cholinergic activity in the Nic-Sired mice using nicotinic acetylcholine receptor (nAChR) binding and potassium and nicotine-evoked acetylcholine release in the dorsal and ventral hippocampus. Our results showed reduced ventral, but not dorsal, hippocampal cholinergic function in the Nic-Sired mice as well as increased nAChR binding in the whole hippocampus. In parallel, we also found increased DNA methylation in the ventral hippocampi of the Nic-Sired mice whereas this effects was absent in the dorsal hippocampus. Together, our results suggest that paternal nicotine exposure may result in alterations in the epigenome, which, in turn, leads to exaggerated fear learning and abnormal cholinergic function in subsequent generations.

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PA6-3

CHRONIC INTERACTIONS OF SEROTONERGIC AND DOPAMINERGIC TREATMENTS WITH NICOTINE INFUSIONS FOR DECREASING NICOTINE SELF-ADMINISTRATION IN RATS

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SIGNIFICANCE: Tobacco addiction each year causes millions of deaths worldwide. Nicotinic acetylcholine receptors have been shown to be central to tobacco addiction. Nicotine replacement therapy aids tobacco cessation, but the success rate is still quite low. This may in part be due to the fact that nicotinic receptors are not the only neural systems involved in tobacco addiction; interacting neural systems participate as well. Nicotine increases the release of a variety of neurotransmitters, including dopamine and serotonin. Dopamine in particular dopamine D₁ receptors have been shown to be involved in the reinforcing value of nicotine. Serotonin through its actions on 5-HT_{2c} receptors has been shown to play a key role in modulating the reinforcement of addictive drugs, including nicotine. Combination of treatments could provide greater treatment efficacy. These studies were conducted to evaluate combination therapies utilizing nicotine replacement therapy in conjunction with either a dopamine D₁ receptor antagonist SCH-23390 or a serotonin 5-HT_{2c} receptor agonist, lorcaserin. **METHODS:** Sprague-Dawley rats were given access to self-administer nicotine via IV infusions. Osmotic pumps were implanted to reproduce the kinetic of chronic nicotine patch therapy. SCH-23390 or lorcaserin were administered prior to nicotine self-administration sessions. **RESULTS:** Reproducing earlier findings SCH-23390, lorcaserin and nicotine replacement therapy were effective at reducing nicotine self-administration. Both D₁ antagonist and 5HT_{2c} agonist treatments had additive effects with chronic nicotine infusion for significantly lowering nicotine self-administration. Combination treatments were particularly effective for maintaining suppressing nicotine self-administration after the treatments stopped. **CONCLUSION:** This study shows the promise of combination of chronic nicotine with therapies targeting non-nicotinic receptors as treatment options for tobacco addiction.

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PA6-4

NICOTINE WITHDRAWAL-INDUCED ANXIETY AND DEPRESSION-LIKE BEHAVIOR IN C57BL6 MICE: AN ANIMAL MODEL FOR NICOTINE PHYSICAL DEPENDENCE

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BACKGROUND: Depression, anxiety, and learning defects are the major symptoms of nicotine withdrawal and these symptoms coexist in humans. The currently available animal models of nicotine physical dependence could not mimic these coexisting symptoms. The present study was aimed to develop and validate the coexisting nicotine withdrawal-induced symptoms in male C57BL6 mice. **METHODS:** Mice were grouped into normal control (which received drinking water) and nicotine group (which received 10-200 µg/mL nicotine solution for forty days, as the only source of drink). During this period, daily fluid consumption, feed intake, and body weight were recorded. Five days before nicotine-withdrawal, 50 µL of blood sample was collected from the mouse tail vein and serum cotinine level was estimated. During nicotine withdrawal, the nicotine solution was replaced with drinking water. The normal control mice received the vehicle and the nicotine group was further divided and treated either with vehicle (negative control) or bupropion (10 mg/kg, i.p.) for the next nine consecutive days, respectively. All behavioral tests were conducted 30 min after drug treatment. The somatic signs (paw tremor, body tremor, and head shake), locomotor activity, memory defects (modified-elevated plus maze test), anxiety (light/dark test and marble burying test) and depression (tail suspension test and forced swim test)-like behavior were assessed in the nicotine-withdrawn mice. **RESULTS:** There was a gradual reduction in body weight of the mice exposed to the nicotine solution whereas normal control group gained body weight over forty days. The average nicotine consumption of the mice exposed to 200 µg/mL nicotine solution was found to be 24 mg/kg. Serum cotinine was detected in the mice which received nicotine solution, thus confirming the intake of nicotine from the oral drinking solution. However, the nicotine-withdrawal did not produce any somatic signs or a change in locomotor activity or learning defects in mice. Interestingly, nicotine-withdrawal significantly induced anxiety and depression in mice as compared with normal control. The bupropion treatment significantly reversed the nicotine withdrawal-induced depression but did not alleviate anxiety in mice as compared with negative control. **CONCLUSION:** This study demonstrates the coexistence of anxiety and depression-like behavior in nicotine withdrawn mice. This animal model that has been developed could be used to study the therapeutic potential of compounds against the nicotine physical dependence in mice.

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PA6-5

EXAMINING SELF-MEDICATION OF NICOTINE IN SCHIZOPHRENIA USING RODENT MODELS OF NICOTINE SELF-ADMINISTRATION FOLLOWING SUB CHRONIC KETAMINE EXPOSURE

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SIGNIFICANCE: Cognitive deficits represent one of the core disabling symptoms within this disorder, accountable for the majority of disruption to everyday life. Over 80% of patients with schizophrenia smoke compared to just 30% of the general population, which has been postulated as a form of self-medication to remediate the cognitive symptoms. Our laboratory has shown that a sub-chronic, sub-anesthetic dosing regimen of the NMDA antagonist ketamine can induce cognitive deficits on a variety of cognitive domains such as memory capacity of working memory and executive decision-making in the attentional set-shifting task. **METHODS:** The objective was to examine the effects of treating rats with ketamine (daily injection of 30mg/kg IP for 5 days) on acquisition to self-administer intravenous nicotine (0.015 & 0.03mg/kg/inj) using two-lever operant conditioning chambers. Following 5 days of a 'washout' period from the sub-chronic treatment, groups of rats (n=12) were given access to intravenous nicotine in 1 hr sessions under a fixed-ratio schedule of reinforcement. **RESULTS:** Both ketamine- and vehicle-treated subjects showed a steady rate of acquisition with no significant difference between the groups. Differences were however apparent when rats were given a choice between IV nicotine and sucrose (oral dose of 5ug/reinforcement) under a concurrent choice procedure. Over 3 three sessions, vehicle-treated rats migrated to respond

exclusively for sucrose, whilst ketamine-treated rats exhibited fewer responses on the sucrose lever and maintained their intake of nicotine. **CONCLUSIONS:** The results from this experiment suggest that the sub chronic ketamine regimen used to model cognitive deficits associated with schizophrenia in rats does not modify the primary reinforcing effects of nicotine. However, under a choice situation, ketamine exposure made rats resistant to alternative reinforcers such as sucrose. These findings suggest that patients with schizophrenia smoke excessively to self-medicate in order to restore underlying cognitive deficits instead of experiencing more satisfaction from the nicotine.

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PA6-6

MENTHOL DECREASES ORAL NICOTINE AVERSION IN C57BL/6 MICE THROUGH A TRPM8-DEPENDENT MECHANISM

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INTRODUCTION: Nicotine is a major oral irritant in smokeless tobacco products and has an aversive taste. Mentholated smokeless tobacco products are highly popular, suggesting that menthol increases their palatability and may facilitate initiation of product use. While menthol is known to reduce respiratory irritation by tobacco smoke irritants it is not known whether this activity extends to oral nicotine and its aversive effects. **METHODS:** The two-bottle choice drinking assay was used to characterize aversion and preference in C57BL/6 mice to a range of menthol concentrations (10-200 microgram/ml). Then, effects of menthol on oral nicotine aversion were determined. Responses were compared with those in mice deficient in the cold/menthol receptor, TRPM8, expressed in trigeminal sensory neurons innervating the oral cavity. **RESULTS:** Mice showed aversion to menthol concentrations of 100 microgram/ml and above. When presented with a highly aversive concentration of nicotine (200 microgram/ml), mice preferred solutions with 50 or 100 microgram/ml menthol added over nicotine alone. In contrast to wild-type mice, Trpm8^{-/-} showed a strong aversion to mentholated (100 microgram/ml) nicotine (200 microgram/ml) and preferred nicotine alone. Trpm8^{-/-} mice show aversion to lower concentrations of menthol than wild-type mice. **DISCUSSION:** Oral menthol can reduce the aversive effects of oral nicotine and, at higher concentrations, acts as an irritant by itself. Menthol's effects in relation to nicotine require TRPM8, the cool temperature sensing ion channel that activates analgesic and counterirritant mechanisms. These mechanisms may underlie preference for menthol-containing smokeless tobacco products and may facilitate initiation of product use.

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PAPER SESSION 7: SMOKING IN LOW AND MEDIUM INCOME COUNTRIES

PA7-1

VERY UNSUCCESSFUL ATTEMPTS TO QUIT: EXAMINING CORRELATES IN THE 13 COUNTRIES WHERE ALMOST 2/3 OF SMOKERS LIVE

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BACKGROUND: Every year, millions of smokers try to quit smoking. Unfortunately, a significant portion of these smokers fails to maintain abstinence for more than 24 hours, resulting in a Very Unsuccessful Attempt to Quit (VUAQ). Previous studies have shown that VUAQ is related to both levels of dependence and the severe symptoms of nicotine withdrawal. However, there are indications that other variables may also play a role. This study aimed to investigate the correlates of VUAQ using a cross-national sample. **METHODS:** We used data from the Global Adult Tobacco Survey (GATS) - designed to produce national estimates among all non-institutionalized men and women 15 years of age or older - from the 13 countries where almost 2/3 of smokers live. Those smokers who reported having tried to quit at least once were included in the present analysis: Bangladesh (n = 1,058); Brazil (n = 2,928); China (n = 489); Egypt (n = 1,577); India (n = 3,499); Indonesia (n = 821); Mexico (n = 839); Philippines (n = 1,288); Russia (n = 1,403); Thailand (n = 1,503); Turkey (n = 1,028); Ukraine (n = 832); Vietnam (n = 1,168). We carried out weighted regression models for VUAQ including sociodemographic, smoking, treatment, and media/perceptions as dependent variables. **RESULTS:** VUAQ varied from 1.0% in the Philippines to 13.6% in Brazil. The category most consistently associated with VUAQ was less time to first cigarette (7 countries), followed by female gender and older age (5 countries) and cigarette advertising in stores (4 countries). Nicotine Replacement Treatment (NRT) was negatively associated with VUAQ in only two countries and Counseling and Brief Advice in none. Sociodemographic variables were more important in America, and level of dependence was less important in Asia. Treatment and Media/Perception variables were not important for VUAQ (with the exception of advertising in stores). **CONCLUSION:** Our findings support both the multicausality and great prevalence variability of VUAQ. Although reinforcing the importance of dependence level in many countries, the use of medications that alleviate withdrawal had hardly any effect. Interestingly, there is a justification for special interventions for women and the elderly, and also the banning of in-store advertising, in the attempt to reduce VUAQ.

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PA7-2

COMPARING PACK DESIGN AND BRANDING APPEALS BETWEEN THE MOST EXPENSIVE AND THE CHEAPEST CIGARETTE PACKS FROM 14 LOW AND MIDDLE INCOME COUNTRIES

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SIGNIFICANCE: Cigarette packs are a key marketing method to attract and retain smokers. Cigarettes are highly branded so as to make connections with the consumer and construct meanings beyond the product's physical properties. Price segmentation is important in the tobacco market; cigarette price influences smoking rates, with young and poorer people being most price sensitive. In this analysis, we explore whether and how branding elements on cigarette packaging vary between products at the lowest and highest price points across 14 low and middle income countries. **METHODS:** In 2013, we collected over 3000 unique cigarette packs from diverse neighborhoods in 44 cities across the 14 countries. Each pack was coded for distinctive features (e.g. soft or hard, shape, beveled edges) as well

as marketing appeals employed. Each pack was double coded using a structured framework. Local prices were converted to US dollars using exchange rates from the collection date and adjusted for stick count. Our dataset includes the most expensive (top 5%) and the cheapest (lowest 5%) packs from each country, and we compare major pack features and marketing appeals between the two groups overall using a chi-square test (sub-analyses by country to be conducted). **RESULTS:** We analyzed data from 187 'cheap' and 198 'expensive' packs across the 14 countries. Cheap pack prices ranged from US\$0.93 to US\$1.72 and expensive pack prices ranged from US\$2.09 to US\$49.25. Cheap packs were more likely to be soft ($p < 0.01$), less likely to be wide ($p < 0.01$) or have beveled/rounded edges ($p < 0.01$). Expensive packs included more 'less harm' references ($p < 0.05$). In contrast, there were more luxury imagery on the cheaper packs ($p < 0.1$). We found no difference for feminine appeals. **CONCLUSIONS:** There are distinctive pack design features at the lowest and highest price points, with more 'basic' packs at the lower prices. Packs across the price points were equally likely to make appeals to women. Expensive packs were more likely to convey reduced harm messaging, whereas the greater likelihood of luxury imagery on the cheaper packs may reflect cigarettes as an aspirational product at this price point.

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PA7-3

SMOKERS' REACTIONS TO TEXT AND GRAPHIC WARNINGS ON CIGARETTE PACKAGES: FINDINGS FROM ITC AFRICAN COUNTRIES

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SIGNIFICANCE: Health warnings on cigarette packages are among the most cost effective means of communicating the health risks of tobacco use to the public. However, these warnings range from single text-only to graphic health warnings (GHWs). Population research on health warnings is mostly conducted in high-income Western countries. This is the first comparative study to assess the impact of text-only and GHWs on health warning effectiveness from African countries. **METHODS:** Data were analyzed from the International Tobacco Control (ITC) Surveys in Kenya (KE), Mauritius (MU) and Zambia (ZM) (N = 3,406), face-to-face surveys of nationally representative samples of adult smokers. Warnings on cigarette packages differ in the three countries, i.e. ZM has one English text warning, KE has 13 English and Swahili text warnings while MU has 8 GHWs. The ITC surveys included 6 validated indicators of health warning effectiveness impact under 3 broad categories: Salience (*noticing warnings, reading warnings*), cognitive (*thinking about health risks, motivation to quit*) and behavioral (*avoiding warnings, forgoing a cigarette*). **RESULTS:** Mauritian smokers were more likely to report a greater salience (*noticing warnings*: MU=85%; KE=65%; ZM=23% and *reading warnings*: MU=53%; KE=30%; ZM=19%), cognitive (*thinking about risks*: MU=42%; KE=28%; ZM=25% and *thinking about quitting*: MU=27%; ZM=27%; KE=25%), and behavioral (*forgo cigarettes*: MU=30%; KE=20%; ZM=19% and *avoid warnings*: MU=36%; KE=13%; ZM=9%) reaction to the health warnings after the implementation of the GHWs than Kenyan or Zambian smokers. **CONCLUSIONS:** The pattern of health warning impact in the three African countries is consistent with the findings from high-income Western countries, that is, larger and more graphic warnings are more effective. Mauritian smokers reported the highest impact of health warnings among the three African countries, after the implementation of the GHWs, while Kenyan and Zambian smokers who are exposed to only text warnings reported lower health warning impact. The study demonstrates that the implementation of GHWs enhances the effectiveness of health warning labels.

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PA7-4

SALE OF SINGLE CIGARETTES NEAR PRIMARY AND SECONDARY SCHOOLS IN 10 COUNTRIES

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The sale of single cigarettes promotes smoking among youth. Article 16 of the WHO FCTC calls for measures that prohibit sale of tobacco to minors, including the sale of single cigarettes. This study describes the prevalence of the availability of single cigarettes for sale around primary and secondary schools in 10 countries representing four of the six WHO regions. As a part of a study on tobacco marketing at the point-of-sale, retailers within a 100-250 meter radius of primary and secondary schools were observed in 10 countries – Argentina, Bangladesh, Bolivia, Bosnia and Herzegovina, Georgia, Kenya, Nicaragua, Romania, Switzerland, and Ukraine. Data collection occurred in June-August 2016. Data collectors observed whether single cigarettes were available for sale at retailers; when single cigarettes were not displayed, cashiers were asked if they sold single cigarettes. Descriptive analysis was conducted using Stata 14.0. 5,203 retailers were observed, 3,878 of which sold tobacco. Across countries, 45% of retailers (n=1,732) that sold tobacco sold single cigarettes. At least one retailer in all countries, except for Bosnia and Herzegovina, sold single cigarettes. The percentage of retailers that sold single cigarettes among all tobacco retailers ranged from 4% in Switzerland (n=9) to 99% in Bangladesh (n=507). The vast majority of tobacco retailers in Bolivia (90%; n=178), Kenya (92%; n=612), and Nicaragua (98%; n=142) sold single cigarettes. Across countries, 44% of the retailers (n=766) that sold single cigarettes were visible from primary or secondary school grounds. Single cigarettes were available for sale in nine countries, demonstrating noncompliance with country prohibitions on the sale of cigarettes in packs of fewer than 10 or 20 sticks. Having single cigarettes available for sale appears to exacerbate already existing disparities across countries by country income level. Findings that single cigarettes are sold in close proximity to primary and secondary schools in nine countries strengthen the call for a need to protect children and youth from the harms of tobacco and inform advocacy efforts for improved implementation of current laws.

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PA7-5

WATERPIPE SMOKING AMONG EAST-AFRICANS: A COMMUNITY-BASED PARTICIPATORY RESEARCH TRIAL INVESTIGATING THE POTENTIAL ROLE OF RELIGION IN CESSATION

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Waterpipe smoking (WPS) is associated with serious health outcomes including lung cancer. Despite WPS having similar health risks as cigarettes and being discouraged in Islam, it is a growing trend in the new immigrant communities from East Africa. An exploratory cessation trial was developed utilizing the tools of community-based participatory research. The feasibility, acceptability, and efficacy of a faith-based intervention targeting WPS cessation was evaluated. Enrolled participants were ≥18, Muslims of East African-origin, and who had engaged in WPS in the past year. Eligibility status was verified, consent completed and baseline data obtained. A sermon was developed through a collaborative effort between a local Imam, community leaders and academic partners. The sermon, emphasizing that WPS violates four tenants of Islam: harm to self, family and community and wastes money and is thus, forbidden, was delivered by the Imam (Islamic faith leader) at a local community center. A follow-up assessment was scheduled. Data were analyzed using REDCap and R Statistical Software. Participants were predominantly male, Somali/Oromo, 25.6 years old, single (77.3%) and college educated (51%). The majority (78.3%) believed that religion was central to their lives; 91.3% reported that they were likely to decrease WPS use if their Imam told them

to; 60.9% were sure that religious advice would result in WPS cessation and the majority (60.9%) was interested in quitting shisha. Study feasibility, acceptability and efficacy were influenced by the stigma associated with WPS; influence of a collectivistic vs. individualistic world view in new immigrant communities; necessity to ensure confidentiality when evaluating behaviors that challenge social norms; important role of social capital in community engagement; and the vital importance of Imam commitment to the trial. Results will summarize the potential utility of faith-based interventions to address health behavior change. A 3-pronged approach will emphasize culture, religion and health as it applies to WPS cessation. Lessons learned in this faith-based intervention might inform future community-based research.

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PA7-6

THE ECONOMICS OF TOBACCO FARMING IN LOW- AND MIDDLE-INCOME COUNTRIES

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SIGNIFICANCE: The tobacco industry argues – often successfully – with little or no empirical support that tobacco control jeopardizes the dynamic livelihoods of millions of smallholder tobacco farmers around the world. As a result of such opposition, many tobacco control policies have been stopped, slowed or even reversed. The public health community has mostly failed to counter this narrative, often because of insufficient data. This research seeks to fill this gap. METHODS: Using individual-level economic surveys of more than two thousand tobacco farmers across nationally-representative samples in four major tobacco-growing countries (Kenya, Malawi, the Philippines and Zambia) this research examines in empirical depth the state of the economic livelihoods of these individuals. In particular, the research tracks the incomes and costs of tobacco-farming households, including a systematic incorporation of labor costs, an input that heretofore has been mostly overlooked by researchers despite evidence that tobacco cultivation is the most labor intensive of any major crop in the world. It also systematically examines the dynamics of the financial contracts that many farmers sign with tobacco firms. RESULTS: We find that household income from tobacco farming is typically very low – particularly in Sub-Saharan Africa – and far less than claimed by the tobacco industry. Moreover, when labour is included in the cost part of the equation, farmers' profits often diminish to nothing or even less, typically starting or perpetuating a cycle of indebtedness that keeps farmers growing tobacco indefinitely. The relationship between farmer and tobacco industry is often further complicated by economic contracts between them, typically to the detriment of the farmers' livelihoods. CONCLUSIONS: This research demonstrates empirically that most tobacco farmers' livelihoods in these four major tobacco-growing countries are economically challenged, which is directly contrary to the tobacco industry's unsubstantiated claims. It also suggests that the existing contracting system often disadvantages farmers.

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PAPER SESSION 8: SMOKING AND E-CIGARETTE USE IN PREGNANCY

PA8-1

SMOKING DURING PREGNANCY IN THE UNITED STATES, 2005-2014: THE ROLE OF PSYCHOLOGICAL DISTRESS AND DEPRESSION

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OBJECTIVE: First, the study investigated the relationship between major depression and acute psychological distress and cigarette smoking among pregnant women in the United States. Second, the study estimated the change in prevalence of cigarette smoking among pregnant women with and without mental health problems from 2005-2014. **DESIGN:** Nationally representative, cross-sectional community-based survey conducted annually from 2005 to 2014 in the United States. **EXPOSURES:** Past-month psychological distress and past-year depression. **MAIN OUTCOME AND MEASURES:** Past 30-day smoking among pregnant women was examined using logistic regression models. Heterogeneity in this association by demographic characteristics and trends over time was also examined. **RESULTS:** Prenatal smoking is significantly more common among pregnant women with, compared to without, depression and acute psychological distress. Depression and psychological distress were associated with significantly higher rates of cigarette smoking during pregnancy in all examined demographic strata. Striking disparities in the prevalence of smoking during pregnancy by demographics, depression and psychological distress emerged. Over time, smoking during pregnancy increased significantly among women with depression (35.9% to 38.4%; $p=0.02$) and prenatal smoking showed a decreasing, but not significant, trend among women without depression (12.5% to 9.1%; $p=0.07$) from 2005-2014. **CONCLUSIONS AND RELEVANCE:** Smoking among pregnant women with depression and psychological distress is up to four times higher than smoking among pregnant women without these mental health problems. The prevalence of cigarette smoking during pregnancy among women with depression has significantly increased over the past decade. The size of the disparities in smoking during pregnancy by mental health status and socioeconomic subgroups is notable, further highlighting the importance of focused efforts among vulnerable sub-groups of pregnant women in need of targeted intervention and assistance.

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PA8-2

PREVALENCE OF E-CIGARETTE USE AND CHARACTERISTICS IN A U.S. NATIONALLY REPRESENTATIVE SAMPLE OF PREGNANT WOMEN

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SIGNIFICANCE: E-cigarette use among women of reproductive age is increasing. Most individuals who use e-cigs report that they consider them less harmful than tobacco cigarettes or that they use them to reduce or quit smoking. However little research has examined prevalence of e-cig use or distinguished cigarette only versus dual cigarette/e-cig use in a nationally representative sample of pregnant women, which was the purpose of this study. **METHODS:** Data were obtained from the Population Assessment of Tobacco and Health (PATH), a household-based, nationally representative, longitudinal cohort study of 45,971 youth (age 12-17) and adults (> 18) in the U.S. We investigated prevalence of cigarette smoking and dual use of cigarettes/e-cigs in pregnant women ($n=386$). Among current cigarette smokers, we also compared cigarette only versus dual users on sociodemographics, current tobacco smoking, and history of quit attempts. **RESULTS:** 12.4% ($SE=1.6\%$) of pregnant women reported current cigarette smoking, of which 71.9% ($SE=4.7\%$) used cigarettes only and 28.1% ($SE=4.7\%$) were dual users. The groups did not differ on sociodemographics. There was a trend for more dual users than cigarette smokers to report attempting to quit smoking completely in the

past year (40.6%, $SE=10.9\%$) (21.3%, $SE=5.3\%$) ($p=0.1$), and for fewer dual users than cigarette smokers to report reducing instead of quitting (4.1%, $SE=4.2\%$ vs. 19.4%, $SE=4.9\%$, $p=.07$). Dual users smoked tobacco cigarettes on significantly more days in the past month than users of cigarettes only ($M=28.6$, $SE=0.6$ vs. $M=25.4$, $SE=1.3$, $p=25\%$) in pregnant cigarette smokers. Although trend-level evidence indicated that dual users may be more interested in complete abstinence than tobacco cigarette only users, dual users smoked on more days and did not differ from cigarette smokers on indicators of nicotine dependence. It will be important for future research to dissociate reduction or cessation outcomes based on specific patterns of e-cig use and to examine the consequences on the developing fetus.

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PA8-3

POSTPARTUM CHANGES IN MOOD AND SMOKING-RELATED SYMPTOMATOLOGY: AN INVESTIGATION USING ECOLOGICAL MOMENTARY ASSESSMENT

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Pregnancy is a strong motivator for smoking cessation. However, the majority of women relapse soon after childbirth. Mood and breastfeeding are significantly associated with postpartum smoking relapse, though less is known about the temporality of these relationships. Therefore, using an ecological momentary assessment (EMA) protocol, we sought to investigate how mood and smoking-related symptomatology changes in relationship to three events: childbirth, discontinuation of breastfeeding, and smoking relapse. Eligible participants self-reported smoking abstinence for at least one month with a history of ≥ 5 cigarettes/day prior to pregnancy. At 36 weeks gestation participants begin EMA data collection, which continued until 12 weeks postpartum. EMA included depression (the Edinburgh Postnatal Depression Scale; weekly) and positive affect, negative affect, physical symptoms, craving and withdrawal (Subjective State Scale; daily). Participants also reported childbirth, breastfed and smoking via the EMA program. Linear mixed models were used to assess for a difference in mood in relation to the three events. Participants ($n=46$) were, on average, 26.5 \pm 5.2 years old and smoked 10.1 \pm 4.5 cigarettes per day prior to pregnancy. Compared to during pregnancy, during postpartum there were significant increases in craving ($\beta=0.17\pm0.06$, $p<0.01$) and positive affect ($\beta=0.29\pm0.06$, $p<0.01$) whereas decreases occurred in withdrawal ($\beta=-0.24\pm0.04$, $p<0.01$) and negative affect ($\beta=-0.45\pm0.05$, $p<0.01$). Compared to while breastfeeding, after the discontinuation of breastfeeding craving significantly increased ($\beta=0.33\pm0.10$, $p<0.01$) whereas all other items significantly decreased ($p<0.03$). Compared to before postpartum smoking relapse, after relapse significant increases were noted in craving ($\beta=0.77\pm0.12$, $p<0.01$), positive affect ($\beta=0.21\pm0.08$, $p=0.02$), and physical symptoms ($\beta=0.17\pm0.06$, $p=0.01$). While withdrawal and negative affect consistently declined during the postpartum, cigarette craving significantly increased following childbirth, discontinuation of breastfeeding and postpartum smoking relapse. These data can be used to inform innovative postpartum relapse prevention interventions.

FUNDING: Support for this project was provided by the R21DA034840 and the Building Interdisciplinary Research Careers in Women's Health Grant (K12HD055887; A. Allen) from the Eunice Kennedy Shriver National Institutes of Child Health and Human Development (NICHD), the Office of Research on Women's Health, and the National Institute on Aging, NIH, administered by the University of Minnesota Deborah E. Powell Center for Women's Health.

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PA8-4

PREDICTORS OF POSTPARTUM SMOKING RELAPSE INTENT IN A SAMPLE OF ROMANIAN WOMEN

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SIGNIFICANCE: The majority of pre-pregnancy smokers who quit during pregnancy relapse early in the postpartum period. This study aims to explore the predictors of postpartum smoking relapse intent in a sample of Romanian women who quit six months before pregnancy or in the first pregnancy trimester. **METHODS:** Data was collected cross-sectionally between November 2013 and May 2016 from 389 postpartum women in the first week following delivery, using a paper-based questionnaire. Variables of interest include sociodemographics, smoking relapse intent at six months postpartum, heaviness of smoking prior to quitting, smoking abstinence self-efficacy, level of perceived partner support for smoking cessation (Partner Interaction Questionnaire), and the presence anxiety (General Anxiety Disorder scale), depression (Edinburgh Postnatal Depression Scale) and stress (Perceived Stress Scale) symptoms. Descriptive statistics and logistic regression were employed to address the aim of the study. **RESULTS:** The mean age of the women enrolled in the study was 30.85 years (SD=4.52), 89% of them being of Romanian ethnicity. Our sample was highly educated, 57% of the women having undergraduate, graduate, or postgraduate studies. In terms of reproductive history, 60% of women in the sample were at their first pregnancy. Approximately 23% of women reported intentions to resume smoking six months after birth. Reporting high stress levels in the last month prior to filling out the study questionnaire increased the odds of relapse intent at six months postpartum by 3.9 times (CI: 1.34-6.12; $p=.009$). Other variables predicting relapse intent were having a smoker partner (OR: 2.4; CI: .96-6.12; $p=.061$) and reporting low smoking abstinence self-efficacy (OR: .816; CI: .76-.87; $p=.000$) and low assigned importance to remaining quit (OR: .72; CI: .58-.88; $p=.002$). Level of perceived partner support for smoking cessation did not bring any contribution to the regression model. **CONCLUSIONS:** Our findings suggest that interventions designed to prevent postpartum smoking relapse should focus on reducing perceived stress levels in women and on improving their smoking abstinence self-efficacy.

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PA8-5

HOW INCENTIVE PROGRAMS FOR PREGNANT INDIGENOUS WOMEN TO QUIT CHANGE IN PRACTICE.

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Incentives to abstain from smoking, in the form of retail vouchers and gift-packs of product, had efficacy promise in trials with Indigenous pregnant women. We evaluated two programmes, funded by the New Zealand (NZ) Ministry of Health, to use incentives to boost enrolment of Indigenous pregnant women in quitting and abstinence rates in real-life settings. One programme was designed and implemented by a Maori (Indigenous NZ people) health provider (MHP) in Palmerston North, a major sized town in central New Zealand. The other was designed by a District Health Board (DHB) in New Zealand's largest urban centre, Auckland. Both projects considered design recommendations from incentive research literature. For example, the DHB initially wanted to use gift-packs of product as the incentive but DHB accounting procedures were prohibitive. Retail vouchers were administratively easier to give out to clients. Our previous research had warned that negative attitudes held by midwives towards women who smoke in pregnancy could be a barrier to recruitment. To overcome this, the MHP appointed a Midwife Enabler and midwife leadership group. Service records showing number of referrals, conversion into enrolment and abstinence rates were audited. Semi-structured qualitative interviews with referrers and programme personnel were also conducted. Both programmes appeared to experience slower and lower enrolment of Maori pregnant women than expected, consistent with the experience of trials. Respectable results were obtained for those enrolled, but to obtain the target number of participants, the MHP programme opened up recruitment to non-Maori. Non-Maori participants had higher quit rates distorting the apparent success of the programme for Maori. The DHB programme suffered from low numbers of

referrals from midwives, and poor conversion into enrolment as found in trials. Though enjoyed by staff and clients, the DHB programme was discontinued due to government realignment of cessation services across the country. Innovative interventions are needed and should be trialled. If effective there is an expectation that proven concepts will be transferred into practice. There are however real-life practice and environmental constraints that may prohibit implementation of the effective components of proven interventions. Barriers to efficacy identified at trial can also be replicated in real-life if not adequately countered.

FUNDING: Te Wakahuia Manawatu Trust & Waitemata DHB

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PA8-6

THE INFLUENCE OF PARTNER'S SMOKING ON FACTORS ASSOCIATED WITH INTENTION TO QUIT SMOKING AMONG PREGNANT SMOKERS ENROLLED IN A CESSATION INTERVENTION TRIAL

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SIGNIFICANCE: Pregnant women who smoke is a priority group for cessation. Studies of factors associated with quitting have mainly focused on the woman's characteristics and have failed to consider the smoking status of the woman's romantic partner. Guided by the Theory of Planned Behavior, this study tested whether partner's smoking status moderated the effects of attitudes, perceived norms, and self-efficacy on intention to quit smoking among a sample of pregnant women who enrolled in a smoking cessation intervention trial in a U.S. state with a high rate of smoking during pregnancy. **METHODS:** The women (N=289) were recruited to the study upon self-reporting cigarette smoking during their first prenatal care visit. Clinic staff referred potentially eligible women to study staff who then confirmed eligibility and enrolled them in the study. Multiple linear regression was used to test attitudes, perceived norms, self-efficacy, and partner's smoking as predictors of intention to quit smoking. In addition, we tested the effects of the two-way interactions between partner's smoking and attitudes, perceived norms, and self-efficacy on intention. **RESULTS:** Self-efficacy (Standardized Beta=.537, $p<.001$) and perceived norms (Standardized Beta=.193, $p<.001$) were significantly associated with intention to quit smoking, but there were no effects of attitudes and partner's smoking. The main effect of perceived norms on intention was modified by an interaction with partner's smoking ($p=.01$). Probing of this interaction revealed that the association between perceived norms and intention was significant for women with a smoking partner ($p<.001$) but not for women with a non-smoking partner ($p=.89$). **CONCLUSIONS:** These findings suggest that cessation interventions for pregnant women who smoke should focus on increasing self-efficacy to quit. In addition, perceived norms can be a useful target for change, but only for women whose romantic partners also smoke cigarettes.

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PODIUM PRESENTATION 4

PAPER SESSION 9: TOBACCO PRODUCT HEALTH WARNINGS

PA9-1

OVER-TIME IMPACTS OF NOVEL PICTORIAL HEALTH WARNING LABELS AND THEIR DIFFERENCES ACROSS SMOKER SUBGROUPS: RESULTS FROM SMOKERS IN AUSTRALIA AND CANADA

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BACKGROUND: In 2012, both Canada (CA) and Australia (AU) introduced new larger sized pictorial health warning labels (HWLs). In CA, the new HWLs increased in size from 50% to 75% on both front and back of cigarette packs and included pack inserts with complementary cessation messages. In AU, the HWL size increased from 30% to 75% on front of packs and plain packaging was simultaneously implemented. This study examines smokers' responses to new pictorial HWLs over the post-implementation period, focusing on differences in trends across key smoker subgroups. **METHODS:** Data were collected from online panels in AU (Jan 2013 – Sept 2014) and CA (Sept 2012 to Sept 2014), with 1,000 adult smokers surveyed in each country every four months. Data were pooled across countries, and generalized estimating equation regression models estimated HWL responses (i.e., attention to HWLs; cessation-related cognitive responses to HWLs; forgoing cigarettes due to HWLs) on time (i.e., survey wave), followed by assessment of interactions between time, country, and key cessation predictors (i.e., smoking intensity, quit intentions, recent quit behavior, self-efficacy to quit). **RESULTS:** In CA, unlike AU, attention to HWLs decreased significantly while cognitive reactions increased over time ($p < 0.05$ for both). Forgoing cigarettes due to HWLs increased significantly in both countries ($p < 0.01$). Temporal changes in cognitive responses and forgoing cigarettes were unassociated with smokers' smoking intensity, quit intentions & recent quit behavior. In both countries, smokers with higher self-efficacy showed a greater increase in forgoing cigarettes over time compared to smokers with low self-efficacy ($p < 0.01$); unique to AU, smokers with relatively higher self-efficacy had a greater increase in attention and cognitive responses over time ($p < 0.001$ for both outcomes). **CONCLUSIONS:** Novel HWL policies in AU and CA appear effective in staving off wearout over a two-year post-implementation period, with few differences between key smoker sub-groups. In Canada, package inserts with efficacy enhancing messages might have helped smokers with low self-efficacy to sustain cessation-related cognitive responses to HWLs.

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PA9-2

MONITORING COMPLIANCE OF CIGARETTE PACK GRAPHIC HEALTH WARNING LABELS THREE MONTHS AFTER IMPLEMENTATION OF INDIA'S NEW HEALTH WARNING LABELS LAW

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SIGNIFICANCE: The purpose of this pilot study was to monitor the level of compliance with India's new health warning label (HWL) law after 3 months of implementation. Starting April 1, 2016, cigarette packs must meet new HWLs requirements: (1) Graphic and text, (2) Message stating: "WARNING Smoking causes throat cancer", (3) Coverage of 85% of the principal display area (PDA), (4) Minimum size of 3.5 cm (w) x 4 cm (h), (5) Located on front & back of the pack, (6) Located on the top of the pack, (7) Text in 1 or 2 languages (English, Hindi and/or a local Indian language), and (8) Complete visibility, HWLs cannot be covered in any manner

when the pack is sealed or opened. **METHODS:** A monitoring compliance study was conducted in eight cities in India (Tiruvananthapuram, Bengaluru, Guwahati, Jaipur, Srinagar, New Delhi, Hyderabad, and Kolkata) in July 2016. A convenience sample ($n=786$) of cigarette packs was purchased from 24 brands of four tobacco companies (Indian Tobacco Company, Godfrey Phillips India, NTC Industries, and VST Industries) at three vendor types (tobacco specialist, kiosk, and small grocery store). A questionnaire was developed to assess compliance with the following HWLs requirements: type, message content, location (front & back, and top of the pack), size (% of the PDA and minimum size), language, and visibility of the HWLs. **RESULTS:** 67% of the packs were found to be fully compliant with the HWLs requirements. Most cigarette packs were compliant with the HWL requirements of visibility (98%) and language (94%). Almost three quarters of the cigarette packs (73%) were compliant with the minimum size of the HWLs. More than two thirds of the packs (68%) were compliant with five HWLs requirements: graphic, text content, location (front & back), location (top of the pack), and size (% of the PDAs). The level of full compliance varied across all cities. Guwahati had the highest (90%) and Srinagar the lowest (53%). At least one pack from all 24 cigarette brands purchased were in full compliance. **CONCLUSIONS:** Authorities should enforce the implementation of the new HWL law across India to achieve full compliance with all cigarette labeling requirements.

FUNDING: Bloomberg Initiative to Reduce Tobacco Use

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PA9-3

CHARACTERIZING SOCIAL INTERACTIONS ABOUT PICTORIAL WARNINGS ON CIGARETTE PACKS

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SIGNIFICANCE: Social interactions are a key mechanism through which health communication efforts, including pictorial cigarette pack warnings, may exert their effects. Interactions may offer smokers the opportunity to think more deeply about the messages. However, researchers are only beginning to study social interactions in the context of pictorial cigarette pack warnings. **METHODS:** We aimed to describe social interactions about cigarette pack warnings reported by 2,149 US adult smokers who participated in a randomized controlled trial. Participants were randomly assigned to have their cigarette packs labeled with pictorial or text-only warnings for four weeks, and they completed surveys during the baseline visit and each of the subsequent four weekly visits. **RESULTS:** During the first week of the study, smokers with pictorial warnings on their packs talked about the warnings with other people on more occasions than those with text-only warnings (mean occasions = 3.27 v. 1.84, $p < .01$), and this pattern continued in the subsequent weeks. Throughout the study, the most common conversation partners were friends (82% pictorial vs. 75% text-only, $p < .05$), spouses/significant others (41% vs. 41%, ns), and other family members (44% vs. 35%, $p < .05$). Smokers in the pictorial warning arm were more likely than those in the text-only arm to discuss the health effects of smoking (74% vs. 68%, $p < .05$), whether the warnings would make them want to quit (75% vs. 60%, $p < .05$), and whether the warnings would make others want to quit (64% vs. 45%, $p < .05$). Pictorial warnings were more likely than text-only warnings to be described as scary (70% vs. 41%, $p < .05$), gross (58% vs. 10%, $p < .05$), or depressing and gloomy (51% vs. 24%, $p < .05$) during conversations. **CONCLUSIONS:** Pictorial warnings sparked more conversations about the warnings, the health effects of smoking, and quitting smoking than text-only warnings. These social interactions may extend the reach of pictorial warnings beyond the targeted smoker. Future research is needed to examine whether social interactions operate as a mediator of the effects of warnings on smoking-related beliefs and behaviors.

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PA9-4

LONGITUDINAL EFFECT OF EMOTIONAL GRAPHIC WARNING LABELS ON THE BRAIN

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SIGNIFICANCE: The Food and Drug Administration (FDA) proposed to place graphic warning labels (GWLs), which consists of a textual warning and an image depicting negative health consequences of smoking, on cigarette packs. The implementation of GWLs has been delayed by tobacco companies' legal action. They argued that the emotional images comprising GWLs encroach on their 1st Amendment rights. The court opined that the FDA's evidence is not strong enough to support the inclusion of these emotionally salient images in GWLs. Previous studies show that GWL rated high on emotional reaction (ER) had greater brain and behavioral impact on adult smokers than these ones rated low on ER. However, it is unknown whether these effects could wear off after repeated exposure. **METHODS:** 20 non-treatment-seeking smokers (6 females, 27.29 ± 8.61 years old, 13.47 ± 5.92 cigarette per day, Mean ± SD) were randomly assigned to either High ER or Low ER groups and were exposed to high or low ER GWLs respectively for 4 weeks. Before and after the 4-week exposure, participants' brain response to GWLs was measured using magnetic resonance imaging (MRI), their memory of GWL and perceptions of the harmful effects of smoking were also assessed. **RESULTS:** At baseline, High ER group showed greater right amygdala response to GWLs than Low ER group ($p < 0.0005$), and showed no difference in the right middle frontal gyrus ($p = 0.19$), right inferior frontal gyrus ($p = 0.11$) and bilateral precuneus (left: $p = 0.34$; right: $p = 0.55$). After 4-week exposure, High ER group showed greater brain activation in the right middle frontal gyrus ($p = 0.002$), right inferior frontal gyrus ($p = 0.002$) and bilateral precuneus (left: $p = 0.05$; right: $p = 0.002$). Recall performance improved after 4-week exposure ($p = 0.015$) and High ER group always performed better than Low ER group ($p = 0.012$). No change in risk perception of smoking was observed ($p = 0.144$). **CONCLUSIONS:** Brain response to high ER GWLs decreased in the brain regions associated with emotion regulation and increased in the regions associated with decision making and planning after 4-week exposure. Recall of both high and low ER GWLs was improved after repeated exposure, with high ER GWLs recalled better than the low ones. These data provide an experimental platform for further research and implementation of science-based tobacco product's labeling and marketing.

FUNDING: National Institute on Drug Abuse

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PA9-5

CHARACTERISTICS OF WARNING STATEMENTS PRINTED ON ELECTRONIC CIGARETTE LIQUID BOTTLES MANUFACTURED AND DISTRIBUTED IN THE UNITED STATES

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SIGNIFICANCE: The regulation of tobacco product packaging and labeling can be critical to protecting the public from the harms of tobacco. This study examined the content of warning statements on electronic cigarette (e-cigarette) liquid bottles using a national sample collected prior to the U.S. Food and Drug Administration's regulation of e-cigarettes in 2016. **METHODS:** Research staff randomly selected four e-cigarette liquid manufacturers/distributors from four U.S. geographic regions. Staff documented the characteristics of product packaging and content of warning statements on 147 e-cigarette liquids (0-24 mg/ml of nicotine) purchased online from 16 manufacturers/distributors in April of 2016. **RESULTS:** Descriptive data showed that 97.9% of the samples included a warning statement on e-cigarette liquid bottles using print less than 12-point font size. The term "warning" was used on 33.3% and "caution" used on 6.1% of the bottles. A total of 19 types of warning statements were identified. The most common warning statements printed on bottles were to keep the product away or out of reach from children (87.7%) or pets (69.3%). Only 22.4% of bottles used a warning statement that indicated that the "product contains nicotine" and 31% stated that the product "may contain

nicotine", although 67.0% of the samples contained nicotine. None of the statements that indicated that the product contained nicotine stated that nicotine was "addictive" and 6.1% stated that nicotine was habit forming. Nearly 60% of the statements on bottles indicated that the person must be at least aged 18 to purchase or that the product was intended for persons of legal age only. A statement that warned consumers about reproductive harms or harm to pregnant women was found on 22.4% of bottles in the sample. **CONCLUSIONS:** Most manufacturers/distributors printed a warning statement on e-cigarette liquid bottles, but statements avoided warning consumers about the presence of and the addictiveness of nicotine. To further inform tobacco product regulation in the U.S., studies are needed to examine manufacturer/distributor modifications of warning statements on product packaging and how packaging may influence consumer behaviors.

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PA9-6

EVALUATION OF WAYS TO COMMUNICATE HARMFUL AND POTENTIALLY HARMFUL CONSTITUENTS (HPHC) INFORMATION ON PRODUCT INSERTS: A DISCRETE CHOICE EXPERIMENT

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SIGNIFICANCE: The US FDA has regulatory authority to use tobacco product inserts (i.e., small printed leaflets) to communicate with consumers about harmful and potentially harmful constituents (HPHCs) in tobacco products. However, little is known about the most effective manner for presenting HPHC information to promote consumer understanding of HPHCs and their associated risks. **METHODS:** In a discrete choice experiment, participants evaluated 8 choice sets that included two cigarette packages from different brand families (Marlboro, Pall Mall, Camel, or Basic) and tar levels ("full-flavor" or "light"). Each pack was accompanied by an insert containing experimentally manipulated HPHC information; i.e., between-subject: (i) listing of HPHCs vs. grouping by disease outcome, and (ii) numeric values ascribed to HPHCs vs. no numbers; within-subject: statement linking HPHCs with disease vs. statement of smoking causing disease. For each choice set, participants were asked: (1) which product would be more harmful, and (2) which insert would motivate them to quit; each with a "no difference" option. Latent class models regressed choice on pack, insert, and participant characteristics. **RESULTS:** 1212 participants were recruited from an online consumer panel provider and included: 725 18-29 year-old smokers and susceptible nonsmokers; 487 30-64 year-old smokers. Participants were more likely to endorse "full-flavor" products as more harmful than "light" products when numeric HPHC information was present. Participants were more motivated to quit with the presence of a statement linking HPHCs with disease and with the presence of numeric HPHC information. Grouping of HPHCs by disease category (vs. simple listing of HPHCs) did not have a significant impact on perceived harm and motivation to quit. **CONCLUSIONS:** Numeric HPHC information on inserts appears to produce misunderstandings of reduced risk for "light" cigarettes. Furthermore, short narratives that link HPHCs to smoking-related disease may promote cessation better than HPHC communications that do not provide an explicit link to disease.

FUNDING: Grant/R01 CA167067/ Building evidence for effective and sustainable cigarette warning label policy (PI: Thrasher).

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PAPER SESSION 10: ATTITUDES TOWARDS SECONDHAND EXPOSURE POLICIES

PA10-1

HOUSEHOLD SMOKING BANS AND YOUTH SMOKING BEHAVIOUR IN ITALY: FINDINGS FROM THE SIDRIAT LONGITUDINAL STUDY

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SIGNIFICANCE: The Italian nationwide smoking ban entered into force in 2005 partially contributed in increasing the adoption of household smoking bans (HSB). Aim of this study was to determine whether youths living with HSB were more likely to develop antismoking attitudes and less likely to progress to smoking. **METHODS:** we conducted a longitudinal, 12-year, 2-wave study on a sample of 3,091 Italian youths aged 6-14 years in 2002; 1,763 (57%) were re-interviewed in 2012-2014. We used logistic regression to investigate HSB effects on youth anti-smoking attitudes and smoking behaviours. **RESULTS:** Youths living with HSB significantly increased from 60% at baseline to 76% at follow-up ($p < 0.001$), particularly those living with ≥ 1 smoking parent (from 22% to 47%, $p < 0.001$). Youths with no HSB at baseline were more likely to become established smokers at follow-up (OR=2.15; 95%CI=1.47-3.14), even with smoking parents (OR=1.83, 95%CI=1.09-3.10). Youths with HSB at baseline but no HSB at follow-up were more likely to become experimenters or established smokers compared to youths with HSB in both waves (OR=1.86, 95%CI=1.23-2.81; OR=2.38, 95%CI=1.52-3.73, respectively). The effect was greater in youths with no HSB in both waves (OR=1.67; 95%CI=1.01-2.76, OR=5.85; 95%CI=3.35-10.24, respectively), as if there was a dose-response relationship. Moreover, youths with no HSB in both waves were more likely to overestimate adult smoking prevalence (OR=2.14; 95%CI=1.39-3.29), and to consider smoking as social acceptable (OR=1.81; 95%CI=1.04-3.15). **CONCLUSIONS:** HSBs recorded in 2002 had a significant impact in protecting youths from becoming established smokers in the 10-12 subsequent years, even in homes with smoking parents.

FUNDING: This work has received financial support from the Istituto Toscano Tumori (grant proposal 2008).

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PA10-2

VALIDITY OF REPORTED MEASURES OF SECONDHAND SMOKE EXPOSURE IN INDIAN HOUSEHOLDS: MISHRI PREPARATION A POTENTIALLY OVERLOOKED SOURCE IN LOW-INCOME INDIAN COMMUNITIES

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SIGNIFICANCE: Self-reported measures and questionnaires are the most commonly used methods for assessing secondhand smoke (SHS) exposure. As there is limited evidence validating reported measures for SHS exposure in India, which has the second highest number of smokers in the world, we compared reported exposure to SHS in low-income Indians to household air and hair nicotine concentrations. **METHODS:** Structured questionnaires were administered to caregivers of children less than 5 years of age and to adult women (> 18 years). Household air and hair samples were taken for nicotine analysis. **RESULTS:** In total, 141 households of 70 pediatric and 71 adult participants were included. Participants primarily resided in unplanned, low-income urban communities ($n=63$, 45%). Air nicotine was detected in 72 (51%) of the homes, and 35 (75%) pediatric participants and 12 (56%) adult participants had detectable hair nicotine. Correlation between air and hair nicotine was statistically significant in children ($r = 0.48$, $p = 0.0002$), but

no association was found in adults ($r = -0.12$, $p = 0.57$). In all participants, poor correlation was found between self-reported measures of exposure and both air and hair nicotine values. No questions were significantly correlated with hair nicotine levels, and the highest magnitude correlation with air nicotine was found for how often someone smoked inside the home in adults ($r = 0.42$, $p = 0.10$) and for reported preparation of mishri, a smokeless tobacco product prepared by roasting on a hot metal plate, in the home for child participants ($r = 0.40$, $p = 0.39$). The highest value for sensitivity using air nicotine as the gold standard was for whether or not people smelled other families preparing mishri on at least a weekly basis (47%; 95% CI: 31 – 62) and reporting preparing mishri in their homes (50%; 95% CI: 19 – 81). Overall, 39 (41%) of participants reported smelling people prepare mishri on at least a weekly basis. **CONCLUSIONS:** We report high levels of SHS exposure, but poor validity of questions assessing exposure. A high proportion of participants reported exposure to mishri preparation, which was more highly associated with air and hair nicotine than many traditional exposure questions. More appropriate questions for this population are needed, including mishri preparation as a source of SHS exposure.

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PA10-3

KIDS SAFE AND SMOKEFREE: PARENTS' SELF-EFFICACY, NOT COPING SKILLS OR HOME SMOKING RESTRICTIONS, MEDIATES COUNSELING TREATMENT EFFECTS ON LOW-INCOME PARENTS' SMOKING CESSATION

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SIGNIFICANCE: Parental smoking is a significant public health problem for both parents and children in low-income populations. Understanding behavioral mechanisms of treatment effects on smoking outcomes is essential to improving treatment impact. Parental smoking cessation is the final goal in harm reduction programs designed to reduce children's tobacco smoke exposure (TSE). In a recently completed randomized trial testing the efficacy of a multilevel intervention to reduce child TSE (primary aim), parents' cessation was a secondary aim. Previous analyses showed that parents receiving our EHR-facilitated pediatrics intervention (Ask, Advise, Refer [AAR] + proactive phone counseling) had higher 7-day point prevalence quit rates at 3 month follow-up compared to standard treatment (AAR+attention control). **METHOD:** The present study assessed hypothesized mediators using path analysis to explain intervention effects on quit rates. All analyses adjusted for 15 potential confounds and used robust standard errors accounting for clustering within clinics. Mediators reflected primary intervention goals: increasing home smoking restrictions with child TSE protections, enhancing urge coping skills, and boosting cessation self-efficacy. **RESULTS:** Parents ($n=327$) were 83% female, 83% African American, 79% below poverty line and had a mean age=33 years old. Complete case data generated results that were similar to intent to treat analysis, indicating that the direct effect of the intervention on quit status was statistically significant ($.120$, $p = .019$), as was the total model effect ($.212$, $p < .001$). The intervention had a significant effect on urge coping, smoking restrictions and self-efficacy (all $p < .001$). However, only the mediated effect of self-efficacy was statistically significant ($.080$, $p < .001$). The mediated effects of urge coping ($p = .472$) and smoking restrictions ($p = .923$) were not significant. **CONCLUSIONS:** The multilevel intervention promoted greater likelihood of parents' quit success compared to the standard treatment, perhaps by boosting parents' confidence in quitting. Interestingly, the influence of parents' self-efficacy in quitting smoking may supersede the influence of home policies restricting indoor smoking (stimulus control) and coping skills - both hallmarks of behavioral inter-



ventions for smoking cessation. Study limitations and future directions guided by these results will be discussed.

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PA10-4

PREDICTORS OF AFFORDABLE HOUSING RESIDENTS' SUPPORT FOR A SMOKING BAN, PRE- AND POST-ADOPTION

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BACKGROUND: Smoking rates among communities of low socioeconomic position (SEP) remain substantially higher than the general population. The introduction of smoke-free laws in public housing and multi-unit housing settings may provide a strategy to promote cessation and denormalize smoking among low SEP communities. The U.S. Department of Housing and Urban Development (HUD) has proposed a rule to make indoor areas of public housing properties smoke-free. Successful implementation of this policy may depend on enhancing resident support for the policy. To tailor future implementation strategies, this study assessed the attitudes of residents living in affordable housing, pre- and post-adoption of a smoke-free policy. **METHODS:** Residents (n=70 smokers; n=168 non-smokers) of 12 affordable housing developments in 4 eastern US states were surveyed immediately prior to, and six months after the adoption of a smoking ban. Differences in proportions of respondents who supported vs. not supported the ban were assessed pre- and post-adoption using Fisher's exact test. Multiple logistic regressions were used to assess factors associated with support. **RESULTS:** At baseline, only 25.4% of smokers supported the ban, compared with 82.7% of non-smokers. The proportions of smokers and non-smokers who supported the ban did not change significantly ($p>0.3$) after implementation (29.5% of smokers vs. 78.6% of non-smokers). In crude analyses, unemployed respondents had lower odds of supporting the policy compared to employed respondents (OR = 0.16; $p=0.001$). These findings held in adjusted analyses (OR = 0.22; $p=0.021$), which controlled for smoking status, gender, number of children in the household, level of education and race. **CONCLUSIONS:** Non-smokers expressed greater support for a smoke-free policy compared with smokers, with little change in attitude after implementation. The findings suggest that future implementation strategies must be targeted to the needs of different residents, including smokers and non-smokers, as well as unemployed residents who may encounter difficulty complying with a ban owing to more time spent in their homes.

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PA10-5

THE EFFECT OF A SMOKING BAN IN CASINOS ON ADMISSIONS AND REVENUE

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BACKGROUND: While state smoke-free air laws have proliferated across the United States over the past 15 years, many of these state laws have exemptions for smoking in casinos. Moreover, casinos operated by American Indian tribes on tribal lands are exempt from state smoke-free laws. Concern about potential lost revenue if the casinos go smoke-free is often a rationale for not adopting those policies. In order to assess the impact of smoke-free policies on casino revenue, we examined the effects of the Smoke-Free Illinois Act on casino admissions per capita and real per capita adjusted gross receipts revenues. **METHODS:** We explored the potential of assessing changes in revenue when a tribally-owned casino went smokefree, but we were not able to obtain those data. However, we were able to examine data from monthly gaming commission reports for the states of Illinois, Indiana, Missouri, and Iowa for the period January 1998 – September 2015 in order to assess real per-capita adjusted gross receipts and admissions per-capita in Illinois (where smoking was banned) relative to the other states. **RESULTS:** A positive and significant relationship was found between the number of electronic gaming devices and both casino admissions per capita and per capita adjusted gross receipts. Similarly, a positive relationship was found between the number of

table games and both per-capita casino admissions and per-capita adjusted gross receipts. However, the Smoke-free Illinois Act was found to be a statistically insignificant determinant of per capita casino admissions and was found to be a statistically insignificant determinant of real per-capita gross adjusted receipts in all the models we estimated. **DISCUSSION:** Our analyses clearly indicate that the Illinois law that banned smoking in casinos has had no significant negative economic consequences for the casinos in terms of per-capita admissions or revenues. While this study did not focus on tribally owned casinos, the results suggest that banning second-hand smoke will not damage casino revenues. Additional analyses are needed to replicate this work with tribally owned casinos in order to have the best possible generalizability.

FUNDING: National Cancer Institute

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PA10-6

RESTRICTIONS ON THE USE OF E-CIGARETTES IN PUBLIC AND PRIVATE PLACES - CURRENT PRACTICE AND SUPPORT AMONG ADULTS IN GREAT BRITAIN

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BACKGROUND: Debates around policies regulating the e-cigarette use make it important to obtain an overview of current practice, people's attitudes and correlates of policy support. Aims were to assess i) current practices for e-cigarette use in homes and workplaces; ii) characteristics associated with allowing e-cigarette use in the home; iii) level of, and characteristics associated with, support for extending smoke-free legislation to include e-cigarettes. **METHODS:** Online survey in 2016, n=11389 adults in Great Britain. All measures were described; multivariable logistic regressions of allowing e-cigarette use in homes and support for extension of legislation onto age, gender, socio-economic status, voting intention, smoking and e-cigarette use status, perception of risk of smoking due to nicotine and perceived harm of e-cigarettes relative to cigarettes. **RESULTS:** Most (79%) reporting on workplace policies reported some level of restrictions on e-cigarette use. Small majorities would not allow e-cigarette use in their home (58%) and supported an extension of smoke-free legislation (52%; 21% opposed). Associations were similar across both outcomes; likelihood of allowing use was lower and likelihood of supporting an extension higher among men, respondents from a higher socio-economic status, ex-smokers, never-smokers, non-users of e-cigarettes and respondents with increased perceived relative harm of e-cigarettes or nicotine (all $p<0.001$). **CONCLUSION:** In Great Britain, the majority of workplaces appear to have policies restricting e-cigarette use. Over half of adults would not allow use of e-cigarettes in their home and support prohibiting the use of e-cigarettes in smoke-free places. Adjusting for socio-demographics, more restrictive attitudes are more common among never-smokers, never-users and those with increased perception of relative harms of e-cigarettes or nicotine as cause of smoking-related illness.

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SRNT NOTES

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PODIUM PRESENTATION 5

PAPER SESSION 11: PUBLIC EDUCATION CAMPAIGNS

PA11-1

OUTCOME EVALUATION RESULTS FOR FDA'S THE REAL COST CAMPAIGN: IMPACT ON YOUTH'S RISK PERCEPTIONS, BELIEFS ABOUT SMOKING AND SMOKING BEHAVIORS

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SIGNIFICANCE: This paper will provide an overview of data-driven approaches to examining the impact of campaign exposure on changes in youth smoking perceptions, beliefs and behaviors. In February 2014, the U.S. Food and Drug Administration's (FDA's) Center for Tobacco Products launched *The Real Cost*, the first of several complementary national public education campaigns designed to prevent and reduce tobacco use among U.S. youth aged 12 to 17. Initial campaign advertising under *The Real Cost* was designed to prevent the initiation of cigarette smoking among youth who have never smoked but are susceptible to smoking and to discourage further smoking among youth who have experimented with smoking in the past. **METHODS:** We examined longitudinal data from youth (n=1,680) who had experimented with or were susceptible to future cigarette smoking in 75 U.S. media markets. Respondents completed surveys at baseline and three follow-ups 5 to 8 months apart. We performed descriptive analyses of aggregate changes in beliefs and logistic regressions to examine the association between campaign exposure and beliefs. Exposure was measured by self-reported frequency of exposure and target rating points. **RESULTS:** Levels of agreement with campaign-targeted beliefs increased from baseline to first and second follow-ups, with a mean relative increase of 10.4% and 11.5%. Self-reported and exogenous measures of campaign exposure were positively associated with increased odds of agreeing with 5 of 8 campaign-targeted beliefs. Exposure was not significantly associated with 12 of 14 non-targeted tobacco-related beliefs. Updated longitudinal data will be shared that show to what extent *The Real Cost* exposure is associated with reduced susceptibility for initiation or progression to established smoking. To assess behavioral impact, evaluation data rely on exogenous differences in exposure across youth and associations with changes in youth smoking. Data from models will be shared that examine *The Real Cost*'s impact on two transition points: 1) 'Never smoker not susceptible to smoking' to 'never smoker susceptible to smoking'; and 2) 'Never smoking' to 'tried smoking'. **CONCLUSIONS:** A sustained national tobacco public education campaign can change population-level perceptions of tobacco-related harms and may also impact smoking related behaviors among youth.

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PA11-2

DIGITAL EXPOSURE TO ANTI-SMOKING MESSAGING AND SMOKING-RELATED ATTITUDES AND INTENTIONS TO SMOKE

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SIGNIFICANCE:

The digital realm is a new channel for exposure to anti-tobacco advertising campaigns. There is currently no evidence assessing whether such exposure impacts campaign-targeted attitudes or smoking intentions. Advances in online tracking technology enable new methods for measuring objective exposure to anti-tobacco ads on digital platforms. This study utilizes a new tracking methodology to evaluate the impact of exposure to truth® youth anti-smoking campaign ads among youth and young adults. **METHODS:** A probability-based nationally representative cohort

aged 15-21 was surveyed online every 6 months for 4 waves. Respondents consented to have cookies placed on their digital device to objectively track exposure to online truth® ads. We examined two samples: a full sample of respondents with data at all 4 waves (n= 7,477) and a refined sample who reported at all 4 waves that the device used for tracking was their own personal device (n= 2,872). Multivariate logistic regressions analyses examined campaign attitudes and smoking intentions as a function of objective exposure to ads, adjusting for demographics, baseline scores on the outcome, brand awareness and self-reported online awareness of truth® ads. Objective exposure was calculated as none (0 contacts), moderate (1-5 contracts) or high (> 5 contracts). **RESULTS:** Respondents with high exposure had significantly higher agreement with campaign-targeted attitudes (i.e., wanting to join an anti-tobacco social movement) than those not exposed among the full and refined samples (b= 0.094; CI: 0.025, 0.159; and b=0.104; CI: 0.008, 0.200, respectively). Among the full sample, those with moderate exposure had a significantly lower odds of intending to smoke (OR=0.55; 0.342, 0.892) than those not exposed. **CONCLUSIONS:** This study presents the first evidence linking objectively measured digital exposure to individual-level changes in smoking attitudes and intentions. Results have important implications for tobacco research and practice given the wide reach, efficiency and potential impact of digital advertising.

FUNDING: This study was funded internally by Truth Initiative

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PA11-3

CAN TV MASS MEDIA CAMPAIGNS LEAD TO CHANGES IN SMOKING BEHAVIOUR IN SCOTLAND? A STRUCTURAL VECTOR AUTOREGRESSION ANALYSIS

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AIMS: To evaluate the impact of national tobacco control TV MMCs on intention to quit smoking and quitting behaviour. **DESIGN:** Multivariate time series analysis applying structural vector autoregression (SVAR), 2003 and 2012. **SETTING:** Scottish adult population. **DATA SOURCES:** Tobacco control campaign data from the Mediacom; calls to SmokeLine from NHS Health Scotland; gross ingredient cost (GIC) of NRT is supplied by Practitioner Services Division (PSD) of the Scottish National Health Service. **MEASUREMENTS:** Monthly calls to NHS SmokeLine and monthly GIC of NRT prescribing. **FINDINGS:** A one standard deviation increase in tobacco control TVRs, (5.61%) led to an immediate increase in calls to SmokeLine of 0.24% (95% CI: 0.097%, 0.383%). The cumulative impact remained significant for 18 months after broadcast. A one standard deviation increase in tobacco control TVRs led to a 0.048% (95% CI: 0.002%, 0.093%) increase in the GIC of NHS prescriptions for NRT. The cumulative effect was significant up to 3 months post broadcast, 0.216% (95% CI: 0.026%, 0.407%) before declining to -0.043% (95% CI: -0.402%, 0.316%) after 18 months. **CONCLUSIONS:** Tobacco control TV MMCs increase both intention to quit and quitting behaviour in adult smokers, but the impact on intention to quit is greater and sustained for longer. Our data support the continued use of TV in mass media and social marketing campaigns as part of national tobacco control strategies.

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PA11-4

A COST-EFFECTIVENESS ANALYSIS OF INCREASING THE DOSE OF TELEVISION ADVERTISING IN A NATIONAL ANTISMOKING MEDIA CAMPAIGN: RESULTS FROM A RANDOMIZED FIELD TRIAL

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BACKGROUND: Following the launch of the first federally-funded national mass media antismoking campaign in 2012, the Centers for Disease Control and Prevention launched the second year of Tips From Former SmokersTM (TipsTM) in 2013. The second national mass media campaign featured higher-dose advertising in 67 randomly selected local media markets to assess the dose-response impact on quit-related behaviors. **OBJECTIVE:** We conducted an analysis to evaluate the cost-effectiveness of higher-dose advertising from a funding agency's perspective. **METHODS:** Sustained cessations; premature deaths averted; undiscounted life years (LYs) saved; and quality-adjusted life years (QALYs) gained by the higher-dose advertising at both the national and sub-national levels were estimated. Costs were considered from the funding agency's perspective because CDC designs, implements, and funds the TipsTM campaign. A Monte Carlo simulation was designed and implemented using TreeAge Pro version 2015 15.2 to generate appropriate confidence interval (CI) estimates for health benefits and cost-effectiveness measures. **RESULTS:** Compared to standard-dose markets, higher-dose advertising was associated with a 3.9% absolute increase in population-level quit attempts, for a total of approximately 284,000 additional quit attempts in the higher-dose markets. When implemented in the 67 randomly selected local media markets, the spending on higher-dose TipsTM ads was approximately \$930 per quitter; \$7,860 per premature death averted; \$1,400 per LY saved; and \$670 per QALY gained. Had higher-dose advertising been implemented nationwide, the cost per health benefit would be less. Nationwide estimates were approximately \$480 per quitter; \$3,230 per premature death averted; \$550 per LY saved; and \$300 per QALY. **CONCLUSIONS:** Higher-dose advertising for an antismoking mass media campaign at either the national or sub-national levels is highly cost-effective in reducing tobacco use burden. The cost-effective assessments of the first and second TipsTM campaigns have underscored both the public health and economic benefits of a federally-funded national mass media antismoking campaign.

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PA11-5

ASSOCIATION BETWEEN MEDIA DOSES OF THE TIPS FROM FORMER SMOKERSTM CAMPAIGN AND CESSATION BEHAVIORS AND INTENTIONS TO QUIT AMONG CIGARETTE SMOKERS, 2012-2015

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BACKGROUND: Since 2012, CDC has implemented *Tips From Former SmokersTM* (TipsTM), the first federally funded tobacco education campaign in the United States. To date, its long-term impact on cessation-related outcomes has not been evaluated. **OBJECTIVE:** To assess the long-term impact of the TipsTM campaign on cessation-related behaviors and intentions among U.S. smokers from 2012 to 2015. **METHODS:** A multi-wave, national, probability-based, online survey of cigarette smokers (n = 22,189) and recent quitters (n = 776) was used to examine associations between doses (i.e., gross rating points or GRPs) of TipsTM advertising, quit attempts within the past 3 months, and intentions to quit in the next 30 days and in the next 6 months. Logistic regression models estimated outcomes as a function of market-level campaign GRPs, controlling for covariates at individual, market, and state levels. **RESULTS:** An increase of 1,000 quarterly GRPs was associated with increased odds of making a quit attempt in the past 3 months (adjusted odds ratio [AOR] = 1.23, p < .001) and intentions to quit in the next 30 days (AOR = 1.17, p = .015) and the next 6 months (AOR = 1.12, p = .014). Consistent with diminishing returns, the relative change in the quit attempt rate for each increase of 1,000 quarterly GRPs was 13.2% from 0 to 1,000 GRPs; an additional 5.0% from 1,000 to 2,000; and an additional 3.7% from 2,000 to 3,000. There was

a significant association between GRPs and quit attempts among non-Hispanic whites (AOR = 1.26, p < 0.01), non-Hispanic blacks (AOR = 1.35, p = 0.04), those with a mental health condition (AOR = 1.34, p < 0.01), and among those without a mental health condition (AOR = 1.19, p = <0.01). **CONCLUSION:** TipsTM is associated with cessation behaviors among U.S. adult smokers over time. Results show the campaign may be particularly effective among some subgroups of smokers including non-Hispanic blacks and those with a mental health condition. Given that there are nearly 40 million adult cigarette smokers in the U.S., this study reinforces the public health importance of antismoking media campaigns on cessation.

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PA11-6

BRAIN PROCESSES INVOLVED IN SELF-RELATED PROCESSING DURING MESSAGE EXPOSURE ALSO USED DURING RECALL OF "THE REAL COST" ANTI-SMOKING CAMPAIGN

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SIGNIFICANCE: Activity in the brain's medial prefrontal cortex (mPFC) during initial exposure to anti-smoking ads predicts subsequent behavior change. However, many questions remain about how ads engage and change the brains and minds of their recipients. Here we use fMRI to link neural effects of messaging that take place during initial exposure to messages from "The Real Cost" anti-smoking campaign with those during cued-recall of the messages. Specifically, we focus on whether engagement of neural regions implicated in self-relevant processing that have predicted behavior change in past work are re-engaged when teens later recall ads. **METHODS:** Thirty-eight adolescents (aged 14-17) viewed twelve ads from the "The Real Cost" campaign. fMRI data were recorded while adolescents viewed the ads (exposure) and later recalled them (recall). We computed the percent signal change in the mPFC for each ad during these tasks and ranked the level of mPFC activity across the ads within each participant. We then computed the mean rank per ad, creating an order of how strongly ads engaged the mPFC across participants. Finally, we compared this ordering of ads between exposure and recall tasks. **RESULTS AND CONCLUSIONS:** Ads that prompt high activity in the mPFC during exposure also recruit high activity during recall (rho = .62, p = .031). That is, the way in which teens' brains respond within mPFC when viewing specific ads mirrors their neural response to subsequent thought about those ads. These data are consistent with theories and evidence suggesting that integration of message content with recipients' self-concepts are one key path to behavior change; our data suggest that the extent to which messages engage self-related processing during initial exposure may also relate to engagement of similar integration of message content and self-related processes when teens subsequently recall the messages. These results could help identify message features that promote integration of message content with self-concept during exposure and recall, which may lead to more efficient production of messages that stick.

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PAPER SESSION 12: PRENATAL EXPOSURE TO TOBACCO, E-CIGARETTES, AND MARIJUANA

PA12-1

PRENATAL SMOKING EXPOSURE AND THE RISK FOR PSYCHIATRIC MORBIDITY IN SINGLETON SIBLING PAIRS

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INTRODUCTION: Maternal smoking has been associated with an increased risk of psychiatric morbidity. We studied the effects of prenatal smoking exposure on psychiatric morbidity among Finnish sibling pairs to control even non-measurable genetic/familial factors.

METHODS: Sibling pairs included the first two children born between years 1987-1995 by the same mother (150168 pairs). Information on maternal smoking (categorized as no smoking/smoking) was derived from the Finnish Medical Birth Register. Information on offspring's psychiatric diagnoses (1987-2013), and mothers' psychiatric diagnoses (1969-2013) given in specialized hospital care was derived from the Finnish Hospital Discharge Register. We did two sibling pair analyses by smoking exposure: Sibling pairs of 1) Quitters (mother smoked only in the first pregnancy, n=6986, 4.7%), were compared to Smokers (mother smoked in both pregnancies, n=14394, 9.6%), and 2) Starters (mother smoked only in the second pregnancy, n=4918, 3.3%), were compared to Non-Smokers (mother did not smoke in either pregnancies, n=116391, 77.5%). Missing information on smoking in 5.0%. Statistical analyses were adjusted e.g. with maternal and sibling's psychiatric morbidity. **RESULTS:** The risk for psychiatric diagnoses was significantly lower in latter sibling in Quitter sibling pairs (adjusted OR 0.77, 95% CI 0.72-0.83) compared to Smoker sibling pairs. Higher risk for psychiatric diagnoses was found in latter sibling in Starter sibling pairs (1.39, 1.30-1.49) compared to Non-smoker sibling pairs. More robust effect of smoking on psychiatric morbidity was found in children with externalizing diagnoses (0.74, 0.66-0.82 and 1.68, 1.51-1.87, in respectively). **CONCLUSIONS:** These results suggest that maternal smoking has an independent effect on the risk for psychiatric morbidity in offspring even when genetic and other familial factors was controlled by studying sibling pairs of the same mother.

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PA12-2

PRENATAL TOBACCO AND MARIJUANA EXPOSURE AND ADULT USE OF ALTERNATE TOBACCO PRODUCTS AND BLUNTS

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BACKGROUND: Use of alternate tobacco products (ATP) such as hookah/waterpipe, smokeless tobacco, cigars, and little cigars/cigarillos is increasing, especially in Black and Latino youth. Black youth are also more likely to co-use tobacco and marijuana in the form of blunts. Prenatal tobacco exposure (PTE) and prenatal marijuana exposure (PME) have been linked to combustible cigarette and marijuana use, but it is unknown if they are also associated with ATP and blunt use. **METHODS:** Pregnant women were recruited in their 4th or 5th trimester and asked about substance use during the first trimester. Offspring were assessed during childhood, adolescence and adulthood. As young adults, 242 offspring completed a telephone interview on substance use (M age = 29.5, range = 22-33 years old; 60% female, 40% male; 60% Black, 40% White). Logistic regressions were used to test the independent effects of PTE and PME on ATP and blunt use. **RESULTS:** ATP and blunt use were common in this community sample (25% hookah/waterpipe, 21% cigars, 21% little cigars/cigarillos, 16% smokeless tobacco, 21% blunts). PTE predicted ATP in a regression model, such that exposed individuals were less likely to have used an ATP (Adjusted Odds Ratio = 0.97, CI 0.94-0.99). In the regression on blunt use, PME was only statistically significant in the first step

of the equation (Odds Ratio = 1.78, CI 1.16-2.74). In the final model, there was only a trend for PME. Combustible cigarette use at age 16 (Adjusted Odds Ratio = 1.15, CI 1.04-1.27) increased the likelihood of adult past-year blunt use. **CONCLUSIONS:** Contrary to our hypothesis, there was a negative association between PTE and adult ATP use that merits further study. PME did predict adult blunt use, but was not statistically significant in the final model. It is possible that PME has an indirect effect on blunt use via vulnerability to adolescent cigarette use or tobacco dependence. Of note, we did not find significant racial differences in ATP and blunt use in multivariate models that considered prior exposures during the gestational and adolescent periods.

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PA12-3

PRENATAL TOBACCO EXPOSURE AND ADULT ELECTRONIC CIGARETTE USE

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BACKGROUND: Prenatal tobacco exposure (PTE) has been linked to adolescent and adult use of combustible cigarettes, and use of combustible cigarettes is associated with electronic cigarette use. The goal of this study is to determine if PTE predicts electronic cigarette use in young adults from a prospective birth cohort study. **METHODS:** Pregnant women were recruited in their 4th or 5th trimester and asked about their substance use. The exposure of interest was 10 or more cigarettes per day during the first trimester of pregnancy. Offspring were assessed during childhood, adolescence and adulthood. As young adults, 242 offspring completed a telephone interview on electronic cigarette use (M age = 29.5, range = 22-33 years old; 60% female, 40% male; 60% Black, 40% White). Chi square tests and multiple logistic regression were used to test the effects of PTE on electronic cigarette use. **RESULTS:** Thirty-eight percent of the offspring had ever tried electronic cigarettes, and 19% had tried them more than once. Twenty-seven percent of the participants who had tried them more than once had first trimester PTE compared to 15% who had no PTE (Chi square = 4.43, $p < .04$). In the multivariate analysis, PTE was only significant in the first step of the equation (Odds Ratio = 2.04, CI 1.04-4.00). Combustible cigarette use at age 16 (Adjusted Odds Ratio = 1.17, CI 1.08-1.27) and White race (Adjusted Odds Ratio = 2.39, CI 1.13-5.06) significantly predicted adult electronic cigarette use. **CONCLUSIONS:** The hypothesis that individuals with PTE may be more vulnerable to electronic cigarette use was not supported in the multivariate model. Only use of combustible cigarettes during adolescence and White race predicted electronic cigarette use in adulthood, consistent with prior research. Future work should investigate potential indirect effects of PTE on electronic cigarette use via early cigarette initiation.

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PA12-4

PHYSIOLOGICAL REGULATION DURING THE FIRST YEAR OF LIFE AMONG INFANTS PRENATALLY EXPOSED TO CIGARETTES AND MARIJUANA

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SIGNIFICANCE: Although 24-30% of women use tobacco and marijuana concurrently during pregnancy (SAMHSA, 2013) and negative developmental outcomes may be exacerbated when pregnant mothers use multiple substances, most studies of child outcomes have examined the effects of these substances independently. The purpose of this study was to examine physiological regulation among infants prenatally exposed to tobacco (PTE; n=64), infants prenatally exposed to both tobacco and marijuana (PTE/PME; n=95) and nonexposed infants (n=66). **METHODS:** Participants were recruited from the prenatal clinic at an urban hospital into an ongoing longitudinal study. Cigarette exposure status was determined by a combination of maternal report, chart review, maternal salivary cotinine, and infant meconium. Physiological regulation was assessed with respiratory sinus ar-



rhythmia (RSA) at the 1- and 9-month laboratory assessments. RSA is a measure of the variability in heart rate that occurs at the frequency of respiration and is believed to index the parasympathetic influence of heart rate variability via the vagus nerve. Baseline RSA (BRSA) was assessed during a 10-minute period of sleep at 1-month of age and while infants watched an emotionally neutral video at 9 months. At 9 months, RSA was also assessed during a negative affect (NA) paradigm which consisted of a gentle arm restraint (a widely-used, well-validated measure of anger/frustration used to assess infant regulation; Goldsmith & Rothbart, 1996). To assess physiological reactivity, change in RSA from baseline to NA task calculated. Negative scores indicate a decrease in RSA and more optimal physiological reactivity during environmental challenge. RESULTS: After controlling for demographics and alcohol exposure, PTE/PME infants had a significantly smaller BRSA at 1 month of age than nonexposed infants, $F(1,178)=3.03$, $p=.05$, and an increase in RSA during the NA task rather than the optimal decrease demonstrated by the nonexposed infants, $F(1,179)=3.77$, $p=.03$. There were no group differences in BRSA at 9 months. CONCLUSION: These findings highlight the importance of exploring potential synergistic effects of prenatal substance exposure on child outcomes.

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PA12-5 PRENATAL TOBACCO AND CANNABIS EXPOSURE AND TODDLER EMOTION REGULATION: MEDIATING ROLE OF AUTONOMIC REGULATION IN INFANCY

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Although cannabis is one of the most common substances used with tobacco during pregnancy, few studies have examined the effects of prenatal exposure to both substances together (PTCE). We examined the association between prenatal tobacco (PTE) and PTCE on child emotion regulation during an observational paradigm at 2 years of age (toddler) and poor autonomic regulation in infancy and maternal pre and postnatal anger/hostility (AH) as mediating mechanisms. 251 pregnant women (75 PTE, 103 PTCE, 73 control) were recruited in the first trimester of pregnancy. Prenatal exposure was assessed using multiple methods: maternal self-reports, saliva, and infant meconium. Change in respiratory sinus arrhythmia (RSA) in response to frustration was measured in the lab in infancy as the measure of autonomic regulation. Negative scores indicated a decrease in RSA and more optimal autonomic regulation. Maternal harshness and child emotion regulation during a "no toy" observational paradigm was coded at toddler age. There were no group differences in emotion regulation, but PTCE mothers exhibited higher maternal harshness compared to the other groups, $F(2, 196)=5.82$, $p=.004$. Results from path analysis indicated that the model fit the data well, $\chi^2(6)=10.61$, $p=.10$, CFI=.98, RMSEA=.05. Infants in the PTCE group exhibited a non-optimal increase in RSA in infancy ($\beta=.25$, $p=.006$) compared to the other two groups, and RSA increase in infancy was prospectively predictive of lower emotion regulation at toddler age ($\beta=-.22$, $p=.02$). PTCE was associated with higher maternal AH in pregnancy, and was predictive of continued AH postnatally ($\beta=.65$, $p=.00$), and higher postnatal AH was marginally predictive of higher maternal harshness during the emotion regulation paradigm at toddler age ($\beta=.13$, $p=.06$). The within time covariance between high maternal harshness and toddler emotion regulation was also significant ($r=-.22$, $p=.002$). The concurrent use of tobacco and cannabis exacerbates risk for developmental processes that set the stage for poor emotion regulation in early childhood.

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PAPER SESSION 13: ENDGAME STRATEGIES FOR TOBACCO USE

PA13-1 CAN ENDGAME INTERVENTIONS ACHIEVE A TOBACCO-FREE WORLD BY 2040? AND WITH WHAT QALY GAINS AND COST SAVINGS?

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BACKGROUND: Achieving a tobacco-free world goal (Lancet; smoking prevalence <5% by 2040) will require substantive action by all countries. But, little modelling work has been done to allow comparison between different potential strategies. Therefore, we progressed such modelling for New Zealand (NZ) as a test-case. Given the large disparities in tobacco smoking between Māori (indigenous population) and non-Māori, all model outputs were considered by ethnicity (a proxy for within country social disparities in tobacco smoking in other countries). METHODS: We used both a dynamic open population forecasting model for smoking prevalence; and a closed cohort (NZ population alive in 2011) multi-state life-table tobacco model including 16 tobacco-related diseases. The impacts of the following endgame strategies were modelled on future smoking prevalence, quality-adjusted life-years (QALYs), and health system costs: (1) 10% annual tobacco tax increases, (2) the tobacco-free generation (TFG) strategy, (3) a substantive tobacco retail outlet reduction strategy, (4) a sinking lid on tobacco supply until supply equals zero, and (5) a combination of strategies 1, 2 and 3. RESULTS: All these endgame strategies were found to achieve fast reductions in smoking prevalence, and reductions in disparities, resulting in large health gains among the population and net cost savings to the health system. But results suggest that only the TFG strategy, the sinking lid on supply, or the combined endgame strategy would be sufficient to achieve the <5% smoking prevalence goal for both Māori and non-Māori by 2040 in NZ. For the population alive in 2011, the sinking lid on supply resulted in the largest population health gains (64 QALYs gained per 1000 people alive in 2011, 95%UI: 41–91) and cost savings (US\$837 per person alive in 2011, 95% UI: 545–1220) at 3% discounting. CONCLUSIONS: Although the evidence supporting these endgame strategies is far from complete, this work provides modelling-level evidence that countries using them might make substantive progress in tobacco control, with large population health gains and large health system cost savings.

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PA13-3 YOUNG ADULT SMOKERS' PERCEPTIONS OF ENDGAME INTERVENTIONS: A QUALITATIVE ANALYSIS

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BACKGROUND: Achieving the dramatic reductions in smoking prevalence needed to realise endgame goals requires intensified use of existing measures as well as fundamentally different approaches to those currently used. Endgame strategies raise two important questions. First, what interventions could support the rapid behaviour change sought, and second, how acceptable will these interventions be in countries that have progressive tobacco control policies, where further measures may be regarded as unnecessarily intrusive. METHODS: We explored these questions in six focus groups involving 30 young adult New Zealand smokers or recent quitters. Participants from Māori, Pacific and NZ European communities commented on interventions ranging from enhanced life skill development through to policies that would reduce young adults' exposure or access to tobacco e.g. by extending smokefree laws to include outdoor areas of bars and restaurants. Data



were disambiguated using a thematic analysis approach. **RESULTS:** Participants preferred educative measures to policy interventions and consistently privileged their freedom to act over their right to freedom from harm. Several saw smoking as an assertion of adult freedoms and viewed strong policy measures as threatening the "personal responsibility" they wished to assume and saw as central to their adult identity. Yet despite favouring education and some social marketing themes, many doubted their effectiveness, and thought pro-smoking social environments would counteract these approaches. **CONCLUSIONS:** Stronger denormalisation strategies could expose how tobacco is engineered to promote addiction and undermine the control young people value. This approach could encourage individuals to elevate their right to freedom from addiction above their right to engage in risk behaviours, and potentially elicit greater support for endgame measures among young adults.

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PA13-4

COULD SOCIAL MOVEMENTS GALVANISE ENDGAME MOMENTUM?

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BACKGROUND: Tobacco end-game goals reframe policy discourse from "controlling" the tobacco epidemic to ending it, and aim to bring smoking prevalence as close to zero as possible. However, despite strong public support for ending the tobacco epidemic, specific endgame goals have not always received the strong political commitment they require if they are to be realised. Social movements have had considerable success in supporting health measures that benefit the public and could be a key strategy in promoting end-game goals. **METHODS:** We review how social movements may advance public health goals, examine specific examples within tobacco control, and explore the potential for social movements to catalyse realisation of endgame goals. Approaches reviewed include opportunistic movements through to sophisticated and well-resourced national strategies. **RESULTS:** Early social movements such as BUGA UP relied on culture-jamming to create political pressure that later saw the removal of tobacco billboards. Major movements, such as the Truth® campaign, have evolved into mass mobilisation activities that draw on counter-cultural activities to promote youth action. "Subvertising", whether undertaken by grassroots campaigners or integrated into a mass media strategy, could potentially intensify political pressure to introduce visionary policies that would support endgame goals. **CONCLUSIONS:** Subversion of corporate norms has wide appeal; it exposes harms caused by corporate duplicity as well as pointing to the actions needed to control this behaviour. Social movements offer a potent opportunity to harness and amplify consumer concerns, modify social norms and policy, and catalyse realisation of tobacco endgames. Countries setting endgame goals need to consider how to mobilise and use public support, given politicians' fickleness.

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PAPER SESSION 14: EXPOSURE TO TOBACCO AND E-CIGARETTE ADVERTISING

PA14-1

CIGARETTE PACKAGING TECHNOLOGY GIMMICKS: HOW TOBACCO COMPANIES MARKET PRODUCT TECHNOLOGY AND INNOVATION IN 14 COUNTRIES

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As countries have implemented FCTC packaging and labeling requirements tobacco companies continue to introduce new cigarette packaging designs and marketing appeals. Tobacco companies have recognized the importance of packaging design and marketing since the 19th century. We describe how technology and product innovation is marketed on cigarette packs from 14 low- and middle-income countries. In 2013, we purchased unique cigarette packs in Bangladesh, Brazil, China, Egypt, India, Indonesia, Mexico, Pakistan, the Philippines, the Russian Federation, Thailand, Turkey, Ukraine and Vietnam using a systematic protocol. Two independent coders examined the cigarette packs for descriptors and imagery of marketing technology and innovation. Descriptive analysis was conducted using Stata14. 2468 packs were collected which displayed a health warning label from the country in which it was purchased. Of that sample, technology marketing was found in all 14 countries. Capsule cigarettes were a technology appeal marketed in different ways: 59 (2.39%) packs had some type of indication on the pack that the user could change the cigarette; power buttons (38, 1.5%) including play and skip images were the most common imagery used to illustrate a capsule cigarette. Mexico had the largest sample (27, 20%) of packs marketing capsule cigarette technology. Additionally, filter technology was marketed on 73 (2.9%) packs with an illustration of the stick and the filter's technology. Terms associated with technology (e.g. "high definition", "nano") were found on 89 (3.6%) packs and numerous packs (136) used other technology buzz words to describe the product (e.g. "laser perforation", "precision thread technology", "taste transmission technology"). Terms indicating product innovation were identified on 224 (9%) packs (e.g. "new generation", "innovative", "modern"). Odor reduction (63, 2.5%) and "reloc/pro-freshness" (136, 5.5%) were types of innovation marketed on packs. Technology related images and popular terms were seen on packs in the 14 countries examined, and for 11 countries it was found on the stick. Our findings can strengthen the evidence for the need for plain packaging.

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PA14-2

YOUNG ADULT PERCEPTIONS OF THE BRITISH AMERICAN TOBACCO NEW ZEALAND AGREE/DISAGREE PLAIN PACKAGING COUNTER-CAMPAIGN

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BACKGROUND: In 2012, British American Tobacco New Zealand (BATNZ) launched a mass media campaign branded "Agree/ Disagree" as a response to the New Zealand government's plans to introduce plain packaging. We examined young adult's views about the campaign to assist tobacco control policymakers in planning future interventions. **METHOD:** Interviews with young adults living in the Auckland area were conducted. Interviews covered existing knowledge about plain packaging of tobacco, knowledge about the tobacco industry, and perceptions of specific advertisements included in the campaign. Interview data was analysed to determine the dominant social discourse about the campaign. **RESULTS:** Participants were mostly ambivalent about the campaign, which reflects quasi-libertarian leanings when discussing economics and trade, commercial versus personal responsibility and the value of freedom (commercial and social). These perspectives were often held simultaneously with conflicting socially responsive values and references to the hegemonic position of "big business". **DISCUSSION:** Our evidence suggests that young people are highly attuned to the language of eco-

nomics, individuality, choice and freedom, just as they are with their core values of justice and ethics. Ensuring that tobacco control initiatives both embody, and communicate, fairness and justice is essential to retaining public support, particularly from young people. This study affirms the importance of closely monitoring public opinion about tobacco control and of broadening denormalisation strategies to reflect the critical role the tobacco industry plays in prolonging the tobacco epidemic.

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PA14-3

RESIDENTIAL VENDOR PROXIMITY AND REGULAR ADOLESCENT TOBACCO USE: THE WALKABILITY FACTOR?

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SIGNIFICANCE: Little is known about proximity of vendor location to an adolescent's residence and subsequent tobacco use. Analysis of this relationship could inform future decisions about tobacco vendor licensing, zoning, and placement to minimize youth tobacco use. The goal is to evaluate the relationship of geolocations of tobacco vendors and adolescent residences to tobacco use over time. **METHODS:** Latent class analysis was used to characterize tobacco product use, based on longitudinal surveys of 5971 adolescents participating in the Southern California Children's Health Study. Tobacco vendor locations (N=1462) were available for 1679 children in 7 communities. Vendor and participant home locations were geocoded, and vendors were assigned to 300, 500, 750, and 1,000 meter buffers representing vendor density around each residence. The number of vendors with an active tobacco license within each buffer was weighted by adolescent time in the residence during the influential 9th and 10th grade period. The association of tobacco use class with vendor proximity was assessed. Sensitivity analyses were conducted to determine whether the proximity-tobacco use relationship differed according to categorical class, categorical buffer, and location of vendor by address or census block location. The outcome was class (pattern) of tobacco use. **RESULTS:** Four classes emerged: LC1 or non-users (70.9%), LC2 or light users (13.4%), LC3 or late initiators (6.3%), and LC4 or heavy users (9.4%). Stable heavy users were classified as 20+cigarettes/week. Only this class was significantly related to tobacco vendors within 300 meters of an adolescent's residence (OR=1.66; 95% CI: 1.15, 2.40*). Analyses controlled for potential clustering effects by neighborhood/community/town. **CONCLUSIONS:** Being within a walkable distance of a tobacco vendor after accounting for length of time in residence and length of time of vendor licensing appears to increase risk for heavy adolescent tobacco use. Future research should examine whether changing local tobacco vendor licensing, zoning, and specific location helps to decrease risk for addictive tobacco use, particularly among young people.

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PA14-4

EXPOSURE TO POINT-OF-SALE MARKETING AND PRODUCT DISPLAYS OF CIGARETTES AND E-CIGARETTES AS A PREDICTOR OF SMOKING CESSATION

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SIGNIFICANCE: Cue-reactivity theory suggests smoking-related cues may increase relapse during cessation attempts by causing tobacco users to experience an increase in nicotine cravings in the presence of visual stimuli related to use. Cues may include point-of-sale (POS) marketing and product displays for cigarettes and e-cigarettes. This study examined exposure to POS marketing and product displays and subsequent cessation behaviors among young adult current cigarette smokers. **METHODS:** Participants included 819 18-29 year old (m=21.1, sd=2.70) college students from 24 colleges in Texas (52.5% female, 41.3% white) who were current, past 30-day smokers. Multivariable logistic regression models

examined the impact of baseline exposure to cigarette and e-cigarette POS marketing on three outcomes at 6 month follow up: using e-cigarettes for cessation, smoking cessation, and any cessation attempt. Baseline covariates were age, sex, race/ethnicity, past quit attempts, desire to quit smoking, nicotine dependence, and e-cigarette use. **RESULTS:** With each increase in e-cigarette POS marketing exposure, odds of using an e-cigarette for cigarette cessation increased by 1.33 (95% CI: 1.07-1.65) controlling for cigarette POS exposure and covariates. With each unit increase in exposure to e-cigarette displays, the odds of quitting smoking was reduced by 0.86 (95% CI: 0.71-0.91), controlling for cigarette displays and covariates. Cigarette displays predicted decreased odds of quitting (AOR: 0.79; 95% CI: 0.69-0.91), but was not significant when controlling for e-cigarette displays. E-cigarette POS marketing exposure predicted making a quit attempt (AOR: 1.15; 95% CI: 1.00-1.33) but was not significant when controlling for cigarette POS exposure. **CONCLUSION:** Smoking-related cues may undermine cigarette cessation. Though e-cigarette POS marketing exposure increased odds for cessation attempts, e-cigarette displays guided smokers towards an unproven cessation aid, and actually cessation was reduced. More study is needed to determine the net effect of e-cigarette marketing exposure on cessation behaviors. Regulation of retail marketing may be needed to facilitate cigarette cessation.

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PA14-5

ELECTRONIC CIGARETTE TV ADVERTISING: AMOUNT AND CONTENT AND THEIR IMPACT ON E-CIGARETTE USE

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BACKGROUND: Recent rapid increases in e-cigarette use coincided with the expansion of e-cigarette marketing across media channels, including TV where ads for cigarettes have long been prohibited. While some recent studies have documented a link between intention to use and exposure to e-cigarette advertising in experimental settings, little is known about how the amount of contemporaneous and cumulative exposure and the content of e-cigarette TV ads may affect e-cigarette sales. **METHODS:** E-cigarette TV advertising data were linked to e-cigarette retail sales data compiled from retail store scanner data from 2010-2015. The amount of TV ads exposure was measured by contemporaneous and cumulative TV ratings within a market. Ads were classified into four categories based on their content: ads for disposables, reusables, refills and vape shops. The scanner data primarily track mass-manufactured e-cigarettes sold in retail stores, and do not include sales via "vape shops", online, or non-tracked retail channels. Fixed effects models controlling for market-level influences on e-cigarette sales and a Generalized Estimating Equation (GEE) model were used to estimate market-averaged effects of advertising exposure on e-cigarette sales. **RESULTS:** We found the amount of exposure, both contemporaneous and cumulative, to e-cigarette TV ads had a positive and significant impact on product sales, but only for the product type that was advertised. Impact was stronger when the level of cumulative exposure was higher. A negative cross-product advertising impact was detected, i.e. a higher level of exposure to disposable ads reduced the sales of reusables, and vice versa. In addition, a higher level of exposure to vape shops ads reduced sales of cartridges in non-vape shop retail stores. **CONCLUSIONS:** The preliminary results suggest that both the amount and the content of e-cigarette TV advertising matter. E-cigarette advertising may either induce users to increase use of the product or substitute away depending on the type of product advertised. These findings have the potential to inform public health policy, planning, and practice related to e-cigarette advertising within the U.S.

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PAPER SESSION 15: SMOKING CESSATION IN VULNERABLE POPULATIONS

PA15-1

ARE MODEST FINANCIAL INCENTIVES FOR SMOKING CESSATION AND TREATMENT ENGAGEMENT IN ADULT LOW-INCOME MEDICAID MEMBERS EFFECTIVE: RESULTS OF A REAL WORLD STUDY

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BACKGROUND: Changing demographics regarding smoking rates require new approaches to improve cessation reach and effectiveness among low-income smokers. While research has identified the effectiveness of relatively large financial incentives (\$750+) to promote cessation among smokers in general, few data are available regarding the effectiveness of incentives among low-income smokers. This study examined the impact of modest financial incentives designed to boost both treatment engagement and cessation among low-income Wisconsin Medicaid members who smoke. **METHODS:** 1900 Adult Medicaid smokers from 16 counties in Wisconsin were recruited and randomized over a two-year period to participate in a quit line based cessation program. Intervention participants (n = 948) were offered up to \$190 in treatment incentives (\$30 per call for taking up to 5 counseling calls and \$40 for biochemically determined abstinence at 6-months). Control participants (n = 952) received no treatment incentives, but all participants received payments for attending a baseline (\$40) and 6-month (\$40) biochemical assessment. **RESULTS:** Incentive participants had significantly higher Intent to Treat smoking abstinence rates at 6 months than Controls (21.6% vs. 13.8%, respectively; $p < .0001$). Treatment effects were present across multiple abstinence indices. Incentive condition participants were also significantly more likely than Controls to accept quit line treatment calls. Mediation analyses showed that quit line call engagement mediated Incentive effects on biochemically determined abstinence at 6-months. **CONCLUSIONS:** Modest incentives offered to low income adult Medicaid members resulted in greater treatment engagement and biochemically confirmed abstinence. These results provide an additional approach to promoting tobacco cessation among low-income smokers. Based on the mediation analysis, future research might explore whether incentivizing engagement alone (without incentivizing abstinence) would produce similar results with lower cost.

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PA15-2

PSYCHOLOGICAL AND BEHAVIORAL MEDIATORS OF A MULTILEVEL INTERVENTION TO REDUCE TOBACCO SMOKE EXPOSURE IN LOW-INCOME CHILDREN LIVING WITH A SMOKER

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SIGNIFICANCE: Tobacco smoke exposure (TSE) in low-income and minority children is a significant public health threat. We recently completed a randomized controlled trial (n=327), Kids Safe & Smoke Free (KiSS), to address child TSE in a sample of predominantly low-income, female, African American smokers with children under 11-years-old. KiSS compared child TSE outcomes in families randomized to either a system-level pediatric intervention ["Ask, Advise, Refer"; AAR] combined with telebased counseling (AAR+Counseling) or pediatric AAR and an attention control nutrition counseling intervention (AAR+Control). We previously reported that AAR+Counseling was more effective at eliminating children's TSE from all sources than AAR+Control (45.8% vs. 29.1%, $p = .001$). This paper presents new findings on the role of three hypothesized mediators in explaining this intervention effect. Mediators include: parent's self-efficacy to create a smoke-free home (SE), use of smoking urge management coping strategies (UM), and use of smoking restrictions in the home (SR). **METHOD:** Path analysis using R statistical software. **RESULTS:** Path analyses on complete cases revealed a significant total effect of the model ($-.162$, $p = .005$). The direct effect of the intervention (AAR+Counseling vs. AAR+Control) on TSE was not statistically significant ($p =$

.939), nor was the mediated effect of UM ($p = .198$), but the mediated effect of SE and SR were statistically significant ($-.081$ and $-.062$, respectively, both $p < .001$). Intention-to-treat analyses using multiple imputation for missing data resulted in the same pattern. All analyses adjusted for 15 potential confounds and used robust standard errors to account for the clustering within clinics. **CONCLUSIONS:** The combined, multi-level AAR+Counseling intervention promoted a greater likelihood of reducing child TSE than AAR alone, possibly by improving smoking parents' confidence and skills (e.g., rule setting) in creating a smoke-free environment for the child.

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PA15-3

SEXUAL AND GENDER MINORITY DISCRIMINATION AND PERCEIVED SMOKER-RELATED STIGMA: ASSOCIATIONS WITH SMOKING BEHAVIORS AMONG SEXUAL AND GENDER MINORITY CURRENT OR FORMER SMOKERS

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SIGNIFICANCE: We know little about the overlapping effects of smoker-related stigmas and stigmas related to sexual and gender identities on smoking behaviors. To start addressing this research gap, we investigated associations between smoking behaviors, experiences with sexual and gender minority (SGM) discrimination, and perceived smoker-related stigma among SGM current and former smokers. **METHODS:** Results reported in this abstract are based on survey data collected from 125 young adult and adult SGM current and former smokers in California, USA (20-64 years old). Participants reported their past year experiences with 11 types of SGM discrimination (e.g., been subject to slurs or jokes, been treated unfairly in healthcare setting) (mean=2.1, range 0-9). Also, using the smoker-related stigma scale, we asked participants how much they disagree or agree with the statements that (1) most people believe that cigarette smoking is a sign of personal failure, and (2) most people think less of a person who smokes cigarettes. We created a summary score for these items and ranked this score to create low versus high levels of perceived smoker-related stigma. **RESULTS:** We used a univariate General Linear Model to investigate both main effects and interaction between past year experiences with discrimination and perceived smoker-related stigma on the number of cigarettes smoked per day. There was a significant interaction between experiences with SGM discrimination and perceived smoker-related stigma, on the number of cigarettes individuals smoked per day, $F(7,84)=117.08$, $p=0.04$. This interaction suggests that those who perceived a low level of smoker-related stigma smoked a similar number of cigarettes, regardless of their experiences with SGM discrimination. However, among those who perceived a high level of smoker-related stigma, the number of cigarettes smoked per day increased as their experiences with SGM discrimination increased. **CONCLUSIONS:** Results suggest the need to develop alternative strategies, other than stigmatizing smokers, to reduce high smoking levels among SGMs.

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PA15-4

PROMOTING SMOKING CESSATION AMONG VIETNAMESE AMERICANS USING A FAMILY-BASED LAY HEALTH WORKER INTERVENTION: A CLUSTER RANDOMIZED CONTROLLED TRIAL

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SIGNIFICANCE: Smoking prevalence remains high among some Asian American communities, such as among Vietnamese American men who speak limited English. Many Vietnamese American smokers underutilize evidence-based smoking cessation treatment including Quitline and nicotine replacement therapy (NRT). We developed a novel family-based lay health worker (LHW) intervention to pro-

mote smoking abstinence and use of evidence-based cessation treatment among Vietnamese male smokers. **METHODS:** We conducted a cluster randomized controlled trial to evaluate the efficacy of this new intervention involving 18 LHWs who recruited from their social networks 107 dyads of Vietnamese male smokers and non-smoking family members. LHWs and their dyads were randomly assigned to either intervention "Tobacco and Health" (TOB, n=54 dyads) or attention-control "Healthy Living" (HL: covered nutrition and physical activity information but not tobacco, n=53 dyads). All participants received 2 LHW-led small group sessions on the assigned topic and 2 individual calls within 8 weeks. Participants were assessed at baseline and 6 months. **RESULTS:** Smokers' mean age was 56.3 years, 40.7% had not finished high school, 92.5% spoke limited English, 26.2% in precontemplation, 20.5% had ever used e-cigs, and mean cigarettes smoked/day = 7.4 (range: 1-30). At 6 months, compared to HL group, TOB group reported greater use of Quitline (38.5% vs. 1.9%) and NRT (32.7% vs. 3.9%) and higher 30-day point prevalence abstinence verified by family and salivary cotinine (TOB: 33.3% vs. HL: 12.5%), $p < 0.01$. In multivariable logistic regression analysis, TOB group was > 3 times the odds (OR: 3.7, 95% CI: 1.2 – 11.5) of achieving abstinence. Being older (OR = 1.1; 95% CI: 1.02 – 1.1), and less nicotine dependent (OR: 1.99, 95% CI: 1.1 – 3.8) also predicted abstinence. **CONCLUSIONS:** Family-based health promotion delivered by LHWs who are non-health professionals led to remarkable abstinence rates among Vietnamese American male smokers. A family-based LHW intervention targeting tobacco use was more efficacious than one targeting healthy living in promoting use of evidence-based cessation treatment and in getting smokers to quit.

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PA15-5

PREDICTORS OF SUCCESSFUL CESSATION FOR SMOKERS UNDER COMMUNITY CORRECTIONS SUPERVISION: THE IMPORTANCE OF MEDICATION ADHERENCE

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SIGNIFICANCE: Individuals in the U.S. criminal justice system represent 12% of all current smokers, although few interventions have targeted this population. The aim of this study was to examine predictors of successful cessation among smokers under CJ supervision in the community. **METHODS:** Smokers under community corrections supervision (N=500) were randomized to receive either four sessions of smoking cessation counseling or no counseling with 12 weeks of bupropion treatment plus brief physician advice to quit. Logistic regression analyses examined smoking variables associated with successful abstinence ("floating abstinence"). Mediation analysis evaluated the indirect effects of smoking variables on smoking abstinence. **RESULTS:** Of the almost 50 demographic and smoking variables examined, significant associations with abstinence included age, race, age of first tried smoking, CPD, abstinence self-efficacy, motivation, nicotine dependence, craving, difficulty of prior quit attempt, medication adherence, desire to quit in the next 30 days, and prior bupropion use. Using logistic regression, we found that medication adherence was the single best predictor of abstinence (OR=2.29; 1.32-3.97; $p=0.003$). CPD was the only other variable associated with abstinence (OR=0.939; 0.898-0.981; $p=0.005$). Only five variables were significantly associated with bupropion adherence: race, age, prior bupropion use, treatment group, and percentage of friends who smoke. When these variables were simultaneously entered into a logistic regression model, prior use of bupropion was the single best predictor of adherence (OR=3.50; CI: 1.45-8.47; $p=0.005$). Mediation analysis indicated that previous use of bupropion indirectly increased cessation rates through the pathway of increased medication adherence. **CONCLUSIONS:** Previous experience with medication was related to improvements in medication adherence, which was then associated with smoking abstinence and these associations were not accounted for by motivation, abstinence self-efficacy, or belief in the efficacy of medication. Providing exposure to medication may be a promising intervention to increase medication adherence and cessation.

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PA15-6

EXAMINING THE EFFECTS OF SUBSTANCE USE ON TOBACCO CESSATION OUTCOMES IN THE HELPING HAND 2 RANDOMIZED CONTROLLED TRIAL

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SIGNIFICANCE: Individuals with substance use disorders (SUD) smoke at higher rates than the general population of smokers, have higher levels of nicotine dependence and are more likely to die of tobacco-related disease. Evidence suggests that despite an interest in smoking cessation, smokers with SUDs have greater difficulty quitting. Of interest is whether hospitalized smokers with SUDs have difficulty quitting smoking. **METHODS:** Analysis of data from a 3-site RCT among hospitalized adult cigarette smokers interested in quitting that compared a post-discharge smoking cessation intervention to usual care (Rigotti et al., in press). The intervention provided free FDA-approved cessation medication and telephone support. Those admitted for an intravenous drug overdose were excluded. Self-reported (SR) continuous and 7-day point prevalence (PP) abstinence were assessed 1, 3, and 6 mo post-discharge; PP was biochemically confirmed at 6 mo. This analysis compared participants with (n=418) or without (n=939) current substance use (SU) based on SR past year illicit drug use at baseline or discharge diagnosis of a SUD. **RESULTS:** Those with SU (vs those without SU) were younger, had less education, and were more often male ($p < .01$). SU, vs. No SU, decreased SR continuous abstinence at 3 mo (17% vs 21%, $p < .05$) and 6 mo (12% vs 18%, $p < .01$), and confirmed PP at 6 mo (12% vs 18%, $p < .05$). Overall, substance users were less likely to be confirmed quit at 6 months (AOR 1.58, 95% CI 1.10-2.25, $p = .01$) in a multivariate logistic regression controlling for age, gender, cigs/day, study site, and study arm. At 1 mo, more of those with SU (vs without SU) reported NRT use post-discharge (57% vs 53%, $p = .03$) but NRT use did not differ by group at 3 (68% vs 64%, $p = .12$) or 6 mo (72% vs 69%, $p = .28$). Use of counseling did not differ between the groups at mo 1, 3, or 6 ($p > .05$). **CONCLUSION:** Hospitalized smokers who use illicit drugs were less likely to quit than nonusers, despite similar uptake of cessation assistance following discharge. More intensive tailored interventions may be required to address smoking in this population.

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PODIUM PRESENTATION 6

PAPER SESSION 16: TRENDS IN TOBACCO PRODUCT USE

PA16-1

COUNTRY-SPECIFIC PROFILES AND GLOBAL PATTERNS OF THE TOBACCO EPIDEMIC. IMPLICATIONS OF CURRENT PROFILES OF SMOKING AND POPULATIONS AGE STRUCTURE FOR TOBACCO-RELATED HEALTH OUTCOMES IN THE FUTURE

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SIGNIFICANCE: A feature of the tobacco epidemic is the delay between the uptake of persisting smoking in a population and its full effect on mortality. Prevalence alone is an insufficient indicator of accumulated risk. By reason of the strong dependence of risk on the intensity and frequency of smoking, both measures must be considered when making projections of tobacco related morbidity and mortality. Furthermore, an earlier age of initiation extends the potential duration of smoking throughout the lifespan. The general aim of this paper is to describe global patterns based on country-specific profiles of cigarette smoking. **METHODS:** The Global Adult Tobacco Survey is a nationally representative household survey that uses a standardized questionnaire, sample design, data collection method, and analysis protocol that ensure comparability across countries. We used information collected between 2008 and 2013 that is currently available for public use. We calculated age-specific estimates describing measures of current cigarette smoking (manufactured cigarettes, hand-rolled cigarettes, bidis and kreteks). By using principal components analysis, we generated for every country a predicted score, so countries are classified according to its specific profile of frequency (daily or less than daily), intensity (amount smoked per day), and age of daily smoking initiation. Calculations were performed with Stata 14.1 and 3D visualizations with Maya. **RESULTS:** First, we describe the size, location and shape of the tobacco epidemic within the population age structure of 22 nations from the 6 WHO regions. Secondly, we identified clusters of countries based on current intensity of smoking and age of daily smoking initiation among current daily smokers. Finally, by accounting for patterns of intensity, age of daily smoking initiation, and frequency of smoking across cohorts of male 30 years and older, a 5-category taxonomy is described and each country is pinpointed in a 3D visualization. **CONCLUSIONS:** A better understanding of the relationship between each country's smoking profile and its age structure will help to implement measures to promote quitting and prevent initiation, and consequently will reduce the leverage of demographic dynamic on tobacco-related health outcomes.

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PA16-2

DIFFERENTIAL CIGARETTE CONSUMPTION TRAJECTORIES FROM YOUNG ADULTHOOD TO MID-LIFE BY RACE AND GENDER

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OBJECTIVES: While US national surveillance data showed that prevalence of smoking decreases with age, we explore the heterogeneity in cigarette consumption from young adulthood to mid-life by race (White vs. Black) and gender (male vs. female). **METHODS:** Data were from the Coronary Artery Risk Development in Young Adults (CARDIA) Study. Participants were aged 18-30 years were sampled from four US cities in 1985-86, and completed 8 surveys over a 24-year period. Only participants who reported smoking in at least one of the surveys were included (n=2,025; White n=860, Black n=1165; male n=967, female n=1058). Participants reported number of cigarettes smoked per day (CPD) at each survey. Growth mixture models were used to examine trajectories of cigarette consumption stratified by race and by gender, adjusting for participant age, gender, education, city, drinking behaviors, and parent education at baseline. **RESULTS:** Among White smokers, 3 trajectories were identified: heavy smokers who reduced consumption (Y0=27 CPD, Y24=2 CPD; 11%), light smokers who reduced consumption (Y0=7

CPD, Y24=2 CPD; 65%), and heavy persistent smokers (steady 20 CPD; 25%). Among Black smokers, 2 trajectories were identified: heavy smokers who reduced consumption (Y0=20 CPD, Y24=10 CPD; 16%), and light persistent smokers (steady 6 CPD; 84%). Among male smokers, 2 trajectories were identified: heavy smokers who reduced consumption (Y0=26 CPD, Y24=14 CPD; 20%), and light persistent smokers (steady 8 CPD; 80%). Among female smokers, 3 trajectories were identified: heavy smokers who reduced consumption (Y0=24 CPD, Y24=3 CPD; 9%), light smokers who reduced consumption (Y0=6 CPD, Y24=3 CPD; 76%), and heavy smokers who increased consumption (Y0=16 CPD, Y24=18 CPD; 15%). These trajectories also differed in demographics. **CONCLUSIONS:** Among young adults who smoke, trajectories of cigarette consumption differ between males and females, as well as White and Black young adults as they age into mid-life. These trajectories may in part explain the disparities in smoking-related outcomes by race and gender. Further research is needed to understand the psychosocial factors related to these trajectories to inform tailored interventions.

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PA16-3

LONGITUDINAL RELATIONSHIPS BETWEEN E-CIGARETTE USE AND SMOKING INITIATION IN UK ADOLESCENTS

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SIGNIFICANCE: Four US longitudinal studies have found that young never smokers are more likely to have initiated smoking if they had tried e-cigarettes compared with those who had not. This is the first longitudinal study to examine this relationship in young people from Europe. **METHOD:** All pupils (age 11-18) from 4 high schools in Scotland, UK were surveyed in Feb/Mar 2015 (n=3807) and followed up 1 year later. 70.8% (n=2696) of the original cohort completed the follow up survey. We restricted our analysis to never smokers for whom we had data on e-cigarette use and smoking at both baseline and follow-up (n=1868; 49% of total 2015 sample, and 62.3% of never smokers). The sample was then divided into those who had tried an e-cigarette at baseline and those who had not, and smoking initiation rates at follow up compared. Smoking initiation was defined as any cigarette use, even just one or two puffs. Multivariate logistic regression was used to control for potential confounding factors; sex, age, ethnicity, family affluence, smoking within the family and susceptibility to smoking. **RESULTS:** 9.9% of our final sample had tried an e-cigarette at baseline. Of these, 39.7% (73/184) went on to initiate smoking cigarettes by follow up compared with only 13.9% (234/1684) of those who had not tried an e-cigarette. After adjusting for demographics and smoking susceptibility at baseline, the adjusted odds ratio for smoking initiation in ever e-cigarette users was 1.83 (95% CI 1.21-2.75) higher than in never smokers who had never used an e-cigarette. The adjusted risk ratio for the model was 1.45 (95% CI 1.12-1.88). **DISCUSSION:** Even after controlling for smoking susceptibility, young never smokers were still more likely to go on to try smoking cigarettes if they have tried an e-cigarette. However, the absolute numbers of young people who go on to try smoking after using e-cigarettes in both ours and other studies is small, and we do not know how many went on to become regular smokers. Nevertheless, experimentation with smoking is recognised as a risk factor for regular smoking in young people and we go on to consider policy implications and potential opportunities for intervention.

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PA16-4

DO NEVER-SMOKERS MAKE UP AN INCREASING SHARE OF SNUS USERS AS CIGARETTE SMOKING DECLINES? THE NORWEGIAN EXPERIMENT

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AIMS: To examine how the relative size of six groups of ever snus users (current and former users of snus who were current, former or never cigarette smokers) varied over time in Norway, and to then examine a series of measures of tobacco behaviour within these groups. **DESIGN:** Repeated cross-sectional nationally representative surveys of tobacco use. The association between survey year and the six categories of ever snus use was examined using cross tabulation and multinomial logistic regression analysis. Logistic and OLS regression examined tobacco behaviour in each ever snus use category. **SETTING:** Norway, 2003-2015 **PAR-TICIPANTS:** 2,067 males aged 15-79 years. **MEASUREMENTS:** The categories of ever snus use represented all six combinations of cigarette smoking (current, former or never) among current and former users of snus. The variables measuring tobacco behaviour were: order of product uptake (snus or cigarettes first), mean cigarette consumption, reduction from daily to occasional smoking, intentions to quit cigarettes, future smoking identity and use of snus in latest quit attempt. **FIND-INGS:** Over the period 2003-2015, the relative share of never smokers among ever snus users, and current snus users who were former smokers, increased. The share of dual users, and smokers who were former snus users, decreased. Among men who reported lifetime experience with both products, a large majority had initiated their tobacco use with cigarettes. The average number of cigarettes smoked weekly was lower among dual users compared to exclusive smokers and current smokers who were former snus users. **CONCLUSIONS:** In Norway, with a mature snus market, the majority of snus users still derive from the smoking population, even during a period when smoking has been declining rapidly. However, the relative size of never-smokers among users of snus has increased.

FUNDING: The Norwegian Government

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PA16-5

DAILY CANNABIS USE AMONG CIGARETTE SMOKERS IN THE UNITED STATES, 2002-2014: IMPLICATIONS FOR THE FUTURE OF TOBACCO CONTROL?

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INTRODUCTION: Cigarette smoking has declined substantially over the past several decades, yet this trajectory has decelerated over the past 15 years. One possible contributing factor to this slowed decline could be the simultaneous increase in the use of another smoked product: cannabis. Cannabis use is strongly associated with cigarette smoking. The objectives of this study were to investigate the relationship between daily cannabis use and daily and non-daily cigarette smoking, and to estimate changes in the prevalence of daily cannabis use among daily, non-daily, former and non-cigarette smokers by demographics from 2002-2014 in the United States. **METHODS:** The National Survey on Drug Use and Health (NSDUH) is an annual, nationally representative cross-sectional study conducted from 2002-2014. Logistic regression models estimated associations between past month daily cannabis use and daily, non-daily, and no cigarette smoking. Heterogeneity of these associations by demographic characteristics and trends over time was also examined. **RESULTS:** Daily cannabis use occurs nearly exclusively among non-daily and daily cigarette smokers compared with non-cigarette smokers (8.0%, 9.0%, 0.5%, respectively). Daily cannabis use increased significantly and substantially over the past decade among both non-daily (8.0% in 2014 vs. 2.9% in 2002; $\beta=0.08$; $p<0.001$) and daily smokers (9.0% in 2014 vs. 4.9% in 2002; $\beta=0.06$; $p<0.001$). While the prevalence of daily cannabis use remained relatively low in non-smokers, this group demonstrated the most rapid increase in daily cannabis use (0.52% in 2014 vs. 0.12% in 2002; $\beta=0.12$; $p<0.001$). Rates of increase of daily cannabis use were particularly notable among youth and female cigarette smokers. **CONCLUSIONS:**

The vast majority of daily cannabis use occurs among cigarette smokers; a very small percentage occurs among non-smokers. Daily cannabis has increased significantly among non-daily and daily smokers over the past decade, and with particularly rapid increases among non-smokers, and among youth and female smokers. It is conceivable that the ongoing increase in cannabis use may be stunting tobacco control progress in the US. Future research will need to monitor these trends with an eye toward keeping the progress in tobacco control from further decelerating or even reversing; and on monitoring the increase in daily cannabis use.

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PAPER SESSION 17: TOXICITY OF TOBACCO PRODUCTS

PA17-1

ALDEHYDE EMISSIONS FROM ELECTRONIC CIGARETTES: RELATION TO ATOMIZER AGE, PRODUCT MANUFACTURING VARIABILITY, AND INTRA-PUFF PARTICLE GENERATION INTERMITTENCY

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Electronic cigarettes (ECIGs) electrically heat and aerosolize a liquid containing propylene glycol (PG), vegetable glycerin (VG), nicotine, and additives. They typically employ an atomizer consisting of an electrical heating coil wrapped around a fibrous wick which serves to replenish liquid as it evaporates. Volatile aldehyde (VA) species, including the human carcinogen formaldehyde, are commonly found in ECIG aerosols, and have been implicated in respiratory diseases in cigarette smokers. VAs are known thermal degradation products of PG and VG. Literature reports of VA yields from electronic cigarettes indicate wide variability in emission rates even when measurement conditions and devices are nominally identical, sometimes confounding study findings. In this study we sought to identify potential sources of variability in VA yields within a given product. In particular, using three nominally identical devices, we investigated effects on VA emissions of atomizer age (zero to more than 1200 puffs) and device variability under various randomly ordered use conditions (4 or 11W, 4 different PG/VG ratio solutions). In addition, instantaneous particle emission rates were measured during repeated sessions of 15-puffs using a fast particle mobility spectrometer (TSI EEPS). Simultaneously, instantaneous heating filament temperatures were measured. We found large differences in VA emissions across devices ($p < .05$), and across power levels ($p < .001$). ECIG age (cumulative number of puffs taken prior to measurement) ($p = 0.15$) and PG/VG ratio ($p = 0.23$) had no effect on VA yields. Formaldehyde levels ranged from 0.15-51.43 $\mu\text{g}/15$ puffs. Greater aldehyde yields were associated with greater variability in instantaneous intra-puff particle emission rates ($p < .05$) and higher rise in atomizer temperatures ($p < .0001$) suggesting that high-emitting ECIG units may be more prone to intermittent starvation of liquid in the heating element of the atomizer during a puff (e.g. due to poor contact between heating filament and wick). This finding would suggest that better quality control in the manufacturing of the wick-heater assembly may reduce human exposure to unwanted ECIG toxicants.

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PA17-2

COMPENSATORY PUFFING BEHAVIOR WITH LOWER NICOTINE STRENGTH E-LIQUID CAN INCREASE CARBONYL EXPOSURE

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RATIONALE: Self-titration is well documented in the tobacco literature; smokers adjust their puffing patterns to regulate and optimise desired blood nicotine levels. More intensive puffing patterns associated with switching to light cigarettes does not decrease, and may even increase, exposure to carbon monoxide and tar. Whether e-cigarette users also engage in compensatory puffing patterns when switching to lower nicotine containing liquid, and whether this is associated with increased toxicant exposure, has not been explored. **MAIN OBJECTIVES:** Two inter-related studies explored 1) the effects of high and low nicotine strength liquid on puffing topography and nicotine delivery in e-cigarette users; 2) whether more intense puffing patterns associated with using the lower nicotine strength liquid produced higher levels of carbonyls in e-cigarette aerosols. **METHODS:** 1) 12 experienced vapers completed 60 minutes of *ad libitum* vaping using low (6 mg/mL) and high (24 mg/

mL) nicotine liquids in two separate sessions. 2) Using HPLC/diode array analysis, four carbonyl compounds (formaldehyde, acetaldehyde, acrolein and acetone) were quantified in 24mg/mL and 6mg/mL nicotine strength aerosols. Aerosols were generated by a smoking machine configured to replicate the human puffing topography data. **RESULTS:** Liquid consumption and puff number were higher, and puff duration longer, in the low nicotine strength condition (all $ps < 0.01$). Plasma nicotine levels were significantly higher in the high condition (all $ps < 0.01$). There were no statistically significant differences between conditions in self-reported craving, withdrawal symptoms or subjective effects. Levels of formaldehyde, acetaldehyde and acetone detected from 6mg/mL nicotine liquid were higher than those from 24mg/mL ($p < 0.01$). Acrolein was not detected. **CONCLUSIONS:** Vapers engaged in compensatory puffing with lower nicotine strength liquid. More intensive puffing resulted in higher aerosol levels of formaldehyde, acetaldehyde and acetone. Our findings suggest, vapers making a sudden switch to much lower nicotine strength liquids may inadvertently increase their exposure to carbonyls.

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PA17-3

PRESENCE OF THE ORAL AND ESOPHAGEAL CARCINOGEN N'-NITROSONORNICOTINE IN SALIVA OF E-CIGARETTE USERS

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Many harmful constituents are present in e-cigarettes at much lower levels than in cigarette smoke, and the analysis of urinary biomarkers in e-cigarette users are consistent with these findings. However, understanding the health effects of chronic exposures to e-cigarette aerosols may require thinking beyond these comparisons. For instance, human exposure to the tobacco-specific oral and esophageal carcinogen N'-nitrosonornicotine (NNN) can be two-fold: in addition to the direct intake from tobacco-containing products, this carcinogen can also be formed endogenously via the nitrosation of the minor nicotine metabolite nornicotine. This process is likely to occur in the oral cavity, where nornicotine can be excreted by salivary glands and react with nitrite formed via the bacterial reduction of dietary nitrate. In agreement with this hypothesis, we recently reported that NNN can be formed from nornicotine in human saliva without deliberate addition of any other substance. In this study, we analyzed NNN in saliva of e-cigarette users, smokers, and nonsmokers, 20 subjects per group. Salivary nornicotine, NNN levels in e-cigarettes used by the study participants, and urinary tobacco biomarkers, including total NNN, were also analyzed. The levels of NNN in saliva of e-cigarette users averaged 0.08 ± 0.13 pmol/mL, ranging from non-quantifiable (LOQ) to 0.42 pmol/mL. In smokers, salivary NNN ranged from LOQ to 4.2 pmol/mL, with 80% of smokers having salivary NNN in the range of levels found in e-cigarette users. Urinary total NNN was quantified in 5 out of 20 e-cigarette users, ranging from 0.002 to 0.010 pmol/mL urine, consistent with the previously published data. In smokers, urinary total NNN averaged 0.17 ± 0.5 pmol/mL urine. NNN was not detected in either saliva or urine of non-smokers. Only trace levels of NNN were measured in e-cigarette liquids. Together, our findings demonstrate that NNN is formed in the oral cavity of e-cigarette users. Given the potent oral and esophageal carcinogenicity of NNN, better characterization of this process is critical. Salivary NNN, rather than urinary total NNN which accounts for only 1-3% of NNN dose, should be used to monitor e-cigarette users' exposure to this carcinogen.

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PA17-4

ELECTRONIC CIGARETTE AEROSOL EXTRACTS INDUCE SIGNIFICANT DNA DAMAGE IN NORMAL AND CANCER CELLS

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BACKGROUND: Cigarette smoking is the main risk factor for lung and head and neck cancer. E-cigarettes (ECs) are battery-operated devices that deliver nico-

tine through inhaled aerosols. ECs are marketed as a less harmful alternative to tobacco cigarettes and a smoking cessation aid. The health risks posed by exposure to EC aerosols are unknown. Yet, the use of ECs has increased sharply since 2003 and EC users report to inhale on average over 200 puffs a day. EC aerosols contain unique constituents, as well as toxicants that are also present in tobacco smoke, including carcinogens and reactive oxygen species (ROS). However, the genotoxicity of EC aerosols has not been characterized. **AIMS:** (1) To determine the genotoxicity of short and long-term exposure to EC aerosol extracts on human epithelial oral and lung cell lines. (2) To investigate the effects of EC aerosol on DNA repair mechanisms. **METHODS:** Extracts were prepared from NJOY (12 or 18 mg/ml of nicotine) and Oakley eGo-T (0, 12 or 18 mg/ml of nicotine) and a reference combustible cigarette, in controlled conditions using a modified smoking apparatus. Cells were exposed for either 1 hour or 2 weeks to diverse doses (1 to 100 puffs/5 L) of EC aerosol or smoke extracts. Overall DNA damage was quantified using the primer anchored DNA damage detection assay (PADDA). 8-oxo-7,8-dihydroguanine (8-oxoG) was quantified using a commercial ELISA kit. mRNA and protein expression were evaluated by RT-PCR and western blot, respectively. Data were analyzed by Student's *t*-test. **RESULTS:** No cytotoxicity was observed. Exposure to EC aerosol caused a dose-dependent increase in DNA damage. Overall, exposure to EC aerosol extracts induced significantly less DNA damage than exposure to smoke extracts. Yet, exposure to EC aerosol extracts induced a significant increase in 8-oxoG, one of the most mutagenic DNA lesions caused by ROS. Long-term exposure to EC extracts resulted in significant alterations in the expression of diverse DNA repair proteins. **CONCLUSION:** Our study suggests that EC aerosols can cause DNA lesions that are highly mutagenic and emphasizes the urgent need to further evaluate their safety to ensure evidence-based public health policies and regulations.

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PA17-5

SMOKING-ASSOCIATED DNA HYPOMETHYLATION IN BLOOD AS A SURROGATE FOR DNA HYPOMETHYLATION AND GENE DEREGLATION IN SMOKERS' LUNG

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SIGNIFICANCE: Tobacco smoking-associated DNA hypomethylation has been frequently observed in blood cells and is a powerful tool to assess the epigenetic consequences of smoke exposure. Specific CpGs hypomethylated in blood have been linked to lung cancer risk. However, the cause of hypomethylation and its mechanistic relationship to lung cancer remain unclear. **METHODS:** We addressed these questions with a three-pronged strategy. 1) We analyzed DNA methylation changes in lung tissue through an epigenome-wide association study using non-tumor lung tissue from 237 lung cancer cases in the Environment And Genetics in Lung cancer Etiology (EAGLE) study, with replication in non-tumor lung tissue from The Cancer Genome Atlas (TCGA). 2) We compared lung tissue hypomethylated CpGs to tobacco exposure-dependent hypomethylated CpGs in blood. 3) We examined the epigenomic environment of lung hypomethylated CpGs using the epigenomes of disease-relevant cells, including primary human alveolar epithelial cells and human lung adenocarcinoma cells. **RESULTS:** We identified seven CpGs hypomethylated in smokers' lung tissues. Four had previously been reported in blood DNA, indicating that blood DNA methylation changes can be strong predictors of epigenetic alterations in the lung. Four CpGs (including three seen in blood) appear to reside in regulatory elements; they lie on the edges of unmethylated regions of DNA in alveolar epithelial cells as determined by whole genome bisulfite sequencing. These regions contain smoking-inducible enhancer elements marked by aryl hydrocarbon receptor (AHR) binding sites and enhancer-specific histone modifications. Cigarette smoke condensate exposure increased these enhancer marks in lung adenocarcinoma cells and induced expression of *AHRR* and cytochrome P450 enzyme *CYP1B1*, known xenobiotic response genes. Expression of both genes was linked to smoking-related transversion mutations in TCGA lung tumors. **CONCLUSIONS:** Certain smoking-asso-

ciated DNA hypomethylation events can be used as surrogates for hypomethylation in the lung and can mark tobacco smoke-responsive elements that potentially regulate genes implicated in lung carcinogenesis.

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PA17-6

HIGH LEVELS OF ORAL NITROSAMINE-DERIVED DNA ADDUCTS IN SMOKERS WHO DEVELOP ORAL/HEAD AND NECK CANCER

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SIGNIFICANCE: The specific carcinogenic events that lead to oral/head and neck squamous cell cancer (HNSCC) are poorly understood. Tobacco specific nitrosamines (TSNA) almost certainly play a role and we report here a study of TSNA-related carcinogenesis (DNA adduct formation) at the tissue level. We enrolled and analyzed a cohort of smokers with and without HNSCC with regard to the levels of TSNA-derived urinary biomarkers and DNA adducts in the oral cavity. **METHODS:** Cigarette smokers with HNSCC (n=30) served as study subjects. Cigarette smokers without any history of cancer served as controls (n=35). Comprehensive tobacco use questionnaires were administered to all enrollees and samples of urine and oral buccal cells were obtained. Urinary biomarkers (NNAL and NNN) were measured by the validated liquid chromatography-tandem mass spectrometry (LC-MS/MS)-based procedure. In addition, TSNA-derived HPB-releasing DNA adducts in the oral cell samples were analyzed using a sensitive high resolution LC-MS/MS with nanospray ionization. The detection limit of the assay is 0.07 fg on-column, and the limit of quantitation is 0.35 fg on-column, starting with 50 pg DNA. Wilcoxon rank sum test was performed using Stata software (College Station, Tx) based on nonparametric data distribution. **RESULTS:** Levels of HPB-releasing DNA adducts were significantly elevated in those smokers who have developed HNSCC compared to those without a history of carcinoma (p=0.0015). However, comparison of TSNA levels (NNAL, p=0.19 and NNN, p=0.09) between the groups were not significantly different. In addition, cotinine levels between groups were similar (p=0.34) suggesting comparable levels of tobacco exposure. **CONCLUSIONS:** This data suggests that, despite similar tobacco exposures in both groups, those smokers who developed HNSCC have greater levels of TSNA-induced DNA damage in the oral cavity compared to smokers without cancer. This predisposition to greater DNA adduct formation may help to explain the eventual development of HNSCC in some smokers while not in others. A future analysis of DNA repair capability in each group would be useful to determine the mechanism for the difference observed in this study.

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POSTER SESSION 1

POS1-1

ASSESSING PRACTICE GUIDELINES FOR SMOKING CESSATION IN SEVERE MENTAL ILLNESS: AN AGREE II APPRAISAL

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BACKGROUND: Smokers with severe mental illness (SMI) are a priority population for cessation assistance. The evidence base for smoking cessation interventions for people with SMI is growing. Translation of this evidence into clinical practice through smoking cessation guidelines (SCG) is critical. This study reviewed the quality of current SCGs that included recommendations for people with SMI. **METHOD:** Systematic search of scientific databases, central government health authority websites, psychiatry peak bodies, guideline clearinghouses and Google for relevant SCGs from English speaking countries. Three reviewers independently assessed guideline quality using the Appraisal of Guidelines for Research and Evaluation II (AGREE II) instrument, which evaluates guideline development and quality of reporting using 23 items across 6 quality domains. **RESULTS:** Fourteen guidelines met the inclusion criteria. Six of these scored $\geq 60\%$ in at least 5 quality domains. Median domain scores for four quality domains ("Editorial independence", "Rigor of development", "Stakeholder Involvement", "Applicability") were less than 60%. Highest median domain scores were obtained for "Scope and purpose" (88%, range 69-100%) and "Clarity of presentation" (87%, range 56-98%). Lowest median domain scores were obtained in "Editorial independence" (40%, range 0-86%) and "Rigor of development" (56%, range 11-92%). **CONCLUSIONS:** Several (n=6) good quality SCGs exist. All SCGs clearly stated the objectives and target population/s. Recommendations of twelve SCGs were unambiguous and easily identifiable. However, many guidelines did not adequately report the methods used to appraise evidence (n=8) or the competing interests of guideline developers (n=8). Future guidelines development can benefit from addressing the AGREE II criteria.

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POS1-2

INCREASING VARENICLINE TO 3MG PER DAY IMPROVES SMOKING ABSTINENCE: A PROPENSITY SCORE ANALYSIS

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SIGNIFICANCE: The current recommended maximum daily dose of varenicline is 2 mg/day. Prior research has shown conflicting results on the utility of increasing the dose of varenicline beyond 2 mg/day. We examined the impact on abstinence of increasing the daily dose to 3 mg, among smokers who had an initial favorable response to the medication, but who were struggling to maintain abstinence. **METHODS:** Our naturalistic sample consisted of 429 smokers enrolled in a comprehensive program designed to treat tobacco use disorder among patients who received care at a comprehensive cancer center. We compared the smoking cessation outcomes in patients (n=73) who had their varenicline dosage increased from 2 mg to 3 mg per day with patients (n=356) who stayed at 2 mg per day, in both unmatched and propensity score-matched samples. All patients were initially treated with varenicline 1 mg twice per day for 6-8 weeks, had not quit, but had reduced smoking to < 5 cigarettes per day. After the initial 6-8 weeks at 2 mg per day patients received either the 2 or 3 mg dose until week 12 (end of treatment). In addition to varenicline, patients in both groups were provided with 6-8 sessions of 15-30 minutes of smoking cessation counseling. At 3, 6 and 9 months after increasing the dosage, abstinence outcome data (7 day point prevalence) were obtained from patients' self-report and confirmed by expired CO (< 4 ppm) in sub-sample who attended follow-up visits in person. Sensitivity analysis to unobserved confounding supported the viability of our findings. **RESULTS:** We found

significant improvement in abstinence in both unmatched and propensity score-matched samples among smokers who were increased to the 3 mg compared to those maintained at 2 mg of varenicline per day (3-month abstinence OR=2.3, $p < 0.05$; 6-month abstinence OR=3.0 $p < 0.05$; 9-month abstinence OR = 2.7, $p < 0.05$, based on the propensity score matched analyses results). We found no difference in adverse effects of treatment between the two groups. **CONCLUSIONS:** Patients who had an initial favorable response to varenicline (i.e., cut back to < 5 cig/day), but are struggling to achieve total abstinence from smoking, may benefit from increasing their dose of varenicline to 3 mg per day, a 30% increase from the currently recommended maximum daily dose.

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POS1-3

EFFECT OF LOW NICOTINE CONTENT ON SMOKING BEHAVIORS AND SMOKE EXPOSURE IN DAILY CIGARETTE SMOKERS

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INTRODUCTION: Reducing nicotine content in cigarettes has been proposed as a strategy to lower smoking prevalence; however, there are concerns smokers might increase their smoking frequency or intensity when using low nicotine content (LNC) cigarettes. The present study examined whether individuals who were switched from their own brand to LNC cigarettes changed smoking behavior or exposure. **METHODS:** Daily, non-treatment seeking cigarette smokers, completed a 35-day trial consisting of a 5-day baseline period, followed by a 15-day period smoking 0.25mg nicotine content cigarettes (LNC1), and a 15-day period smoking 0.08mg nicotine content cigarettes (LNC2). Daily cigarette consumption, smoking topography, total nicotine equivalents (TNE), carbon monoxide (CO) and NNAL, a metabolite of the carcinogen NNK, were the outcome measures. **RESULTS:** 100 participants (73% male, FTND=5.5, SD=1.8) were randomized to LNCs and 84 completed the study. Cigarette consumption increased when switching from own brand to LNC1 (own brand mean=15.1 [SD=5.8], LNC1 mean=17.9 [SD=7.3]) but decreased when switching from LNC1 to LNC2 (LNC2 mean=16.0 [SD=7.4], $p < 0.001$). Total puff volume was lower for both LNC conditions compared to own brand ($p < 0.001$). TNE and NNAL decreased in both LNC conditions compared with own brand ($p < 0.05$, $p < 0.001$, respectively), and did not differ between LNC1 and LNC2. CO boost did not differ between own brand and either LNC condition (own brand mean=4.2 [SD=2.3], LNC1 mean=4.4 [SD=2.0]), but decreased from LNC1 to LNC2 (LNC2 mean=4.0 [SD=1.7], $p = 0.025$). **CONCLUSIONS:** Smoking LNC cigarettes initially increased cigarette consumption during LNC1 use but approached baseline levels for LNC2, and total puff volume was significantly lower for all LNCs suggesting no evidence of behavioral compensation. TNE and NNAL decreased during the LNC periods relative to smoking their own brand, while CO levels did not differ from own brand. Results suggest no increase in smoking intensity and a decrease in exposure when switching to LNCs.

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**POS1-4****SMOKING INTENSITY AND DEPRESSIVE SYMPTOM SEVERITY AMONG EVER SMOKERS: EVIDENCE FOR BIDIRECTIONAL CAUSALITY? THE CARDIA STUDY**

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BACKGROUND: Smoking and depression are comorbid. Evidence indicates that depression perpetuates smoking, and growing evidence suggests that smoking perpetuates depression. We evaluated bidirectional associations between smoking intensity and depressive symptom severity among smokers over 20 years. **METHODS:** We used data from the Years 5, 10, 15, 20, and 25 exams of the Coronary Artery Risk Development in Young Adults (CARDIA) study. We included participants who attended all exams and reported ever smoking (packyears >0). Smoking was assessed as number of cigarettes per day (CPD). Depressive symptoms were assessed by the Center for Epidemiologic Studies Depression (CES-D) scale. We evaluated a cross-lagged panel model using PROC CALIS in SAS. We assessed autocorrelations (e.g. Year 5 CPD to Year 10 CPD) and cross-lagged associations (e.g. Year 5 CPD to Year 10 CES-D). Error covariances (e.g., Year 5 CES-D and Year 5 CPD) were included in the model. **RESULTS:** Participants (N=995) were 58% female, 41% African-American, and 23-35 years old in Year 5 and 43-55 years old in Year 25. Whereas 56% were current smokers in Year 5, only 34% were current smokers in Year 25. The goodness-of-fit statistics indicated that the model was an adequate fit of the data (SRMR=0.093, AGFI=0.818, RMSEA=0.139, BCFI=0.907). All autocorrelations within CPD and CES-D scores were significant and increased over time (CPD path coefficients: 0.53 to 0.62); CES-D path coefficients: 0.46 to 0.59; all $ps < .001$). Significant but small cross-lagged associations were observed for Year 5 CES-D to Year 10 CPD (path coefficient=0.07, $p < .01$), Year 10 CPD to Year 15 CES-D (path coefficient=0.08, $p < .01$), and Year 15 CES-D to Year 20 CPD (path coefficient=0.04, $p < .05$); no other cross-lagged path coefficients were significant. **CONCLUSION:** Using a novel approach to evaluate associations between smoking intensity and depressive symptom severity over 20 years, we found only small initial bidirectional associations that diminished over time, perhaps due to lower smoking rates. The relationship between intensity of continued smoking and depressive symptomatology may be better explained by other common factors, particularly later in adulthood.

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POS1-5**A PROSPECTIVE INVESTIGATION OF ONLINE SOCIAL NETWORK DYNAMICS AND ABSTINENCE**

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INTRODUCTION: Use of online social networks for smoking cessation has been associated with abstinence. To date, no studies have addressed the causal nature of this relationship. Using social network analysis, we investigated how temporal dynamics of an individual's network position are prospectively related to cessation. We predicted that increasing connectedness would be positively associated with abstinence. **METHOD:** Participants were N=2,660 adult smokers recruited to a randomized trial following enrollment on BecomeAnEX.org, an Internet cessation program with an online social network. At 3-months post-randomization, 30-day point prevalence abstinence was assessed and website engagement metrics were extracted. The social network was constructed with clickstream data to capture the flow of information among individuals. Four metrics of an individual's network position were calculated at weekly intervals over 3 months: 1) in-degree, the # of members whose posts a participant read; 2) out-degree, the # of members who read a participant's posts; 3) in-degree slope, the rate of in-degree increase; and 4) out-degree slope. Three clusters of network users were identified based on their community utilization: lurkers (N=2,164), contributors (N=480), and super-users (N=15). For each user type, logistic regression modeled abstinence as a function

of baseline variables, website utilization, and network metrics. **RESULTS:** Abstinence varied by cluster (lurkers=8.9%, contributors=18.3%, super-users=86.7%). For lurkers and contributors, abstinence was most strongly predicted by in-degree slope ($p < .01$). Out-degree and its slope were non-significant. Other predictors varied across user types. Among lurkers, baseline variables associated with abstinence were age, readiness to quit, nicotine dependence, and temptation to smoke. Among contributors, confidence to quit was the only baseline variable associated with abstinence. **CONCLUSION:** This study is the first to demonstrate that increasing connectedness in an online social network was strongly associated with abstinence. Network analysis offers powerful tools for understanding the mechanisms of online cessation intervention efficacy.

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POS1-6**DO MENTAL HEALTH SYMPTOMS PREDICT OUTCOMES IN WEB-BASED SMOKING INTERVENTIONS? A PROSPECTIVE ANALYSIS**

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BACKGROUND: Individuals with mental health conditions (MHCs) have higher rates of smoking than those without MHCs and many studies demonstrate that they are less likely to quit. Web-based interventions have great potential to increase accessibility of treatment for smokers with MHCs and reduce the rates of smoking. However, little is known about how smokers with MHCs respond to web interventions, and findings from the few studies on this topic are mixed. Better understanding differential responses to web interventions could guide treatment development efforts for smokers not responding as well to this platform. Therefore, we assessed smoking outcomes of web interventions among smokers screening positive for MHCs relative to those who do not. **METHODS:** Participants were smokers enrolled in a large (N=2,637), two-arm, web-based RCT for smoking cessation who completed follow-up surveys at 3- and 6-months post-randomization (88% and 89% follow-up rates, respectively). At baseline, participants completed self-report measures of depression, social anxiety disorder (SAD), post-traumatic stress disorder (PTSD), generalized anxiety disorder (GAD), and panic disorder. Outcomes were 7-day point prevalence abstinence at 3 and 6 months. Data were analyzed via logistic regression models controlling for treatment condition. **RESULTS:** Relative to those not screening positive for a MHC, screening positive for panic disorder was associated with 21-22% lower odds of quitting at 3 [OR=0.78, 95% CI=0.61,0.99] and 6 months [OR=0.79; 95% CI=0.63,0.99]. Screening positive for depression was associated with 21% lower odds of quitting at 6 months [OR=0.79, 95% CI=0.64,0.97]. Screening positive for SAD, PTSD, GAD, or ≥ 2 MHCs were not associated with differential odds of quitting. **CONCLUSIONS:** While traditional interventions often yield lower quit rates among smokers with SAD, PTSD, and GAD symptoms compared those without MHCs, web interventions may yield similar quit rates between these groups. In contrast with previous findings from web-based studies, those with depression and panic disorder symptoms were less likely to quit and may benefit from web interventions with additional supports.

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POS1-7

A PILOT RANDOMIZED CLINICAL TRIAL OF SNUS, MEDICINAL NICOTINE, AND E-CIGARETTES: EFFECTS OF INSTRUCTIONS AND PRODUCT ON USE AND SMOKING-RELATED BEHAVIORS

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This study was a multi-site, randomized control trial examining effects of instructions for use of snus and e-cigarettes (EC) as compared to medicinal nicotine and smoking as usual. Adult smokers ($N = 211$, $M_{age} = 43.6$, 45.0% female), uninterested in quitting, were recruited from the Minneapolis, MN, Columbus, OH, and Buffalo, NY areas. This two-phased study included: a) Sampling Week in which smokers were randomized to use Camel snus, Vuse EC or Nicorette gum/lozenges as they like, while continuing to smoke, and b) Clinical Trial phase consisting of eight visits over 10 weeks using assigned product. The Clinical Trial phase was restricted to those who used ≥ 7 pieces of product or ≥ 50 EC puffs during the sampling week ($n = 102$). During the clinical trial phase, participants were randomized to either 1) usual brand cigarettes (UB; $n = 9$); 2) complete substitution with snus (i.e., no smoking; $n = 12$); 3) partial substitution with snus (*ad libitum* use of snus and cigarettes; $n = 22$); 4) complete substitution with EC ($n = 20$); 5) partial substitution with EC ($n = 20$); or 6) complete substitution with gum/lozenge ($n = 19$). Descriptive statistics and repeated measures ANOVAs were used to analyze carbon monoxide (CO) and cigarettes per day (cpd) between baseline and week 4 of the clinical trial. Week 4 was chosen in order to optimize the sample size used for analyses. Fifteen participants achieved CO-verified abstinence by week 4; all were among the complete sub groups (snus = 3, EC = 9, gum/lozenge = 3). Compared to the EC partial sub group, snus ($p = .018$), EC ($p = .001$), gum/lozenge ($p = .004$) complete sub groups reported significantly greater reductions in cpd. Although a similar reduction pattern was seen in CO, between group differences were not statistically significant (mean CO reductions: UB = 0.8 ppm, snus complete sub = 8.9 ppm, snus partial sub = 2.4 ppm, EC complete sub = 12.4 ppm, EC partial sub = 0.3 ppm, gum/lozenge = 7.6 ppm). Some smokers were able to switch completely to non-combusted products; however, when given the option to use product with cigarettes, no smokers in this sample switched completely. Optimal instructions for product use would encourage complete substitution as many smokers may not make significant smoking reductions when instructed to use *ad libitum*.

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POS1-8

IMAGING MICROGLIAL ACTIVATION IN BRAIN AFTER IMMUNE CHALLENGE IN TOBACCO SMOKERS: PRELIMINARY COMPARISON WITH HEALTHY NONSMOKERS

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BACKGROUND: Tobacco smoke contains carcinogenic constituents with inflammatory effects, while nicotine has anti-inflammatory effects. Although the effects of tobacco smoking on the brain's inflammation system are unknown, dysregulated neuroimmune function is associated with cognitive impairment and neurodegeneration. Activation of microglia, brain cells responsible for neuroimmune maintenance, is critical to the brain's innate immune response. The goal of this work was to compare microglial activation in brain between smokers and nonsmokers with a PET neuroimaging paradigm measuring *in vivo* levels of activated microglia before and after an immune challenge. METHODS: Five tobacco smokers (4M, 1F; 22-32 years old) and nine healthy non-smokers (8M, 1F; 19-34 years old) were imaged twice with [¹¹C]PBR28 PET, a radiotracer specific to the 18 kDa translocator protein (TSPO). TSPO levels are overexpressed in activated microglia, thus [¹¹C]PBR28 indirectly measures levels of activated microglia. A baseline PET scan was acquired, followed by IV administration of 1 ng/kg lipopolysaccharide (LPS), a robust immune activator. Then a second PET scan was acquired 3 hours after LPS administration. TSPO levels were quantified with [¹¹C]PBR28 distribution volumes (V_T) throughout the brain. Percent increases in [¹¹C]PBR28 V_T quantified LPS-induced TSPO upregulation, interpreted as microglial activation. RESULTS: Tobacco smokers smoked 7-16 cigarettes per day for 4-14 years, with Fagerstrom Test for Nicotine Dependence scores ranging from 2-6. LPS-induced microglial

activation was blunted in tobacco smokers (36 \pm 17% increase in [¹¹C]PBR28 V_T) relative to nonsmokers (50 \pm 21% increase in [¹¹C]PBR28 V_T). This difference was significant in striatum and frontal cortex ($p < 0.05$) with a trend in parietal cortex ($p = 0.075$). There were no group differences in baseline [¹¹C]PBR28 V_T . CONCLUSION: Results from this study indicate that tobacco smoking may be associated with blunted LPS-induced microglial activation. These findings suggest that tobacco smoking may suppress neuroimmune response in the brain.

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POS1-9

PROLONGED EXTENDED COGNITIVE BEHAVIORAL THERAPY FOR CIGARETTE SMOKING CESSATION

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SIGNIFICANCE: Evidence is limited regarding the ultimate duration of extended cognitive behavior therapy (CBT) for promoting longer-term abstinence from smoking. METHODS: Randomized trial of CBT vs extended CBT for smoking cessation. Open-label treatment consisted of bupropion + nicotine replacement therapy (NRT) + CBT, followed by an adaptive pharmacotherapy treatment. Randomization occurred after a confirmed 24-hour quit analysis based on intention-to-treat. Setting: Community smoking cessation clinic. Participants: 219 smokers ($M = 43$ years of age; $M = 18$ cigarettes/day). Open-Label Intervention: All participants received 10 weeks of combined CBT + bupropion SR plus nicotine patch. From Weeks 11-26, participants received continued CBT and either no medications, continued bupropion + NRT, or varenicline, based on reports of abstinence, craving, and/or depressive symptoms. Extended CBT (E-CBT): Participants were randomized to either receive extended CBT through week 48 or brief telephone calls to obtain smoking status. Measurements: Expired CO-confirmed, prolonged abstinence and seven-day point prevalence abstinence at 52- and 104-week follow-up. RESULTS: There were no statistically significant differences between groups in point-prevalence abstinence at 52 weeks (Non-Extended CBT: 48.6%; E-CBT: 47.2%) (OR: 0.98, 95% CI: 0.73, 1.31) or 104 weeks (Non-Extended CBT: 50.4%; E-CBT: 39.8%) (OR: 0.87, 95% CI: 0.66, 1.1) or prolonged abstinence at 52 weeks (Non-Extended CBT: 35.1%; E-CBT: 30.5%) (OR: 0.86, 95% CI: 0.64, 1.1) or 104 weeks (Non-Extended CBT: 31.5%; E-CBT: 25%) (OR: 0.89, 95% CI: 0.64, 1.2). Prolonged abstinence was higher for males than females at 52 (50% vs. 14%) (OR: 0.55; 95% CI: 0.40, 0.76) and 104 weeks (40% vs 11%) (OR: 0.57, 95% CI: 0.40, 0.80) but there was no significant difference in point-prevalence abstinence rates from at week 52 or 104. Younger age, higher baseline levels of depressive symptoms and lower self-efficacy were associated with lower prolonged and point prevalence abstinence at week 52. CONCLUSIONS: Prolonging CBT from 24 to 48 weeks did not enhance long-term abstinence rates in smokers initially treated with open label CBT and pharmacotherapy. Although early relapse rates were higher for females, there were no differences in long-term (52-week or longer) point prevalence abstinence between genders.

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POS1-10

CHRONIC PAIN AND SMOKING CESSATION IN PRIMARY CARE SETTINGS

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BACKGROUND: Nicotine and tobacco have acute analgesic effects in humans, increasing both pain tolerance (duration) and pain threshold (intensity). Chronic pain is highly co-morbid with tobacco dependence. Pain increases the desire to smoke



and pain patients report smoking to cope with pain. As such, the acute analgesic effects of smoking could increase the reward value of smoking in those with chronic pain thus making quitting more difficult. However, very little research on smoking cessation in this population has been published. **METHODS:** The sample consisted of 25,574 participants who enrolled in a smoking cessation program (consisting of up to 26 weeks of NRT and behavioral counseling at no cost), through their primary care or addiction treatment provider between Jan 2014 and June 2016 and responded to the 3-month follow up survey (58% also responded to the 6-month follow-up survey). Chi-square tests and a logistic regression were conducted to analyze in the association between history of pain and 7-day point prevalence abstinence (PPA) at 3 and 6-months. Findings: 8,497 individuals (33.2%) reported a lifetime history of pain diagnosis at baseline. History of pain was significantly associated with lower quit rates at 3-months compared to those with no history of pain (32% vs. 38%; $p < 0.001$), as well as at 6-months post-enrollment (34% vs. 41%; $p < 0.001$). This association remained significant in a logistic regression controlling for effects of variables known to be associated with both smoking and chronic pain (i.e. depression score, alcohol use, opioid use) (3 months OR= 0.86, 95%CI=0.81-0.92, $p < 0.001$; 6 months OR=0.83, 95%CI=0.076-0.91, $p < 0.001$). **DISCUSSION:** This preliminary analysis of a treatment seeking primary care patient sample indicates that those with a lifetime diagnosis of chronic pain are significantly less likely to have quit smoking 3- and 6-months after enrollment in a smoking cessation program. Further analysis of treatment duration and other co-variables will be undertaken.

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POS1-11

INTERACTIVE VOICE RESPONSE PHONE CALLS TO DELIVER TOBACCO CESSATION TREATMENT AFTER HOSPITAL DISCHARGE: ACCEPTABILITY AND ASSOCIATION WITH SMOKING CESSATION IN TWO RANDOMIZED CLINICAL TRIALS

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BACKGROUND: Hospitalization offers smokers a good opportunity to quit smoking. Starting tobacco treatment in the hospital is effective, but only if treatment continues after discharge. Sustaining treatment after hospital discharge is a challenge for health care systems. A scalable option is to use interactive voice response (IVR) technology to provide automated phone calls to smokers after discharge. We assessed the acceptability of an IVR system to recently-discharged smokers and tested the association between number of IVR calls answered and smoking cessation outcomes. **METHODS:** Qualitative and quantitative data analysis from the intervention groups of 2 large RCTs ($n=1756$) that used IVR to offered post-discharge tobacco treatment to recently-hospitalized adult daily smokers planning to quit. After discharge, smokers received 5 IVR calls over 90 days plus free FDA-approved cessation medication (med). IVR calls offered messages to promote smoking cessation and medication adherence, offered medication refills, and triaged smokers to counseling support. Cessation outcomes were assessed at 1, 3, and 6 months post-discharge. **RESULTS:** At 3 hospitals, 878 smokers (mean age 51 years, 51% male, 74% white, mean 16 cigarettes/d) were enrolled and randomly assigned to the IVR intervention. Participants answered a median of 3 of the 5 planned IVR calls. Older smokers and those with smoking-related diagnoses accepted more IVR calls. Neither nicotine dependence nor baseline confidence in quitting was related to call completion. 70% of participants rated the calls as helpful, specifically citing reasons such as social support, access to counseling and medication and reminders to quit. Smokers who answered more calls were more likely to have quit smoking at 6-month follow-up (OR 1.49, 95% CI 1.30-1.70 for each additional call) in a multiple logistic regression that adjusted for age, sex, education, discharge diagnosis, cigarettes/day, duration of medication use, and perceived importance and confidence for quitting. **CONCLUSION:** Automated IVR-based calls are a feasible and acceptable way to sustain smoking cessation after hospital discharge. Higher IVR utilization was associated with higher odds of tobacco abstinence at 6 month follow-up. IVR technology offers health care systems a way to deliver tobacco treatment routinely and systematically to hospitalized smokers.

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POS1-12

BY WHEN DO I HAVE TO QUIT? COULD I JUST CUT DOWN SOME? EVIDENCE TO HELP INFORM DIFFICULT QUESTIONS IN PREGNANCY SMOKING INTERVENTIONS

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Women who participate in pregnancy smoking interventions often do not quit smoking right away or completely. Due to the need for very large data sets, little evidence exists to inform advice about when quitting should occur, or whether a certain amount of reduction is beneficial. The goal of the current study was to examine the effect of timing of quitting and/or amount of smoking later in pregnancy on newborn birth weight, the birth outcome most often affected by smoking and highly predictive of other adverse events. Data for all births in Tennessee, a state with a high rate and amount of pregnancy smoking, were available for a three-year period and included standard birth certificate variables. Of the 241,616 women, 15.7% ($n=37,975$) self-reported entering pregnancy as smokers, with 20.4% ($n=7,728$) quitting by delivery, and another 31.7% ($n=12,033$) reporting smoking reduction. Compared to those who did not smoke at all, those who quit by the end of the first trimester had only a slightly increased risk of a low birth weight (LBW) delivery (OR=1.16). Overall, smoking into the second trimester but quitting prior to the third led to substantial increase in the likelihood of LBW (OR=1.70), and smoking to delivery nearly doubled the risk of LBW (OR=1.95). Several timing of quitting and amount of reduction patterns across the three trimesters were examined, with any smoking beyond the first trimester substantially increasing the risk of LBW over even smoking more than 10 cig/day in the first trimester then quitting (OR=1.30). Even smoking 5 or fewer cigarettes per day after the end of the first trimester only slightly decreased the risk of LBW compared with higher levels of smoking through to delivery (OR=.95). The self-report nature of the data poses some limitations, and other important outcomes besides LBW may reveal different results. However, these findings suggest that if the goal is to avoid a LBW delivery, pregnant smokers should be advised that quitting completely by the end of the first trimester is important, and that continuing to smoke even 5 cigarettes or fewer per day after that point substantially increases the risk that their newborn will be LBW.

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POS1-13

NICOTINE ENHANCES ANTERIOR INSULA ACTIVATION TO PREDICTED AND UNPREDICTED OUTCOMES AMONG NONSMOKERS

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Tobacco use has a higher rate of dependence than other drugs of abuse. However, the psychopharmacological effects of nicotine are incongruent with the tenacity of tobacco addiction, since nicotine does not produce robust euphoria in humans or self-administration in rodents. A potential explanation for this paradox is that nicotine amplifies the reinforcement value of nondrug rewards, which could influence the initiation and persistence of smoking. However, the neural mechanisms of this process are unknown. The goal of this study was to investigate the acute effects of nicotine on predicted rewards after Pavlovian conditioning. We hypothesized that nicotine would enhance the neural response to unpredicted (relative to predicted) nondrug rewards compared to placebo. Twenty-three nonsmokers underwent two fMRI scans on separate occasions, once after a nicotine nasal spray and once after a placebo nasal spray. During the MRI, participants performed an outcome prediction task in which a pair of cues was associated with either a subsequent reward (the image of a \$100 bill) or a nonreward (the image of a blurry rectangle). On 20% of trials, the cue was followed by an unpredicted outcome. Overall, unpredicted outcomes increased activation in the anterior insula, dorsomedial and dorsolateral prefrontal cortex, and inferior parietal cortex compared to predicted outcomes. A 2 (drug) x 2 (prediction) x 2 (reward) within-subjects, repeated-measures ANOVA revealed a main effect of drug across all outcomes: nicotine increased BOLD acti-

vation in the anterior insula/inferior frontal gyrus and visual cortex and decreased BOLD activation in the caudate. Contrary to our hypothesis, nicotine increased the BOLD response similarly across all outcomes but did not enhance the response to unpredicted rewards in particular. These results suggest that, in nonsmokers, nicotine enhances outcome saliency subserved by the anterior insula and nicotine enhances visual attention subserved by the visual cortex. These mechanisms may underlie how nicotine amplifies the reinforcement value of nondrug rewards, which promotes continued nicotine use and contributes to its addiction liability.

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POS1-14

PREDICTORS OF ADHERENCE TO VARENICLINE OR NICOTINE PATCH AMONG SMOKERS WITH SUBSTANCE USE DISORDERS

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RATIONALE: In a 12-week randomized trial of varenicline (VAR) versus nicotine patch (NRT) for smokers with substance use disorders (SUD), the percentage of smokers abstinent on VAR was greatest among those in the upper third of adherence (took more than 77% of capsules) (Rohsenow et al., under review). Since average duration of adherence was only 3.4 weeks, finding ways to increase adherence is crucial to improving VAR effects. Potential predictors of medication adherence from the health belief model and social learning theory were examined. **METHOD:** Smokers with SUD ($n = 137$) were recruited for a two-group double-blind double-placebo controlled study of 12 wks VAR versus nicotine patch (plus dose run-up week). Predictors investigated were baseline major depression, number of SUDs, nicotine dependence, perceived susceptibility to relapse (expected intolerance of smoking abstinence), importance ratings of perceived barriers to cessation, number of side effects in the first week on medication, and nicotine withdrawal and urges to smoke in the week of their first quit attempt. **RESULTS:** Fewer punishing effects (fewer side effects, $r = -.22$) and more withdrawal relief on quit day ($r = -.32$, both $ps < .05$) predicted more adherence, while urge to smoke on quit day did not. While number/importance of perceived barriers to smoking cessation predicted less adherence ($r = -.28$, $p < .01$), our other predictors from the health belief model were not supported in the predicted direction, including severity of pretreatment nicotine dependence (significant in the opposite direction, $r = -.21$, $p < .05$), perceived susceptibility to relapse (ns), and having comorbid conditions (ns). Older people had more adherence to VAR ($r = .23$, $p < .05$), possibly reflecting maturity or experience, but education was unrelated. No predictors of NRT adherence were significant. **CONCLUSION:** The results indicate that addressing perceived barriers to smoking cessation, ways to manage side effects, and drawing attention to reduced withdrawal when on VAR would be important to address in counseling to improve VAR adherence.

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POS1-15

DIFFERENTIAL EFFECTS OF SMOKING WITHDRAWAL AND METHYLPHENIDATE ON RESTING STATE FUNCTIONAL CONNECTIVITY AMONG SMOKERS WITH AND WITHOUT ADHD

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SIGNIFICANCE: Adults with ADHD smoke at higher rates than the general population, report increased withdrawal symptoms, and are less likely to quit smoking. However, little is known about neurobiological mechanisms underlying this comorbidity. **METHODS:** We examined resting state functional connectivity (rsFC) across multiple brain networks previously implicated in nicotine dependence, in order to determine if withdrawal-induced changes in rsFC are exacerbated among smokers with ADHD. We further investigated the role of dopaminergic neurotransmission with a methylphenidate (MPH) challenge. Smokers with ($n=17$) and with-

out ($n=21$) ADHD completed resting state fMRI scans under 3 conditions: a) smoking as usual + placebo; b) 24 hr abstinence + placebo; and c) 24 hr abstinence + MPH. RsFC analyses were conducted in CONN using seed regions of interest in the medial prefrontal cortex (mPFC), bilateral dorsolateral prefrontal cortex (DLPFC), and dorsal anterior cingulate cortex (dACC), to probe default mode network, executive control network (ECN), and salience network (SN), respectively. Group differences were evaluated in SPM8 using a series of 2 (group) X 2 (condition) ANOVAs separately evaluating effects of abstinence and MPH. **RESULTS:** Across conditions, ADHD smokers exhibited lower rsFC than controls between dACC and right DLPFC, along with several other regions within ECN and SN. Group by abstinence interactions were observed for rsFC between mPFC and left insula/putamen and between right DLPFC and occipital cortex/cuneus, such that ADHD smokers exhibited greater attenuation of rsFC during abstinence compared with controls. A similar group by drug (MPH versus placebo) interaction was observed between mPFC and left caudate/thalamus and between right DLPFC and occipital cortex/cuneus. **CONCLUSIONS:** Overall, smokers with ADHD exhibited weaker rsFC between several key SN and ECN regions that was further attenuated during abstinence. Abstinence-induced decreases in rsFC between ECN and visual attention areas were reversed by MPH in ADHD smokers, suggesting dopaminergic involvement. These effects are consistent with increased withdrawal among ADHD smokers and may help to explain comorbidity.

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POS1-16

THE EFFECTS OF NICOTINE ON THE HABITUATION OF REINFORCER EFFECTIVENESS

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Beyond its primary and secondary reinforcing effects, nicotine also enhances reinforcement from non-drug stimuli unrelated to smoking. Possibly relevant to that effect, nicotine may maintain a non-drug reinforcer's effectiveness across repeated presentations by decreasing habituation to the reinforcer. Nicotine has been shown to slow habituation of reinforcer effectiveness in an animal model, but this effect has not yet been examined in humans. This study explored nicotine's effect on habituation of non-drug reinforcer effectiveness in humans. In a within-subjects design, 18 dependent smokers participated in two nearly identical experimental sessions. Sessions varied by smoking condition, no nicotine after overnight abstinence (>12 hr; CO <10 ppm) or ad lib smoking of own cigarette without overnight abstinence (CO >10 ppm). In each session, participants engaged in a 15-min operant response task to earn time viewing a preferred picture (attractive human model), with unique pictures per session. Within-session patterns of responding were compared across conditions via multi-level modeling. As hypothesized, significant linear interaction of nicotine condition*time showed a shallower decline in responding over time in the smoking condition compared to the no nicotine condition ($\beta=.03$, $p<.05$). A significant interaction of nicotine condition*time², indicated slower rate of quadratic change in responding for the smoking condition compared to the no nicotine condition, ($\beta=-.0003$, $p<.05$). Overall, 38% of variability in responding was explained by nicotine condition, although the effect of nonspecific smoking behavior was not examined. There was no relationship between nicotine withdrawal and duration responding. Results confirm nicotine may slow within-session declines in responding attributed to habituation of reinforcer effectiveness in humans, consistent with preclinical findings. Possible implications of this research for understanding persistence of dependence will be addressed.

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POS1-17

PARSIMONIOUS SMOKING LAPSE RISK ESTIMATION AMONG SOCIOECONOMICALLY DISADVANTAGED SMOKERS USING ECOLOGICAL MOMENTARY ASSESSMENTS

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SIGNIFICANCE: The purpose of this study was to examine three models for identifying risk of smoking lapse in real-time among socioeconomically disadvantaged adults who received an adjunctive, smartphone-based smoking cessation treatment. **METHODS:** Participants were recruited from a safety-net hospital smoking cessation clinic and received a tailored, smartphone-based smoking cessation intervention (Smart-T). The Smart-T app prompted 5 ecological momentary assessments (EMAs; 1 daily diary and 4 random) each day. Participants could also self-initiate EMAs during periods of smoking urge and before/after smoking lapse. A lapse risk score was calculated using current reports of smoking urge, stress, cigarette availability, interaction with someone smoking, recent alcohol consumption, and motivation to avoid smoking. Receiver operating characteristic (ROC) analyses were used to examine the utility of weighted and unweighted versions of the lapse risk score for predicting imminent lapse, and a single item from the daily diary (i.e., self-reported odds of same-day smoking) in predicting daily smoking lapse. **RESULTS:** Participants (N=57) were on average 52.0 years old, female (54.2%), African-American (52.5%), earned less than \$16,000 per year (69.0%), and smoked 20.3 cigarettes per day at baseline. All three models predicted smoking lapse (area under the ROC curve (AUC) = 0.76-0.79). For predicting imminent lapse, the weighted lapse risk score had a sensitivity of 50.7% and a specificity of 87.2%, and the unweighted lapse risk score had a sensitivity of 68.9% and a specificity of 80.4%. For predicting lapse within the day, self-reported odds of smoking had a sensitivity of 63.4% and a specificity of 94.7%. **CONCLUSIONS:** Symptoms reported via EMA can be used to indicate risk of smoking lapse. Study results showed that self-reported odds of same-day smoking may be a parsimonious way to indicate heightened risk for daily lapse. This type of smoking lapse risk estimation could be used to tailor just-in-time smoking cessation interventions.

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POS1-18

INTRA-INDIVIDUAL AND INTER-INDIVIDUAL VARIABILITY OF PLASMA NICOTINE PK PARAMETERS IN E-VAPOR PRODUCT USE BY ADULT CIGARETTE SMOKERS

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SIGNIFICANCE: Plasma nicotine pharmacokinetic profiles are often used to characterize nicotine exposure from e-vapor products (EVP). Intra- and inter-individual variability is useful in the design of such studies (e.g. sample size estimation). This information, however, has not been reported in the literature. **METHODS:** We analyzed two plasma nicotine PK parameters, maximum concentration (C_{max}) and area under the curve (AUC) from a randomized cross-over clinical study in which 6 different commercial and prototype EVPs were used by adult cigarette smokers (n=24) under two use conditions (10 hours apart during the study). The first condition was a pre-specified use of 10 inhalations of 4 second duration with 30 second intervals and the second condition was an ad libitum use condition (use for 10 minutes without pre-specified use condition). A linear mixed model that included study product, sequence and period as fixed effect and subject as random effect was used to estimate the intra- and inter-individual variability. **RESULTS:** Intra-individual variability for C_{max} and AUC was smaller than inter-individual variability under both conditions. The variability (CV%) under the ad libitum condition was larger (intra= 28% and inter= 53% for C_{max}_(0-2hrs); intra= 22% and inter=54% for AUC_(0-2hrs)) than under the pre-specified condition (intra= 26% and inter= 28% for C_{max}_(10-12hrs); intra= 21% and inter= 28% for AUC_(10-12hrs)). Inter-individual variability in the ad libitum condition was over 50% in both parameters. **CONCLUSIONS:** We

have previously reported the variability for 24-hour nicotine equivalents in adult cigarette smokers from confined clinical studies (intra-individual CV =19% and inter-individual CV=38%) which was lower than that observed for nicotine plasma parameters for EVP from this study. These variability estimates could be used in designing future PK studies for EVP, depending on study purpose and design.

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POS1-19

DEPRESSIVE SYMPTOMOLOGY AND OPRM1 A118G VARIANT AS MODERATORS OF NALTREXONE EFFECTS ON SMOKING URGES DURING ALCOHOL ADMINISTRATION

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Naltrexone (NTX) has been advanced as a potential smoking cessation medication that may be especially efficacious amongst heavy drinking smokers and smokers experiencing greater depressive symptomatology. Pharmacogenetic studies have suggested the A118G single nucleotide polymorphism (SNP) of the gene coding for μ -opioid receptors (OPRM1) moderates clinical responses to NTX for alcohol use disorders. To expand the literature on NTX for smoking, this study seeks to examine (1) the effects of NTX on smoking urges during alcohol administration, (2) moderating role of depressive symptomatology, and (3) moderating role of the A118G SNP. A community sample (N = 31) of heavy drinking smokers of East Asian descent (identified for overrepresentation of A118G SNP) completed two double-blinded, counterbalanced alcohol administrations, one after taking NTX (50 mg/day) and one after matched placebo for five days. Participants rated their urge to smoke cigarettes on an 11-point Likert scale obtained at baseline, Breath Alcohol Concentration (BrAC) of 0.02, 0.04, and 0.06 g/dl. Depressive symptomatology was assessed at the first study visit by the Beck Depression Inventory (BDI-II). Mixed model analyses revealed that NTX reduced smoking urge across rising levels of BrAC in comparison to placebo (Med \times BrAC; $b=-0.49$, $SE=0.15$, $p<0.01$). BDI-II predicted smoking urge ($p's<0.01$) and moderated the effect of NTX on urge averaged across BrAC level (Med \times BDI-II; $b=-0.04$, $SE=0.02$, $p=0.04$), such that NTX (relative to placebo) decreased urge more strongly amongst those with greater depressive symptoms. Analyses are underway to test the effects of A118G SNP as a moderator of responses to NTX. Results suggest that NTX blunts smoking urges during alcohol intoxication and, for individuals with higher levels of depression, reduces smoking urges across BrAC level. Alcohol use and depressive symptoms predict an increase in nicotine dependence severity and risk of relapse during smoking cessation. This study suggests that the influence of these two key vulnerability factors on smoking may perhaps be buffered by NTX. Further research of NTX as a candidate for other high risk populations may be fruitful.

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POS1-20

DOES INCLUSION OF CRAVING MANAGEMENT TOOLS INCREASE EFFECTIVENESS AND USAGE OF A STOP SMOKING APP? RESULTS FROM BUPAQUIT TRIAL

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SIGNIFICANCE: Cigarette cravings play an important role in relapse during attempts to stop smoking. Smartphone applications (apps) targeting cravings may reduce the risk of relapse but this has yet to be assessed empirically. This study aimed to evaluate the effectiveness of a smartphone app that included craving management tools (BupaQuit) versus a similar app that did not include them. **METHODS:** The study was a two-arm parallel and double-blind randomised controlled trial (RCT; trial registration: ISRCTN10548241) comparing a fully-automated app, BupaQuit, which included craving management with a version of the app without these tools. A total of 425 adult UK-based daily smokers were recruited remotely, individually randomised within the app to receive the intervention (n=208)



or control (n=217), and followed up through the app, email or phone. The primary outcome was self-reported 14-day continuous abstinence from smoking, assessed at 4 weeks after the quit date. The primary outcome was assessed with fisher's exact test using intent-to-treat (ITT) analysis. Secondary outcomes included app usage and remotely biochemically validated abstinence using personal CO monitors. RESULTS: There was no significant difference between intervention and control arms in self-reported 14-day continuous abstinence rates at 4 weeks (13.9% vs 15.7%, respectively; RR=.89, 95%CI=.56-1.41) or number of logins (mean=9.6 vs 10.5; median=4 vs 5), but intervention participants spent significantly more time using the app (402 vs 326 seconds). At follow-up, 53.8% of participants were reached, of which 11.4% were contacted through the app and 78.6% through the phone. Only a quarter of participants who self-reported abstinence returned a CO reading. CONCLUSIONS: The addition of craving management tools in BupaQuit did not increase app effectiveness. Remote validation of abstinence using personal CO monitors was not successful.

FUNDING: AH is funded by British Heart Foundation PhD Studentship, JB by Society for Study of Addiction, HKU by National Centre for Smoking Cessation and Training, EB by NIHR School for Public Health Research, and RW by Cancer Research UK. AM was employed at Bupa. BupaQuit app development and trial costs were funded by Bupa.

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POS1-21

PREVALENCE OF TOBACCO USE IN PEOPLE LIVING WITH HIV/AIDS: SECONDARY ANALYSES BASED ON DEMOGRAPHIC AND HEALTH SURVEYS

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Following recent advances in antiretroviral therapy, people living with HIV are expected to have near-normal life expectancy. However, smoking is proving to be a major roadblock in achieving this goal. Where antiretroviral therapy is available, more life years are lost to smoking than to HIV. There are no existing global estimates of the prevalence of tobacco use in HIV positive individuals and no attributable disease burden estimates for such exposure. Moreover, the little available prevalence data is mainly from developed country contexts, with a glaring evidence gap for developing countries. This study aimed to estimate the national prevalence of tobacco use among HIV-positive individuals in 28 low- and middle-income countries, and to compare these with the general population national estimates. The study is a secondary analysis of the Demographic and Health Survey (DHS) data from 28 low- and middle-income countries, where tobacco use and HIV Test data is available. For each country, the prevalence of tobacco use (smoked and/or smokeless) among HIV-positive individuals was estimated and compared with general population national estimates stated in the corresponding DHS reports. The prevalence of tobacco use among HIV-positive individuals was consistently higher than the general population prevalence for both men and women. The results highlight the need for targeted policy, practice and research action to address tobacco use in this group, in addition to general population tobacco control strategies, to improve health outcomes. Some recommended actions will be discussed.

FUNDING: No funding

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POS1-22

DESIGNING A TOBACCO CESSATION INTERVENTION FOR INTEGRATION WITHIN NATIONAL TB PROGRAMMES IN SOUTH ASIA

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BACKGROUND: The majority of national TB programmes in low income countries do not routinely assess tobacco use or support patients to quit. Our previous research shows that behavior support delivered by TB health workers enables

cessation but implementation challenges still exist. Our current research aims to adapt and evaluate tobacco cessation interventions that can be integrated within TB programmes in South Asia. The development and feasibility work and how this fits within our cost-effectiveness trial is presented here. METHODS: We used qualitative interviews with tobacco users diagnosed with TB, interviews and questionnaires with health workers and expert meetings with TB programme professionals. Twelve focus groups were held separately with male and female TB tobacco users and 15 interviews with TB health workers in Nepal, Bangladesh and Pakistan. Patients and staff were shown different options of intervention materials (flipbook, leaflet and posters) and their understanding of key messages assessed. The questionnaire assessed health workers' capability, opportunity and motivation to deliver cessation. Questionnaire results and qualitative findings informed development of a training package for TB health workers. To understand organisational and health system context, we interviewed 5 district TB officers and reviewed policy documents. All materials were adapted and discussed with TB programme professionals. A group of independent assessors coded the intervention for behavior change techniques following Michie et al's (2013) taxonomy. Findings: Development of an intervention for all TB patients, not just tobacco users, facilitated buy-in from National TB programmes as did their continual engagement in the development process. Consideration of gender differences were important in the design of materials and training. Addressing staff capability, opportunity and motivation informed the content and style of training. CONCLUSION: the process followed enabled strong engagement of national TB programmes, patients and health workers. The fidelity of delivery, cost-effectiveness and implementation process will be assessed within the trial.

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POS1-23

GENDER DIFFERENCES IN SMOKING BEHAVIOR FOR WOMEN AND MEN WITH HIV/AIDS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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INTRODUCTION: Persons living with HIV/AIDS (PLWH) smoke at higher rates than other adults and experience HIV-related and non-HIV-related adverse consequences of smoking. While gender differences in quitting and other smoking-related behaviors have been found in general population studies, it is not clear whether these same differences are found for PLWH. The purpose of the current study was to conduct a systematic review to synthesize current knowledge about gender differences in smoking behaviors among PLWH. METHODS: Over three thousand abstracts from MEDLINE were reviewed and seventy-five publications were identified that met all of the review inclusion criteria (i.e., reported data on smoking behaviors for PLWH by gender). Sufficient data were available to conduct meta-analyses for current smoking prevalence. Results. Across studies (n=51), the meta-analytic prevalence of current smoking among women was 36.3% (95% CI=28.0%-45.4%) and men was 50.3% (95% CI=44.4%-56.2%; meta-analytic OR=1.78, 95% CI=1.29-2.45). When analyses were repeated on U.S. studies (n=23), the prevalence of current smoking was not significantly different for women (55.1%, 95% CI = 47.6%-62.5%) compared to men (55.5%, 95% CI = 48.2%-62.5%; meta-analytic OR=1.04, 95% CI=0.86-1.26). Few studies reported data by gender on quit or treatment-related variables (e.g., quit attempts, treatment adherence, treatment outcomes). Results were mixed regarding the use of specific treatments to quit smoking and the small number of treatment studies that examined gender did not find evidence of differences in treatment outcomes. No study was identified that compared cravings or withdrawal for PLWH by gender. CONCLUSION: Both women and men with HIV/AIDS report high prevalences of smoking. Little is known about gender differences in smoking-related variables that might impact treatment or treatment-related variables. More research is needed to understand similarities and differences in the smoking behavior of PLWH by gender in order to provide the best interventions to reduce the high smoking prevalence for all genders.

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POS1-24

SMOKING CESSATION IN PEOPLE WITH TYPE 2 DIABETES: AN INTERVENTION TAILORED TO DIABETES AND GENDER SPECIFICITIES

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Gender is an important social determinant of health. Not taking gender into account, can lead to inadequate management and health disparities. Few smoking cessation interventions have been adapted to gender specificities. In a diabetic population, gender might be of even more importance. The relationship between smoking and diabetes is complex. On one hand smoking increases micro- and macro-vascular complications and mortality. On the other hand smokers with diabetes might have more difficulties quitting because of specific barriers linked to weight gain at cessation and consequences on diabetes control. Men and women might have different perceived risks and concerns about quitting smoking and its metabolic consequences. Furthermore, the impact of smoking cessation on diabetes control and complications might differ between men and women. The aim of the DISCOG study (Diabetes and Smoking Cessation: a Gender Oriented study) is to design a gender specific smoking cessation intervention, which acknowledges gender norms and considers women and men's specific needs, in a population of people with type 2 diabetes and to test the efficacy of this intervention. In a preliminary phase, we used mixed qualitative and quantitative approaches to understand the beliefs and needs of type 2 diabetic smokers. Ten in-depth semi-structured individual interviews and 5 focus groups have been performed, including a total of 33 participants (14 women and 19 men, mean age 60 years old), using the Information-Motivation-Behavioral Skills Model. Based on the findings of the qualitative study, we designed a survey which was submitted to 200 smokers (ongoing) and ex-smokers with type 2 diabetes. The conclusions the survey and interviews will help us to tailor to gender and diabetes specificities a combined pharmacotherapy and behavioral smoking cessation intervention. The efficacy of the intervention will then be tested in a randomized controlled trial. Using a participatory design to integrate gender specificities and special needs of type 2 diabetic smokers in a behavioral smoking cessation intervention could increase the uptake, acceptability and efficacy of the intervention.

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POS1-25

DESIGNING A PRIMARY CARE INTERVENTION WITH THE BEHAVIOUR CHANGE WHEEL: THE CASE OF MATERNAL INDIGENOUS SMOKING

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INTRODUCTION: Prevalence of smoking among pregnant Indigenous women remains high globally. In Australia smoking rates among pregnant Aboriginal and Torres Strait Islander women are 47%, and slow to decline. We developed an intervention to meet the needs of the target population, and improve culturally competent smoking cessation care (SCC) for pregnant Indigenous smokers, by training health providers at Aboriginal Medical Services. METHODS: We identified evidence-practice gaps by conducting: two systematic literature reviews on provider attitudes and interventions for SCC in pregnancy; a national survey of Australian clinicians; and gathering stories of smoking and quitting from Aboriginal mothers. These studies facilitated the development of a targeted intervention, called Indigenous Counselling and Nicotine (ICAN) QUIT in Pregnancy using an ABCD (Ask/ Assess; Brief advice; Cessation: Discuss) approach. A Stakeholder and Consumer Aboriginal Advisory Panel was consulted on developing innovative intervention materials. Theoretical models, COM-B and the Theoretical Domains Framework were used to code influences on health provider behaviour. RESULTS: Areas identified for health provider performance improvement included: capability (confidence), motivation (optimism), and opportunity (resources/time). The intervention builds capability by training clinicians to assist women to quit by using counselling and pharmacotherapy; opportunity by providing evidence based culturally sensitive resources that were pre-tested in several Australian communities, and encom-

passing a 'whole-of-service' approach; and optimism for success by presenting up to date evidence, and positive testimonials from patients and clinicians. Webinar brings the training to the services to accommodate time and location constraints. CONCLUSIONS: The formative development of ICAN QUIT in Pregnancy demonstrates how it is uniquely designed to improve the implementation of evidence based SCC for expectant mothers attending Aboriginal Medical Services. Training was designed to improve gaps in SCC identified from several robust studies, and includes improved counselling skills and pharmacotherapy management.

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POS1-26

PRISM: A COUPLE-FOCUSED INTERVENTION TO PREVENT POSTNATAL SMOKING RELAPSE IN ROMANIA

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BACKGROUND: Maternal smoking is one of the most modifiable factors with clear adverse effects for the fetus and the entire family. Addressing the dearth of pregnancy smoking interventions with partner support, PRISM is a partnership between a research institution and the two largest state-owned obstetrics and gynecology clinics in Cluj-Napoca, Romania. OBJECTIVE: To assess the feasibility, acceptability, and initial efficacy of a postnatal smoking relapse prevention intervention in Romania. METHODS: The intervention was a program of counseling for couples based on motivational interviewing and delivered over the phone after birth. The study was a RCT of 199 Romanian couples recruited soon after childbirth, with mothers who spontaneously quit smoking during or before pregnancy and remained abstinent (biochemically verified) until delivery. Participants were randomized to: (1) control (usual prenatal care, n=97); and (2) intervention: up to 3 counseling calls for mothers and 1 for their partners using motivational interviewing to encourage the woman to remain smoke-free and the partner to support her decision (n=102). The primary outcome was maternal smoking abstinence at 6 months postpartum. Participants were coded as smokers if not followed-up. RESULTS: The current six-month follow-up rate is 74%. Approximately 71% (72) accepted 2, and 55% (56) all 3 counseling calls. Over 49% (48) of the women in the control group, 52% (29/56) of those with 3 calls, and 49% (35/72) of those with 2 calls were continuously smoke-free for 6 months at the final follow-up. In multivariate regressions, women who received the complete intervention (3 calls) were more likely to remain smoke-free, although the differences did not reach statistical significance (+4%, p=0.68). Discussion PRISM was a feasible intervention with good acceptability and showed some potential to reduce maternal postnatal smoking relapse among those receiving the complete counseling program. The couples-focused program may be an effective method to prevent and reduce smoking, which may lead to improved child, mother, and partner health both in the short and the long term.

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POS1-27

A PACK OF PILLS AND A PUFF OF SMOKE: COULD HORMONAL CONTRACEPTIVES BE INFLUENCING SMOKING BEHAVIOR?

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Despite mounting evidence that endogenous sex hormones influence smoking behavior, little is known about the role of hormonal contraceptives (HC). This presentation will draw from two studies to describe the current prevalence of use of different types of hormonal contraceptives among premenopausal smokers, as well as to compare women on HC to women who are not (no-HC) and men in terms of smoking behavior, use of alternative tobacco products, smoking-relat-



ed symptomatology and smoking cessation. The first study is an ongoing online cross-sectional study of men and women smokers between the ages of 18 and 35. Preliminary data indicated that nearly half (49%) of women reported current use of hormonal contraceptives. The most prevalent types were oral contraceptive pills (32%), Depo Provera (8%), and Implanon (4%). While there were no significant differences in smoking behavior, significant differences were noted in craving (no-HC>HC>men), craving reduction (no-HC>HC>men) and withdrawal (HC>no-HC>men). Compared to men and no-HC, HC were significantly less likely to report recent use alternative forms of tobacco including e-cigarettes, cigars, pipe, smokeless tobacco, and hand-rolled cigarettes. The second study is a recently completed smoking cessation randomized clinical control trial. Compared to men (n=52) and no-HC (n=52), HC (n=26) had significantly greater withdrawal prior to quit (2.1±0.2 vs. 2.0±0.2 vs 2.9±0.3, respectively), on quit day (2.2±0.3 vs. 2.4±0.3 vs 3.6±0.5, respectively) and 7 days after quit (2.2±0.4 vs. 2.2±0.3 vs 3.6±0.5, respectively). Finally, though not statistically significant, HC had a greater number of days to relapse compared to HC and men (42.3±11.0 vs. 28.8±7.9 vs. 28.3±8.6, p>0.05). These data indicate that hormonal contraception use is prevalent among premenopausal smokers and may be related to a variety of smoking-related outcomes. Thus, the systematic exploration into the role of hormonal contraceptive on smoking behavior and cessation outcomes is warranted.

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POS1-28

THE ROLE OF SUBJECTIVE SOCIAL STATUS IN SMOKERS' RESPONSE TO A PROACTIVE SMOKING CESSATION INTERVENTION

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SIGNIFICANCE: While the overall prevalence of smoking in the US has declined over the past several decades, disparities in smoking prevalence and quit rates by socioeconomic status have increased. Underlying this are likely "fundamental causes" as defined by Phelan and Link (2005), in which those with lesser social and material resources are less likely to reap benefits from traditional health-promotion interventions. The study objective was to test whether a proactive, population-based tobacco cessation intervention would confer greater benefit to higher social status individuals. **METHODS:** This was a secondary analysis of a randomized clinical trial involving a population-based registry of current smokers, identified using the Department of Veterans Affairs (VA) electronic medical record. Current smokers were randomized to usual care or proactive care, which combined proactive outreach and the offer of free smoking cessation services (in-person or by telephone). Social status was assessed by the 10-level MacArthur Scale of Subjective Social Status (SSS), which captures perception of one's position in the social hierarchy. The primary outcome was 6-month prolonged smoking abstinence at 1 year and was assessed by a follow-up survey sent to all participants who had enrolled in the trial at baseline (N = 2249). **RESULTS:** There was an interaction between treatment group and SSS (p = .0047), after taking into account the stratification by site study design and demographics (age, race, gender, and marital status), such that higher SSS smokers were more likely than lower SSS smokers to benefit from the intervention. To illustrate the magnitude of this effect, the extreme cases model estimated quit rates for the proactive and usual care arms were 24.2% and 12.0%, respectively for the highest SSS group (highest 4 levels of the 10 level scale; OR = 2.36 (95% CI=(1.43,3.88)); and 13.5% and 14.6% for the lowest SSS group (lowest 4 levels; OR=0.92 (95% CI=(0.58, 1.46)). **CONCLUSIONS:** Fundamental causes are likely important drivers of smoking disparities and are not necessarily overcome by offering traditional smoking interventions. While proactive cessation outreach is an important and effective tool for connecting with hard-to-reach smokers, disadvantaged smokers could likely benefit from interventions that go even further to enhance their access to resources.

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POS1-29

FINANCIAL STRAIN INDIRECTLY INFLUENCES SMOKING CESSATION THROUGH DEPRESSION, SLEEP QUALITY, AND WITHDRAWAL SYMPTOMS

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SIGNIFICANCE: Previous research has shown that financial strain has an adverse impact on smoking cessation. However, the mechanisms through which financial strain exerts its influence on cessation remain unclear. The purpose of the current study was to examine depression, withdrawal symptom severity, and sleep quality as potential pathways through which financial strain may influence smoking cessation among socioeconomically disadvantaged adults making a quit attempt. **METHODS:** Participants included in the current analyses (N = 139) were primarily Black (63.3%) and female (57.6%) adults enrolled in a smoking cessation program at a safety-net hospital. Participants were randomized to usual care, which included pharmacotherapy and counseling sessions (n = 66), or usual care plus financial incentives for smoking abstinence (n = 73). Financial strain was measured 1 week prior to the quit date. The Center for Epidemiological Studies-Depression (CES-D), the Wisconsin Smoking Withdrawal Scale (WSWS), and the Pittsburgh Sleep Quality Index (PSQI) were administered on the scheduled quit date. Biochemically-verified 7-day point prevalence abstinence was assessed at 4 weeks after the scheduled quit date. Mediation analyses were conducted (using the PROCESS macro for SPSS [model 4]) to evaluate the indirect effects of financial strain on biochemically-verified abstinence through quit date measures of depression (CES-D), withdrawal symptoms (WSWS), and sleep quality (PSQI), after adjustment for age, gender, treatment group, race, years of education, and abstinence on the scheduled quit date. **RESULTS:** Mediation analyses indicated significant indirect effects of financial strain on smoking cessation through depression (CES-D), withdrawal symptom severity (WSWS), and global sleep quality (PSQI) after adjustment for covariates. Specifically, greater pre-quit financial strain was associated with increased depression, more severe withdrawal symptoms, and poorer sleep quality measured on the quit date, which decreased the likelihood of achieving abstinence 4 weeks after the scheduled quit date. **CONCLUSIONS:** Findings suggest that depression, withdrawal severity, and sleep quality are underlying mechanisms through which financial strain influences smoking cessation. Treatment approaches that attempt to ameliorate financial strain directly, or address the post-quit sequelae of financial strain may increase the likelihood of smoking cessation among socioeconomically disadvantaged adults.

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POS1-30

TRANSLATING RESEARCH INTO PRACTICE: OUTCOMES WITH INDIGENOUS POPULATIONS IN REMOTE NORTHERN COMMUNITIES

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OBJECTIVE: A standardised evidence-based smoking cessation program was implemented into practice with Indigenous peoples in Northern Ontario, Canada, to determine the effectiveness of the program in rural and remote areas. In a series of 7 randomised clinical trials with hospitalised patients, the intervention has



consistently evidenced among the highest cessation rates reported in the literature. **METHODS:** Moving On to Being Free™ is a behavioural smoking cessation intervention grounded in Bandura's (1986) self-regulation and self-efficacy theory, Marlatt & Gordon's (1985) relapse prevention model, and Skinner's (1938) operant conditioning. Inpatients and outpatients were recruited in a community hospital that serves northern First Nations remote fly-in communities from as far away from the hospital as 715 km. The intervention was offered at bedside for inpatients by the inpatient smoking cessation nurse and in outpatient programs by clinicians who had a counselling role in the outpatient program and who were trained to deliver the program. After explaining the program and signing informed consent, the initial 1-hr face-to-face session was followed by an 8-week telephone program and phone follow-up at 3, 6, and 12 months. Patients received quit kit "gift bags" with articles such as toothbrushes and toothpaste, and activity items such as colouring books and playing cards to help with options for doing something "instead of" smoking. Pharmacotherapy was not provided by the program but was available at no-cost or low-cost through various options. **RESULTS:** Of the 125 patients enrolled from 37 northern communities; 71% were from remote First Nations reserves, 89% were Indigenous, 50% were unemployed or disabled, 60% were female, 43% had less than high school education, and the majority had a chronic disease. Telephone follow-up was a barrier as many patients did not have access to phones, so alternative options were developed for follow-up. Using intention-to-treat analyses, 50% were smoke-free at one-year; 38% were continuously abstinent for the last 6 months. **CONCLUSIONS:** The intervention was not only effective with this population from remote communities, the outcomes were substantially higher than the 35% one-year cessation rate in randomised trials and in another translational study in northern Ontario. Future directions include expanding this intervention into more communities and developing additional supports for identified priority populations (pregnant/post-partum women, and prescription withdrawal units).

FUNDING: Ontario Ministry of Health and Long-term Care

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POS1-31

IDENTIFYING SMOKERS AT HIGHER RISK FOR RELAPSE USING A NEWLY DEVELOPED NEUROIMAGING-BASED CLASSIFICATION ALGORITHM

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Identifying smokers more likely to relapse during a quit attempt will allow clinicians to offer patients tailored treatments aimed at increasing their chance of success. Recently, we reported that smokers showing blunted brain responses to pleasant but enhanced brain responses to cigarette-related visual stimuli ("C>P") were at higher risk of relapse than smokers with the opposite brain reactivity profile ("P>C"). In this study, we aimed to 1) Build a classification algorithm that will allow researchers to identify smokers with specific brain reactivity profiles on a case-by-case basis, and 2) Validate the clinical relevance of this classification algorithm in an independent dataset by assessing smoking abstinence during a quit attempt by smokers classified as P>C or C>P. We built the classification algorithm by applying discriminant function analysis on a previous dataset that included 180 smokers and found a significant association between smoking abstinence and brain reactivity to emotional stimuli. The forward stepwise analysis indicated that four variables made the most significant contribution to the between-groups discrimination: brain responses to pleasant, cigarette, and unpleasant images, and the smoker's age. We validated this classification algorithm on an independent data set that included data from 177 smokers interested in quitting. For each participant, we collected event-related potentials (a direct measure of brain activity) to emotional images before the quit attempt and we assessed abstinence 12 months after the quit attempt. The algorithm classified 111 smokers as P>C and 66 as C>P. Notwithstanding the overall low abstinence rate (only 8% of the sample, 15 smokers, achieved 12 months abstinence), individuals classified as P>C were 2.5 times more likely to be abstinent than smokers classified as C>P (12% vs. 4.8%). Although this difference did not reach statistical significance ($p=.08$, one tail), these results suggest that neuroimaging techniques can help advance our knowledge of the neurobiological underpinnings of nicotine addiction to improve clinical applications.

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POS1-32

BEHAVIORAL ACTIVATION MEDIATES THE RELATIONSHIP BETWEEN DEPRESSION AND QUITTING SMOKING, BUT NOT RELAPSING

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SIGNIFICANCE: Although it is well documented that depression conveys risk for poor cessation outcomes, the mechanisms maintaining this relationship are poorly understood. One proposed mechanism is that depression may exert its effect on cessation via reduced activation, i.e., disengagement in goal-directed, reinforcing activities. Specifically, depressed smokers may be less likely to engage in reinforcing activities and, in turn, less likely to quit and/or more likely to relapse. However, this pathway has yet to be empirically examined. Within a prospective, online survey of smokers who 1) wanted to quit in the next month or 2) recently quit, we examined activation as a mediator of the relationship between depression and cessation/relapse. **METHODS:** Participants included 283 current smokers and 229 recent quitters (25.2% female, 77.0% White, Age $M(SD)=34.1(8.3)$, CPD $M(SD)$ for smokers=18.7(5.8)) who completed three assessments at 0, +14, and +28 days. Depression was assessed using the Patient Health Questionnaire-8, activation was assessed using the activation subscale of the Behavioral Activation for Depression Scale, and cessation was defined as self-reported continuous two-week abstinence at time 3 (i.e., days 15-28). **RESULTS:** Using the PROCESS macro, the indirect effect of depression at time 1 on cessation at time 3, via activation at time 2, was estimated with bootstrap procedures (10,000 samples), covarying for activation at time 1. Models were run separately by group (i.e., smokers and recent quitters). For smokers, the direct effect of depression on cessation was significant ($b=0.4$, $SE=0.2$, $p=0.02$) as was the indirect effect of depression on cessation via activation ($b=0.05$, $SE=0.04$, $p<0.05$), indicating mediation. For recent quitters, the direct effect of depression on relapse was significant ($b=2.2$, $SE=0.3$, $p<0.001$), but mediation was not observed. Additional follow-up data through +56 days will be available at conference proceedings. **CONCLUSIONS:** We identified activation as a mechanism through which depression interferes with quitting. With further evidence, this suggests that engaging depressed smokers in behavioral activation may promote quitting. Mechanisms underlying the relationship between depression and smoking may differ as a function of trying to quit vs. trying to remain quit.

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POS1-33

PSYCHOMETRIC EVALUATION OF THE ABSTINENCE-RELATED MOTIVATIONAL ENGAGEMENT (ARME) SCALE IN A LONGITUDINAL STUDY

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SIGNIFICANCE: The Abstinence-Related Motivational Engagement scale (ARME; Simmons et al., 2010) was developed to assess level of motivation to remain abstinent after a smoking cessation attempt, with a focus on areas that include cognitive effort, priority, vigilance, and excitement. This contrasts with the more common, single-item, global measures of cessation motivation as well as measures of self-efficacy. Simmons et al. (2010) found that the ARME was negatively associated with length of ongoing abstinence in a small sample of ex-smokers. **METHODS:** The present study is a secondary analysis evaluating the psychometric properties of the ARME and testing the ARME as a predictor of future smoking status. The parent RCT (Brandon et al., 2016) tested the efficacy of a self-help smoking cessation intervention with assessments completed every 6 months for 30 months following enrollment ($N=1851$). Individuals who responded inconsistently to the



ARME reverse scored items were excluded from analysis for that assessment (0.70-0.35%). RESULTS: Results from a series of exploratory factor analyses showed consistent single-factor structure across all 5 assessments, replicating Simmons et al. (2010). Cronbach's alphas ranged from 0.88-0.91 for the total sample, with slightly higher alphas (0.90-0.92) for smokers than abstainers (0.87-0.91). Discriminant validity was assessed using the Situation-specific Abstinence Self-Efficacy scale (SSE; Velicer et al., 1990) with alphas > 0.94. Correlations between the ARME and the SSE ranged from 0.38-0.47 ($p < 0.0001$) among smokers; and from 0.08-0.14 ($p > 0.02$) among abstainers. Similar patterns were observed for single-item measures of confidence and commitment to being abstinent. Among current smokers, the ARME and SSE were independent positive predictors of subsequent abstinence (ORs 1.01-1.04). For those currently abstinent, only the SSE predicted subsequent abstinence (ORs 1.02-1.05). CONCLUSIONS: Results from this analysis demonstrate that the ARME is a reliable measure with unique predictive utility for those currently smoking. Implications for future development and use of the ARME will be discussed.

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POS1-34

AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY OF MECHANISMS LINKING MINDFULNESS AND SMOKING CESSATION

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SIGNIFICANCE: Research suggests that individuals with greater dispositional mindfulness (i.e., non-judgmental, present-focused attention) are more likely to quit smoking, but the underlying mechanisms are unclear. This study investigated mechanisms underlying mindfulness and cessation using ecological momentary assessment (EMA). METHODS: Participants were 424 smokers (144 African American, 141 Latino, 139 non-Latino white; 54% female) receiving cessation treatment. Mindfulness was assessed at baseline with the Mindful Attention Awareness Scale. For 4 days preceding the quit date, participants completed up to 4 EMAs at random times each day to indicate: negative affect (bored, sad, angry, anxious, restless, stressed); positive affect (enthusiastic, happy, relaxed); stress related to new/ongoing issues; urge to smoke; and motivation to quit. Mean, slope, and volatility (scatter) were calculated for each pre-quit EMA variable. Associations among mindfulness, EMA parameters, and quit-day abstinence, as well as indirect effects of mindfulness on abstinence through EMA parameters were examined, controlling for demographics. RESULTS: There was a non-significant trend for mindfulness to predict higher odds of quit-day abstinence ($p = .07$). Mindfulness predicted lower ratings of bored, sad, angry, anxious, restless, and stressed ($ps < .001$); higher ratings of enthusiastic, happy, and relaxed ($ps < .01$); lower stress related to new and ongoing issues ($ps < .001$); and lower smoking urges ($p = .003$). Mindfulness also predicted lower volatility of negative and positive emotions (except enthusiastic), motivation ($p = .001$), and stress related to new issues ($p = .017$). Indirect effects emerged for general stress ($p = .019$) and stress related to ongoing issues ($p = .005$). CONCLUSIONS: This is the first known study to use EMA to examine real-time, real-life mechanisms underlying mindfulness and ability to abstain on quit day. As smokers approach their quit date, those with greater mindfulness may have more favorable emotional profiles, and lower pre-quit stress predicts higher odds of quit-day abstinence. Lower stress might be a primary mechanism through which mindfulness enhances cessation.

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POS1-35

PILOT RANDOMIZED TRIAL OF AN AUTOMATED SMOKING CESSATION INTERVENTION VIA MOBILE PHONE TEXT MESSAGES AS AN ADJUNCT TO VARENICLINE IN PRIMARY CARE

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INTRODUCTION: Varenicline is effective in promoting smoking cessation but most trials have involved frequent visits or intensive behavioral support unlike the support typically provided in primary care. The current study examined if motivational text messages, sent via cell-phone, in addition to varenicline, would increase quit rates for smokers receiving 3 brief treatment sessions in a primary care setting. METHODS: Participants attended an assessment visit at which they chose a quit date and were prescribed a 12 week supply of varenicline. The participant's phone number was entered in the text messaging system, which automatically randomized the participant to the intervention or control group. The intervention group received 2 motivational tips a day for 7 days prior to their target quit date (TQD), then starting on the TQD, 5 tips/day for first month, 2 tips/day for the next month, and 1 tip/day for the final month. In addition, there was an interactive feature that allowed them to request additional tips from the system. Control participants did not receive daily motivational tips and could not use the interactive feature. Participants were followed up in person at 3 weeks and 12 weeks after the TQD. Self-reported smoking status and exhaled carbon monoxide (CO) were collected at these visits. Point prevalent abstinence was defined as no smoking in the past 7 days and a CO < 10ppm. RESULTS: 150 participants were randomized to the study (intervention n=74, control n=76). At the 12 week follow-up visit, there was no difference in point-prevalent abstinence between the intervention and control group (31.1% v. 34.2%, $p = .68$). Within the intervention group, 43.3% of participants who used the interactive feature for additional tips were abstinent, compared to 22.7% of participants who did not use the interactive feature ($p = .06$). CONCLUSION: Daily motivational text messages sent via cell phone did not increase quit rates, however, the use of an interactive messaging system for additional help was associated with greater quit rates. This suggests a more interactive text messaging system may have a greater impact on quit rates than receiving incoming text message tips.

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POS1-36

VALIDATING USE OF INTERNET-SUBMITTED CARBON MONOXIDE VALUES BY VIDEO TO DETERMINE QUIT STATUS

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Some cessation trials require daily visits to verify continuous abstinence via expired-air carbon monoxide (CO), a burden that may deter participation. One way to reduce need for daily visits may be use of a recent procedure to verify abstinence from daily CO values via the Internet. This method requires participants to submit to study staff video recordings of themselves correctly using a CO monitor. The feasibility of obtaining CO values over the Internet has been established by earlier studies. However, it has not been clearly demonstrated that those classified as quit via Internet-submitted videos of CO are also classified as quit from standard in-person CO measures in the lab. Our study compared quit status using CO values submitted over the Internet to quit status via CO collected in later same-day lab visits. Participants (n=23) were a subset from a short-term cessation study, who agreed to record and submit videos in addition to participation in the larger study. All CO values were obtained via Bedfont pico+ Smokerlyzer monitors, with CO < 8 ppm indicating quit. During two 4-day practice quit attempts, a video was submitted followed by a lab visit each day, for a total of up to 8 videos each. Participants used their own cellphone to take and submit videos. A total of 132



videos were submitted (ranging 1-8 per participant), with a mean (SD) of 3 (2.4) hours between time of video and lab visit. Overall, 86 videos indicated not quit and 46 indicated quit. Cohen's Kappa measured consistency in quit status between lab and video assessments. There was substantial agreement in quit status, $\kappa = .66$, $p < .001$, 95% CI [.52, .79]. Focusing only on the 46 videos indicating quit, 38 (83%) were also quit in lab. Of the 8 not quit in lab, smoking was admitted between video and in-lab assessments for 3, 3 went from slightly below 8 ppm to >8 ppm, and 2 others were unexplained (presumed to be unreported smoking). To our knowledge, these results are the first validation of daily CO values submitted via the Internet to confirm daily quit status. Implications for using this procedure in cessation trials will be discussed.

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POS1-37

BRAIN NICOTINE ACCUMULATION FROM ELECTRONIC CIGARETTE USE: A PET STUDY WITH ^{11}C -NICOTINE

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BACKGROUND: Driven both by smokers' demands for safer alternatives to combustible cigarettes and increases in cigarette sales taxes, electronic cigarettes (E-cigs) have witnessed a recent rapid growth in popularity. Similar to other drugs of abuse, the rate and magnitude of brain nicotine accumulation are critical for its acute reinforcing effects. Here we report for the first time the preliminary results of a direct assessment of the brain accumulation of ^{11}C -nicotine from use of E-cigs in comparison with traditional cigarettes. **METHODS:** The accumulation of brain nicotine from E-cigs was assessed in 3 E-cig users (2 ex-smokers and one smoker; age 52 ± 17 ; 1 female). During the PET scan session, the subject's head was scanned over 960 sec (93 frames) after inhalation of a single puff of vapor from an E-cig containing ^{11}C -S-nicotine. The ^{11}C -nicotine kinetics following inhalation from E-cigs was compared with that from combustible cigarette (19 smokers, 10 females) previously reported by us (Zuo et al, 2015). **RESULTS:** After inhalation of a single puff from E-cigs the temporal profile of brain nicotine accumulation was similar to that from a combustible cigarette. The average (\pm SE) brain Cmax and area under curve (AUC) for 12 minutes were $3.8 \pm 0.1\%$ of total absorbed dose/kg tissue (%TAD/kg) and $38.2 \pm 0.4\%$ TAD/kg \times 12 min. These values were 27% ($p < 0.002$) and 34% ($p < 0.001$) smaller respectively than those after inhalation of a single puff of smoke from a combustible cigarette (Cmax: $5.2 \pm 1.7\%$ TAD/kg; AUC: $58 \pm 4\%$ TAD/kg \times 12 min). No significant difference in the $T_{1/2}$ of brain nicotine accumulation was found between E-cigs and combustible cigarettes. **CONCLUSION:** These results suggest that E-cigs are suitable for fast delivery nicotine to the brain. The smaller brain nicotine Cmax and AUC values for E-cig could be compensated through more intensive vaping (longer puff duration, using E-cig with higher power and/or shorter inter-puff intervals) and/or the use of e-liquids with higher nicotine concentration. Therefore E-cigs can be useful for substituting the rapid brain nicotine kinetics of combustible cigarettes. However, E-cig use may result in the development and maintenance of nicotine addiction.

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POS1-38

REASONS FOR MARIJUANA USE AND CONCURRENT USE WITH TOBACCO AMONG YOUNG ADULTS: A MIXED METHODS SCALE DEVELOPMENT STUDY

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Marijuana-tobacco co-use has increased in recent years. We conducted a mixed-methods study to: 1) examine reasons for marijuana-tobacco co-use; and 2) develop a scale assessing reasons for marijuana-tobacco co-use among participants in a two-year, six-wave longitudinal cohort study of 3,418 college students aged 18-25 from 7 Georgia campuses. Semi-structured interviews were conducted via phone in Summer 2015 among 60 participants who used cigarettes, little cigars/cigarillos (LCCs), smokeless tobacco, e-cigarettes, or hookah in the past month. Our sample was 21.1 years old on average ($SD = 2.1$), 43.3% male, and 35.0% Black. Notably, 26 of the 60 had used marijuana in the past 30 days; an additional 20 were lifetime users. Reasons for marijuana-tobacco co-use included enhancing the effects of one substance with the other, one triggering or preceding use of the other, using one to reduce use of another, and co-administration through the same device/papers. Scale items were developed and included on the Wave 3 survey (retention: 83.9%, $n = 2869/3418$). Participants who reported past 30 day tobacco and marijuana use ($n = 328$) completed the Reasons for Marijuana-Tobacco Co-use section. Our sample was an average age of 20.46 ($SD = 1.84$), 40.8% male, and 27.4% Black, and included 37.1% who used cigarettes, 30.4% LCCs, 9.4% smokeless tobacco, 23.7% e-cigarettes, and 30.4% hookah. This yielded a psychometrically sound scale with 4 factors: 1) Instrumentality, indicating the use of one to enhance the other; 2) Displacement, indicating using one product to reduce/quit the other; 3) Social Context, indicating use in different contexts; and 4) Experimentation, indicating experimental use but no specific link. These subscales demonstrated distinct associations with type of tobacco used; nicotine dependence; frequency of use of marijuana and alcohol; motives for tobacco and marijuana use, respectively; perceived addictiveness, harm, and social acceptability of tobacco and marijuana; and parental and friend tobacco and marijuana use. These findings can be used to begin to formulate possible theoretical frameworks upon which co-use occurs and inform future intervention studies.

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POS1-39

DEVELOPMENT OF A SELF-HELP SMOKING CESSATION INTERVENTION FOR DUAL USERS OF TOBACCO CIGARETTES AND E-CIGARETTES

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Most e-cigarette (e-cig) users report initiating use to quit smoking tobacco cigarettes. Yet, little evidence exists to support the efficacy of e-cigs as a smoking cessation tool, and there is concern about high rates of dual use (i.e., using both tobacco cigarettes and e-cigs). Thus, we created a targeted self-help intervention to help dual users quit smoking. We adapted an existing validated self-help smoking-cessation intervention for dual users. The multi-step development process of this new series, titled, "If You Vape: A Guide to Quitting Smoking," included drawing on our prior research, reviewing the literature, and conducting in-depth interviews, as well as learner verification to assess suitability of the materials. First, in-depth interviews ($N = 28$) were conducted to identify new content for inclusion in the booklets, and to assess reactions to the existing *Stop Smoking for Good* materials (10 booklets and 9 pamphlets). Participants represented four subgroups: current dual users with no intention to quit smoking; current dual users who had tried unsuccessfully to quit smoking; e-cig users who had quit smoking; and those who had quit both. Verbatim transcripts were created for content analysis using the constant comparative method. Several key themes emerged. For example, e-cig specific strategies used by successful quitters included gradually reducing nicotine levels, switching from tobacco flavor to an alternative flavor, and limiting e-cig use to places one would normally use tobacco cigarettes (i.e., not expanding use). These

results were used to modify the materials. Next, learner verification interviews ($N=20$ dual users) were conducted to assess visual appeal and acceptability of the revisions. Although the majority responded favorably to the revisions, suggestions included broadening the visual appeal for a younger demographic, adding more tips for quitting smoking using e-cigs, and utilizing a variety of terms for e-cig devices. We will present additional results from the interviews and learner verification as well as the final version of the booklets. The efficacy of these materials is currently being tested in a randomized controlled trial.

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POS1-40

SEX DIFFERENCES IN REAL-WORLD EFFECTIVENESS OF SMOKING CESSATION PHARMACOTHERAPY

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Meta-analyses of clinical trial data have identified varenicline as a particularly efficacious treatment option for women trying to quit smoking, in comparison to transdermal nicotine and placebo. It is unclear whether findings from homogeneous clinical trial samples extend to smokers quitting in real-world contexts. We analyzed cross-sectional data from the 2010-2011 Tobacco Use Supplement to the Current Population Survey. We analyzed data from 3 sub-samples based on use of pharmacotherapy during the most recent quit attempt (limited to previous year): no pharmacotherapy ($n=11,907$), varenicline only ($n=1,481$), and transdermal nicotine only ($n=1,543$). Our independent variable was self-reported achievement of at least 30 days of sustained abstinence, regardless of smoking status at the time of the interview. Nearest neighbor propensity score matching (PSM; with calipers) for all comparisons was stratified by gender, and based on: cigarettes per day, frequency of smoking, age started smoking, and current age. Abstinence was compared between matched samples using generalized estimating equations with robust standard errors, accounting for non-independence of matched data, and adjusting for education, age, income, race/ethnicity, marital status, employment status, cigarettes per day, frequency of smoking, and age started smoking. After PSM, treatment groups were comparable on matched variables. Compared to use of no pharmacotherapy, varenicline was more effective for women ($OR=2.77$; 95%CI=2.08,3.74) compared to men ($OR=1.62$; 95%CI=1.14,2.27; p -value for gender interaction <0.05); transdermal nicotine was effective for men ($OR=1.52$; 95%CI=1.14,2.03) but not women ($OR=1.21$; 95%CI=0.08,0.46; gender interaction non-significant). Compared to transdermal nicotine, varenicline was more effective for women ($OR=1.46$; 95%CI=1.08,1.97) but not men ($OR=1.04$; 95%CI=0.74,1.46; gender interaction non-significant). Overall, the pattern of findings closely followed those from clinical trial data, highlighting varenicline as a particularly effective treatment option for women in comparison to use of no pharmacotherapy or use of transdermal nicotine.

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POS1-41

EFFECTS OF MENTHOL ON THRESHOLD DOSE FOR BEHAVIORAL DISCRIMINATION OF CIGARETTE NICOTINE CONTENT

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The lowest nicotine threshold "dose" in cigarettes that smokers can discriminate from one containing virtually no nicotine may help inform the minimum dose maintaining dependence. We recently developed and evaluated a procedure to test dis-

crimination of nicotine via research cigarettes differing in content, and then we assessed discrimination threshold in a small sample of non-menthol smokers. In the current study, we used menthol and non-menthol Spectrum research cigarettes (from NIDA) differing in nicotine content to determine whether menthol influenced discrimination thresholds. Dependent adults preferring menthol ($n=35$; 15 M, 20 F) or non-menthol ($n=20$; 15 M, 5 F) brands were tested on ability to discriminate cigarettes (matched for menthol) with nicotine contents of 17, 11, 5, 2.3, and 1.3 mg/g, one per session, from an "ultra-low" cigarette with 0.4 mg/g (all had 9-10 mg "tar"). Each 3-hr session, after overnight abstinence, involved 4 "training" trials to learn the discrimination between the two cigarettes, followed by 6 "testing" trials to confirm acquisition of that discrimination. Exposure to each was just 4 puffs/trial to minimize satiation. The number of sessions was determined by the lowest content participant could discriminate on $>80\%$ of trials (i.e. ≥ 5 of 6). Subjective perceptions and puff choice between cigarettes were also assessed and related to discrimination behavior. Discrimination of nicotine threshold tended to be poorer for menthol, as 31% of participants, vs 10% for non-menthol, were unable to discriminate even the highest content, and median threshold was marginally higher, at 8.4 vs. 5.3 mg/g, resp. (χ^2 [5 df] = 10.67, $p<0.06$). As expected, compared to the ultra-low, threshold and subthreshold (next lowest) cigarettes also differed on most subjectives and puff choice, but menthol was unrelated. Threshold for discriminating nicotine via cigarette smoking may be higher for menthol vs non-menthol brands, suggesting menthol may blunt ability to perceive the interoceptive effects of nicotine. Further study may identify other tobacco constituents and individual difference factors influencing nicotine discrimination thresholds.

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POS1-42

RELIABILITY AND CONTEXTUAL FACTORS CHARACTERIZING URGE TO SMOKE AMONG DAILY CIGARETTE SMOKERS

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OBJECTIVE: The Questionnaire on Smoking Urges (QSU) is a widely used measure of cigarette craving, yet its validity as an outcome measure is based on an untested assumption of stability under identical study conditions. The purpose of the present study was to assess the stability of urge across two study sessions and to identify the context of smoking urge by estimating factors predictive of QSU. **METHODS:** Participants were 522 unique smokers enrolled separately in five distinct, non-quit, smoking research studies. Urge to smoke was measured twice during a five-day baseline period, under identical experimental conditions. Cronbach's Alpha assessed stability of QSU total, Factor 1 (positive reinforcement) and Factor 2 (negative reinforcement) at the first and last sessions of the baseline period. We examined associations between demographic and smoking history variables with QSU change scores, and linear regression models were used to assess variables predictive of urge. **RESULTS:** Reliability for each QSU measure was: QSU total: $\alpha=0.71$, Factor 1: $\alpha=0.65$, and Factor 2: $\alpha=0.72$. Those who smoked sooner after waking (<30 min) reported more stable QSU scores versus those who delayed smoking upon waking (>30 min) ($p<0.001$). Greater initial carbon monoxide (CO) levels predicted lower QSU scores ($p<0.05$), while greater proportion of total daily cigarettes smoked ($p<0.05$) and higher FTND scores ($p<0.001$) predicted higher QSU scores. **CONCLUSIONS:** When assessing urge to smoke, measures representative of smoking behavior, including nicotine dependence, CO, and cigarette consumption proportion, should be assessed to help strengthen the utility of QSU. This research impacts regulatory science through offering evidence to enhance study methodology when assessing urge to smoke using the QSU. Accurate assessment of this subjective measure is crucial, as urge is a defining characteristic of nicotine dependence, and is used to predict cessation and/or smoking relapse.

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POS1-43

DEPRESSION CONFERS A COMPARABLE VULNERABILITY TO NEGATIVE AFFECT AND WITHDRAWAL INDUCED TOBACCO CHOICE

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Although smoking and depression commonly co-occur, the specific mechanisms underlying this association remain poorly understood. Depression may drive smoking persistence by enhancing sensitivity to internal states of negative affect and acute withdrawal, and promoting tobacco-seeking behaviour in response to these states. In this human laboratory study, we examined performance on a mood-induced tobacco choice task in depressed and non-depressed smokers. Participants were 29 smokers aged 18-65 who smoked >10 cigarettes/day. Nine participants endorsed a current episode of Major Depressive Disorder (MDD), as determined by the MINI International Neuropsychiatric interview, while the remainder were non-depressed. Participants completed two sessions one week apart, with smoking as normal prior to the session 1, and at least 6 hours of nicotine deprivation prior to session 2. Abstinence was confirmed by CO of either <10 ppm or less than half baseline value. The effect of negative mood induction on tobacco-seeking was measured in both sessions using a method which has been previously validated. Baseline tobacco choice was first indexed by participants' preference to view smoking vs. food images. Negative mood was then induced by a series of negative ruminative statements and sad music, before tobacco choice was again measured. We used ANOVA models to examine the main effect of group (MDD+ vs. MDD-) and interaction with abstinence status (non-deprived vs. deprived) as predictors of tobacco choice at baseline and following negative mood induction. In the smoking as normal session 1, MDD+ smokers showed a greater increase in tobacco choice following negative mood induction from baseline, as compared to MDD- smokers ($p=.046$). MDD+ smokers also showed a greater increase in baseline tobacco choice between the non-deprived and deprived study sessions, relative to MDD- smokers ($p=.023$). Finally, negative affect and withdrawal induced tobacco choice were highly correlated ($r=.67$, $p<.001$). In conclusion, the relationship between depression and smoking persistence may be driven by a comparable vulnerability to increases in tobacco-seeking in response to both negative affective and acute withdrawal states.

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POS1-44

EXERCISE OR RELAXATION FOR SMOKING CESSATION IN POSTMENOPAUSAL WOMEN

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SIGNIFICANCE: Postmenopausal smokers have difficulty quitting smoking and considerable weight gain with smoking cessation. We examined whether a supervised exercise program compared to a relaxation condition could improve cigarette abstinence, decrease cigarettes smoked per day (CPD) and ameliorate weight gain in postmenopausal women. METHODS: Three hundred and ten women were randomized to treatment at two recruitment sites (176 women at UConn Health, 125 at Minnesota). Participants were randomized to a comprehensive treatment program that included either exercise or relaxation as additional treatment. The treatment protocol included 30 treatment sessions, in three phases. In phase I, sessions emphasized smoking cessation and introduced the exercise or relaxation component (4 weeks). In phase II, sessions continued smoking cessation techniques, but spent the majority of time on exercise or relaxation (8 weeks). In phase III, sessions continued with exercise or relaxation treatment (12 weeks). Subjects received varenicline for twelve weeks and were followed for a year after medication treatment. RESULTS: Overall, 50% of patients reported CO-verified abstinence for the 9-12-week period, and 24% reported prolonged abstinence at the 44-week period, with no significant differences between treatment groups. CPD reported at study visits showed significant main effects for time in weeks, for site, and for treatment as well as for baseline CPD. The Exercise group reported smoking fewer CPD over time, and that advantage widened throughout the study. In terms of BMI, significant effects for time in weeks, and for the interaction of week X treatment condition, reflects the gradually increasing BMI in these women over time, but with the increase in BMI slower in the Exercise condition. CONCLUSIONS:

Our moderate intensity exercise program did not increase end of treatment and prolonged abstinence rates in postmenopausal women; however, there was a beneficial effect on smoking reduction and reduced weight gain. Further research is needed to address smoking cessation and weight gain in postmenopausal women.

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POS1-45

IMAGING THE EFFECT OF ELECTRONIC CIGARETTES AT THE BETA-2 NICOTINIC ACETYLCHOLINE RECEPTORS

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SIGNIFICANCE: Electronic cigarettes (ECs) have potential to mediate addiction through inhalation of aerosolized nicotine. Data regarding EC nicotine delivery to the brain and the relation to addiction remain limited. We evaluated the EC effects on nicotine acetylcholine receptor (β_2 -nAChR) occupancy, arterial blood nicotine level, and relationship to product craving and liking. METHODS: Four EC users, mild to moderately dependent on nicotine (FTND=3.0), participated in [¹⁸F]Flubatine positron emission tomography (PET) studies with either high (36 mg/ml, n=4), low (8 mg/ml, n=4), or zero (n=2) dose nicotine EC challenge. [¹⁸F]Flubatine was administered as a bolus plus constant infusion, and subjects were scanned for 150 minutes with EC challenge at 125 minutes (1 puff every 30 seconds for 5 minutes). Receptor occupancy was determined based on the Lassen plot method. Craving and liking were evaluated on a subjective rating scale (0-100) following EC use. RESULTS: Use of the high as compared to low dose EC led to higher receptor occupancy at trend level ($84\pm3\%$ vs $64\pm17\%$, $p=0.068$). Use of zero nicotine EC did not cause significant changes in receptor availability ($2.5\pm5.5\%$). Maximum nicotine arterial blood concentrations (C_{max}) and area under the curve (AUC) were not significant between high and low nicotine groups (12 ± 6 ng/ml, 406 ± 163 ; and 6 ± 4 ng/ml, 192 ± 174 , respectively; $p>0.10$). Product liking was similar among groups (High= 74 ± 26 ; Low= 75 ± 38 ; Zero= 80 ± 28). Highest craving was observed after the use of the low dose EC ($p=0.066$). CONCLUSIONS: Experienced EC users can obtain significant β_2 -nAChR occupancy with low and high dose nicotine EC use, and are similar to the effect of tobacco smoking on β_2 -nAChR occupancy. Highest craving was detected in the low nicotine group. Findings are preliminary and require confirmation with a larger sample; however, results suggest that variables in addition to nicotine may mediate initiation and continued use.

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POS1-46

IS SMOKING-RELATEDNESS OF CANCER TYPE ASSOCIATED WITH COGNITIVE SMOKING CESSATION VARIABLES?

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Smoking plays a causal role in 15 different cancer types, yet some have been more strongly associated with smoking (e.g., lung) than others (e.g., breast). Continued smoking after diagnosis can negatively impact treatment outcomes and quality of life. It is important that cancer patients quit smoking and remain abstinent, regardless of cancer type. The present study analyzed whether the degree of smoking-relatedness of the cancer type (i.e., very related, related, somewhat related, and unlikely related) is associated with plans and beliefs concerning quitting and remaining abstinent (e.g., confidence, expected difficulty in maintaining abstinence). Cancer patients ($N=412$), who had recently quit smoking were categorized based on the level of the cancer type's empirical link with



smoking: lung (Level 4, $n=78$), head and neck (Level 3, $n=75$), gastrointestinal, genitourinary, gynecological, and hematological (Level 2, $n=103$), and all other cancer types (Level 1, $n=156$). Characteristics that varied by level of smoking-related cancer were incorporated into analyses of dependent measures. Logistic regression found the level of smoking-related cancer predicted plans to quit smoking for good (AOR=1.47 [1.18, 1.83]) and confidence in remaining abstinent in the next 6 months (AOR=1.36 [1.13, 1.64]). Multiple regression revealed that level of smoking-related cancer negatively predicted expected difficulty in maintaining abstinence ($b=-0.40$, $p=.007$) and positively predicted situation specific abstinence self-efficacy ($b=1.14$, $p=.013$). Levels of smoking-related cancer were not associated with beliefs about the risks associated with smoking after a cancer diagnosis (e.g., poorer cancer recovery). These findings suggest opportunities for targeted education about the role of smoking on cancer etiology, treatment, and recovery across all cancer types, including types not usually perceived as smoking-related. Further studies are needed to investigate the influence of these variables on actual post-diagnosis smoking behavior.

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POS1-47

ASTHMA, PHYSICIAN ADVICE AGAINST SMOKING, AND ADOLESCENT TOBACCO USE

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SIGNIFICANCE: Adolescents who have asthma are particularly vulnerable to the effects of tobacco use. One might expect that physicians would be particularly likely to warn them against cigarette smoking. However, no research has been conducted on the relations between asthma, physicians' advice, and tobacco use. The first purpose of this study was to determine whether adolescents with asthma receive more physician advice against smoking than healthy children do. Second, we aimed to determine whether asthma and physician advice were associated with smoking and intentions to quit. **METHODS:** This report uses data from the Memphis Smoking Prevention Program, a group randomized trial of a tobacco prevention program. These data were collected before the intervention began, using a survey administered in school to seventh graders. Participants indicated whether they had asthma at present or in the past. These youth were compared to those with no history of asthma. Adolescents also reported whether they had ever been asked by a doctor about whether they smoked (yes/no) and whether a physician had ever advised them not to smoke (yes/no). These questions were used to categorize students into those that (1) received no intervention; (2) were asked only; (3) were advised only; and (4) were both asked and advised. This assessment of physician communication has been correlated with teen tobacco use in previous studies. Overall, 2,242 adolescents averaging 13 years old completed all items. The sample was 90% African American and 10% Caucasian, and 17.1% had a history of asthma. **RESULTS:** Logistic regression was used for analysis. Notably, youth with asthma were not significantly more likely to be asked or advised against smoking than healthy adolescents, $p>.05$. Teens with a history of asthma were more likely to smoke (39.1%) than those without asthma (34.3%), $p<.01$. Physician communication was also associated with smoking, such that teens who were asked about smoking were 7 times as likely to be smokers than those not asked, $p=.015$. In an analysis using only smokers, the interaction of asthma with physician communication was significant in predicting intentions to quit. For those with asthma, teens who were asked and advised were 6.5 times as likely to plan to quit. **CONCLUSIONS:** Importantly, teens with asthma were not more likely to be advised against smoking, but those that did receive advice were more likely to plan to quit. Further research is needed to encourage physicians to address smoking among all teens, especially those who are medically fragile.

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POS1-48

COGNITIVE TRAINING, THE BRAIN, AND DECISION-MAKING

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Increased preference for immediate over delayed and for risky over certain rewards is a hallmark of addiction. Motivated by evidence that enhanced cognitive control can shift choice behavior away from immediate and risky rewards, we tested whether training executive cognitive function could influence choice behavior and brain responses. In this randomized controlled clinical trial, 128 young adults participated in 10 weeks of training with either a commercial web-based cognitive training program or web-based video games (which do not specifically target executive function or adapt the level of difficulty throughout training). Pre- and post-training, participants completed cognitive assessments and functional magnetic resonance imaging (fMRI) during performance of validated decision-making tasks: delay discounting (choices between smaller rewards now vs. larger rewards in the future) and risk sensitivity (choices between larger riskier rewards vs. smaller certain rewards). Contrary to our hypothesis, we found no evidence that commercial cognitive training influences neural activity during decision-making, nor did we find effects of cognitive training on measures of delay discounting or risk sensitivity. Participants in the commercial training condition did improve with experience and practice on the specific tasks they performed during training, but participants in both conditions showed similar improvement on standardized cognitive measures over time. Commercial adaptive cognitive training in healthy young adults appears to have no benefits above those of standard video games for measures of brain activity, choice behavior, or cognitive performance.

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POS1-49

EFFECT OF DOXAZOSIN ON STRESS REACTIVITY AND THE ABILITY TO RESIST SMOKING

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BACKGROUND: The noradrenergic system has been widely implicated in mediating the reinforcing effects of drugs of abuse. The α_1 -adrenergic antagonist, prazosin, has been shown to reduce nicotine self-administration and attenuate reinstatement of nicotine-seeking in preclinical models. The α_1 -adrenergic antagonist, doxazosin, is structurally similar to prazosin and, clinically, has a more manageable dosing profile, but has never been evaluated in a human laboratory model of stress-precipitated smoking. **METHODS:** Using a well-validated laboratory analogue of smoking-lapse behavior, we evaluated whether doxazosin (4 and 8mg/day) versus placebo (0mg/day) attenuated the effect of stress (vs. neutral imagery) on the ability to resist smoking and subsequent ad-libitum smoking in nicotine-deprived smokers ($n=35$) in the laboratory. Tobacco craving and cortisol levels were also assessed. **RESULTS:** Doxazosin (4 and 8mg/day) decreased cigarettes per day during the titration period. At baseline, prior to stress (or neutral) imagery, doxazosin (4 and 8 mg/day) decreased tobacco craving. After adjusting for baseline differences, doxazosin (4mg/day) decreased tobacco craving following stress versus neutral imagery. Doxazosin (collapsed across medication) increased the latency to start smoking in the stress versus neutral imagery condition. Once subjects started smoking, doxazosin decreased the number of cigarettes smoked during the ad-lib period. A-priori contrasts demonstrated that 8mg/day doxazosin increased or normalized cortisol levels following stress imagery and decreased cortisol levels following neutral imagery. **CONCLUSIONS:** Doxazosin decreased tobacco craving, increased the ability to resist smoking, and decreased subsequent cigarette self-administration, supporting a role for the noradrenergic system in smoking behavior. These preliminary findings support further development of doxazosin as a novel pharmacotherapeutic treatment strategy for smoking cessation.

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POS1-50

SMOKING CESSATION APP USERS' QUIT MOTIVATIONS, CONCERNS, AND PLANS: PROFILE OF THE FIRST 1100 USERS OF SMARTQUIT

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SIGNIFICANCE: Development of engaging and effective smartphone applications for smoking cessation depends, in part, on knowledge of user characteristics and preferences. To develop such a profile of app users, we examined data from a large sample of users of the SmartQuit smoking cessation app, which is based on principles of Acceptance and Commitment Therapy. **METHODS:** De-identified data were available from 1129 adult cigarette smokers who downloaded the full version of the app and completed the initial quit plan to start the program. **RESULTS:** The majority of the sample were women (60%) under the age of 55 (89%) who smoked at least 10 cigarettes per day (81%). The top three valued areas of life motivating them to quit were health (88%), family (85%), and relationships (73%). The top three concerns that could interfere with quitting were mood (83%), willpower (74%), and stress (74%). Consistent with program recommendations, most users selected a quit date within 1-2 weeks (+/- 2 days) of starting to use the app (61%), although some wanted to quit sooner (in 0-4 days; 13%). Less than half (43%) planned to use an FDA-approved medication. Of those electing to use an FDA-approved medication, the proportion planning to use each medication was 68% for nicotine replacement monotherapy, 16% for combined nicotine replacement, 16% for varenicline, and 14% for bupropion. **CONCLUSIONS:** App users' motivations and quit concerns reflect commonly reported motivators and challenges of quitting. The proportion of users electing to quit immediately (13%) was significantly lower than in a previous app study where no specific recommendations were made about when to quit (84%), suggesting that users are responsive to app recommendations regarding timing of the quit date. The proportion of app users planning to use medications (43%) was higher than the population-level percentage of quit attempters who use medications (30%), perhaps as a result of the app's encouragement to consider using pharmacotherapy. Overall, these results suggest that users will tend to make plans that are recommended by quit smoking apps, and they highlight several key motivators and challenges of quitting that should be incorporated into these programs.

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POS1-51

REDUCING HOSPITAL READMISSION RATES BY IMPLEMENTING AN INPATIENT TOBACCO CESSATION SERVICE

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BACKGROUND: In the United States, the Joint Commission (JC) has recommended that hospitals screen all patients for tobacco use and offer cessation services and follow up support within 1 month of discharge. Unfortunately, few hospitals implement the JC tobacco treatment quality standards in part because the services require extra costs, the standards are voluntary, and the financial benefits to hospitals and insurers have yet to be documented. The Medical University of South Carolina recently implemented an automated in-hospital smoking cessation program using Interactive Voice Response (IVR) technology to follow-up with patients post-discharge in accordance with JC standards. **OBJECTIVE:** To test the hypothesis that an automated inpatient smoking cessation program will reduce unplanned readmissions. **METHODS:** An interrupted time series design was used to examine monthly trends in unplanned readmission rates before (01/01/13-12/31/13) and after (02/01/14-01/31/15) the tobacco cessation service was implemented. **RESULTS:** The study includes 47532 patients admitted to the MUSC hospital system of whom 10316 were current smokers (22%), 13921 (29%) were former smokers, and 23295 (49%) were never smokers. Previously reported data shows that the tobacco cessation service that was implemented in 2014 was able to provide tobacco cessation support to approximately 60% of patients of smokers admitted to the hospital with either a bedside consult and/or a telephone follow-up call made within a month after discharge from the hospital. The one month nonsmoking rate was 52% (24% based on intent to treat) in those seen by the bedside counselor compared to 32% (12% based on intent to treat) in those

merely followed by phone. A preliminary analysis of unplanned 30-day hospital readmission rates found that 9.1% for patients seen by the bedside counselor as compared with 15.7% for patients who did not receive bedside counseling based on the first 6 months of the program. This presentation will present final results of our analysis of readmission rates comparing current, former and never smokers and among smokers exposed and unexposed to the tobacco cessation service. **CONCLUSION:** This will be one of the first studies examining how implementation of an inpatient hospital tobacco cessation service set up to be consistent with the JC's Tobacco Cessation Performance Measure Set impacts unplanned hospital readmissions.

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POS1-52

PREGNANCY INDUCED CHANGES IN NICOTINE METABOLISM: EXAMINING THE TIME COURSE OF THE NICOTINE METABOLITE RATIO AND ENZYME PATHWAYS DURING ANTEPARTUM AND POSTPARTUM

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SIGNIFICANCE: Pregnancy increases nicotine clearance potentially making it more difficult for women to quit smoking while pregnant. However, the time course of these changes during the antepartum period relative to postpartum is unclear. We investigated when changes in nicotine metabolism occur, how this alters the nicotine metabolite ratio (NMR), a commonly used biomarker, and the changes in oxidation vs. non-oxidation pathways of nicotine metabolism. **METHODS:** NMR (3-hydroxycotinine (3HC)/cotinine (COT)) was assessed using total (free + glucuronide) and free compounds among pregnant smokers from a randomized clinical trial for smoking cessation. Women who reported smoking and provided a urine sample at each of three time points (approximately 10 and 28 wks gestation and 6 months postpartum) were included in the analysis (N=47). Urine samples were analyzed using liquid chromatography tandem mass spectrometry. The NMR ratio of total trans-3'-hydroxycotinine (3HC)/free cotinine was the primary biologically relevant ratio, however we also examined free 3HC/free cotinine and total 3HC/total cotinine. NMRs were logarithmically transformed. **RESULTS:** Repeated measures ANOVA revealed NMR was significantly higher at 28 wks compared to 10 wks gestation and at 10 and 28 wks gestation compared to postpartum for total 3HC/free cotinine (0.76, 0.88, 0.62, respectively; $p < .001$) and free 3HC/free cotinine (0.68, 0.79, 0.53; $p < .001$) suggesting the oxidation pathway is induced by pregnancy and increases as a function of pregnancy stage. Total 3HC/total cotinine was lower at 10 and 28 wks gestation compared to postpartum (0.018, 0.002, 0.212; $p < .01$) suggesting in addition to oxidation, COT glucuronidation may also be induced throughout pregnancy. **CONCLUSIONS:** Our data suggests NMR, a biomarker of nicotine metabolism associated with smoking phenotypes including cessation, is increased in the first trimester and continues to increase over the course of the pregnancy. Future analyses examining oxidative and non-oxidative pathways will be performed to elucidate pregnancy induced changes in different enzyme pathways that may impact nicotine metabolism and NMR during pregnancy.

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**POS1-53****CONTINGENCY MANAGEMENT FOR DRUG USE IN TREATMENT FOR OPIATE ADDICTION: A SYSTEMATIC REVIEW AND META-ANALYSIS**

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BACKGROUND AND AIMS: The use of other drugs whilst in treatment for opiate addiction is a widespread problem that poses serious barriers to treatment success, creating a need for effective interventions. The aim of the current review is to assess the efficacy of contingency management for promoting reduction in the use of other drugs during treatment for opiate addiction. **METHODS:** A systematic search of the databases Embase, PsychInfo, PsychArticles and Medline from inception to March 2015 was performed. Random effects meta-analysis performed on included studies tested the effect of contingency management to treat the use of drugs during treatment for opiate addiction, using either longest duration of abstinence (LDA) or percentage of negative samples (PNS) data. Meta-analyses were performed for all drug types combined and separately by drug type (cocaine, opiates, tobacco smoking, cocaine and opiates combined, other polysubstance use). **RESULTS:** The search returned 3860 papers; 22 studies met inclusion criteria and could be meta-analysed. Contingency Management performed significantly better than control in reducing drug use during treatment for opiate addiction measured using LDA ($d=0.57$, 95% CI: 0.42 to 0.72) or PNS ($d=0.40$, 95% CI: 0.27 to 0.53). When analysed by drug type, contingency management performed significantly better than control for treating the use of all assessed drugs except opiates ($d=0.28 - 1.02$). A lack of available follow-up data meant that no analysis could be performed to assess relapse rates. **CONCLUSION:** Contingency management appears to be efficacious for treating secondary drug use during treatment for opiate addiction. Further research is required to ascertain longer-term effects.

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POS1-54**CONTINUED SMOKING AND COMORBIDITY IN HEAD AND NECK CANCER**

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INTRODUCTION: International literature has reported that a significant proportion of patients with head and neck cancer (HNC) continue to smoke cigarettes (up to 50%) post diagnosis. Continued alcohol use and depression are also reported to be highly prevalent in this population. However few data are available on current rates of smoking in HNC. Data on the co-occurrence of these factors within HNC is also limited. Their potential influence on quality of life, treatment efficacy and survival, warrants further investigation. This study aimed to describe the rates of these factors within a current sample of Australian HNC patients about to undergo radiotherapy. **METHODS:** As part of a multi-site, stepped wedge, randomised controlled trial, baseline and post radiotherapy treatment data on smoking characteristics, alcohol use and depressive symptoms were collected from a sample of HNC patients from four Australian radiotherapy departments. **RESULTS:** The mean age of the 306 patients was 58 and 79% were male. At baseline, 13% of the sample reported being current smokers. Using a cutoff of ≥ 8 CO PPM 10% of patients were confirmed as current smokers. A cutoff of ≥ 4 CO PPM resulted in 45% confirmed as current smokers. 20% of those who had ever smoked reported that their last cigarette was less than 7 months ago. 21% of patients scored positive for two or more of the following problems: current smoking (≥ 4 CO PPM), hazardous alcohol use (AUDIT score ≥ 8) and probable depression (PHQ-9 score ≥ 8). At 4 weeks post treatment, self-reported current smoking status was 12% vs 25% biochemically confirmed (CO PPM ≥ 4). At 12 weeks post treatment, self-reported current smoking status was 12% vs 22% using biochemical verification (CO PPM ≥ 4). **CONCLUSION:** This is the first study to measure biochemically verified smoking status, alcohol use and depressive symptoms, as well as their co-occurrence, in a sample of HNC patients about to undergo radiotherapy. We found a considerable discrepancy between self-reported smoking status and biochemically verified smoking status at baseline, 4 weeks, and 12 weeks post radiotherapy. Self-reported smoking status was also much lower than reported in

previous studies with HNC patients. It may be that some patients were smoking despite reporting abstinence. The rates of smoking in our sample are also considerably lower than rates reported in the international literature. Also, the level of comorbidity (tobacco use, hazardous alcohol use and depression) necessitates further investigation and intervention.

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POS1-55**ASSESSING ANTHROPOMETRIC AND BODY COMPOSITION PARAMETERS DURING A 14 WEEK SUPERVISED EXERCISE-AIDED PHARMACOTHERAPY SMOKING CESSATION PROGRAM FOR WOMEN**

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BACKGROUND: For women, smoking is perceived as a method of weight control and hence, post-cessation weight gain is a common culprit for relapse (Klesges et al., 1988). Furthermore, excess weight, particularly in the form of android or visceral fat, is strongly associated with cardiovascular and metabolic disease (Direk et al., 2013). For this study, a secondary analysis was conducted to determine whether quitting status, achieved through a 14 week supervised exercise-aided NRT (patch) cessation program [the Getting Physical on Cigarette Trial—GPOC; Prapavessis, et al., 2016], affects anthropometric and body composition parameters in female smokers ($N = 413$, M age = 42.39 years). **METHOD:** Anthropometric (weight and BMI) and body composition (% total body fat, % android fat, lean mass, and visceral fat obtained with dual x-ray absorptiometry) parameters were assessed at baseline and end of treatment (week 14). Smoking status was confirmed weekly from expired breath carbon monoxide. Adherence to exercise and NRT patch was calculated from the number of exercise sessions attended and patches worn to the number of exercise sessions offered (3 sessions per week) and patches supplied (weekly for 10 weeks), respectively. **RESULTS:** Percent change in the variables of interest for non-smokers vs smokers were as follows: weight: +1.57 vs -0.24; BMI: +0.8 vs -1.35; visceral fat: -0.14 vs +2.44; lean mass +1.88 vs +1.60; android fat -0.11 vs -2.16; total fat: -0.39 vs -2.21. Factorial (smoking status) ANCOVAs controlling for baseline anthropometric and body composition parameters as well as adherence to exercise and NRT revealed significant differences in weight ($p = .024$; $\eta_p^2 = .019$) and BMI ($p = .009$; $\eta_p^2 = .025$) at week 14. This equated to non-smokers weighting 1.31 kg more and having a .58 higher BMI than smokers. No significant differences were found for any of the body composition parameters at week 14 (η_p^2 range from .001-.007). **CONCLUSIONS:** Weight and BMI gain associated with quitting was minimal for those in the GPOC trial. Smokers who quit compare favorably on both anthropometric and body composition parameters to those who did not quit.

FUNDING: Canadian Cancer Society (#019876-PI-HP)

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POS1-56**CONTRACEPTIVE CHOICE AND RATES OF USE AMONG FEMALE SMOKERS**

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SIGNIFICANCE: Women who smoke have higher rates of unintended pregnancy compared to nonsmokers, likely related to observations that smokers initiate sex at an earlier age and have more sexual partners. Little is known about the contraceptive method choice of female smokers, which may also contribute to higher rates of unintended pregnancy. The primary aim of the current study was to examine contraceptive choice and rates of use among female smokers and nonsmokers. **METHODS:** Estimates from the 2011-2013 National Survey on Family Growth were weighted to reflect the US household population of women 15-44 years old.



Current smokers were defined as women who had smoked at least 100 cigarettes and smoked during the past 12 months. Current contraceptive method choice was based on respondents' answers to questions about contraceptive use in the past 12 months. RESULTS: Overall, 26% of women of reproductive age smoked cigarettes. Women who smoked were more likely to be older, Caucasian, unmarried, and less educated compared to nonsmokers. Consistent with prior findings, smokers initiated sex at a younger age compared to nonsmokers (19.3 vs. 22.3 years old, $p < .0001$), had more heterosexual partners in their lifetime (10.0 vs. 5.2, $p < .0001$), had more pregnancies (2.2 vs. 1.8, $p < .01$) and were more likely to report that at least one of these pregnancies was unintended (59% vs. 37%, $p < .01$). Regarding contraceptive use, birth control pill use was more prevalent among nonsmokers compared to smokers (33% vs. 25%, $p < .05$), primarily due to lower rates of use among smokers > 35 years old when use becomes contraindicated. Use of very effective contraceptive methods was more prevalent among smokers than nonsmokers, with smokers reporting use of both sterilization and long acting reversible contraception (LARCs) more than nonsmokers (30% vs. 23%, $p < .05$ and 18% vs. 12%, $p < .01$, respectively). CONCLUSION: While smokers' patterns of sexual behavior may increase their opportunities to become pregnant, preliminary analyses do not suggest that contraceptive method choice is contributing significantly to higher rates of unintended pregnancy.

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POS1-57

PROMOTING SMOKING CESSATION AND PAIN MANAGEMENT AMONG CANCER PATIENTS

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SIGNIFICANCE: Many cancer survivors, particularly those living in rural areas or who are medically underserved, continue to smoke following their diagnosis and treatment. Some have attempted to promote cessation among survivors. Unfortunately, most cessation programs for cancer survivors have been unsuccessful and are inaccessible to those in medically underserved areas. Cessation might be especially challenging as many cancer survivors struggle with persistent pain. Pain and smoking have a reciprocal relationship. Thus, addressing both smoking cessation and pain management may increase the effectiveness and relevance of smoking cessation interventions for cancer survivors. METHODS: We conducted a two-arm, wait-list randomized controlled pilot study in which we delivered a smoking cessation intervention integrated with a pain management intervention to patients with cancer. All patients had the option to receive first line therapy: up to 6 weeks of the nicotine patch. The main goals of the pilot were to show feasibility, acceptability, and preliminary efficacy. Our pilot data achieved all three goals. RESULTS: Thus far, we have randomized 27 patients (13 intervention and 14 wait-list control). Of the waitlist control participants, 10 have requested the intervention. 17 patients have completed their follow up surveys at 2-months post-randomization. When asked about how useful the intervention was in helping them to quit smoking and manage their pain, 67% of the patients who received the intervention rated it as extremely useful (5 out of 5) in helping them to quit smoking, and 50% of patients who received the intervention rated it a 4 or 5 in helping them to manage their pain. Further, 83% would recommend the program to other patients with cancer. In terms of smoking cessation, 29% of those in the intervention arm, compared to 10% in the control condition had biochemically validated cessation at 2-months post-randomization. Importantly, among those who continued to smoke, there was a much greater reduction in the number of cigarettes smoked per day in the intervention arm than the control condition (17 to 6 cigarettes per day vs. 15 to 10 cigarettes per day, respectively). CONCLUSIONS: Our pilot data suggest the feasibility, acceptability, and preliminary efficacy of this approach. The next step is to conduct a large randomized controlled trial to fully test the efficacy of the intervention.

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POS1-58

VARENICLINE VERSUS PLACEBO EFFECTS ON DEMAND FOR CIGARETTES AMONG SMOKERS WITH SUBSTANCE USE DISORDERS

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SIGNIFICANCE: Smokers with substance use disorder (SUD) have quit rates that are half that of non-substance users. If medication can reduce demand for cigarettes in this population, it may improve smoking outcomes. This analysis of smokers with SUD in smoking treatment (Rohsenow et al., under review) compared the effects of the run-up week of varenicline to placebo run-up plus the first few hours of nicotine patch for effects on demand for cigarettes using the Cigarette Purchase Task (CPT), and investigated whether these changes in demand from baseline were associated with better rates of abstinence from smoking on Quit Day and 1 and 3 months later. METHODS: Participants ($n = 109$) were randomized to one of two double-blind conditions: varenicline capsules with placebo patches, or transdermal nicotine replacement therapy (NRT) with placebo capsules. Participants completed a hypothetical CPT to assess demand for cigarettes at baseline and again on their Quit Day after participating in a one-week medication dose run-up or placebo capsule lead-in. NRT or placebo patches were started on Quit Day hours before demand was re-assessed. RESULTS: Demand for cigarettes significantly reduced from baseline to Quit Day independent of medication condition. Reduced intensity (fewer cigarettes desired when free), reduced O_{max} (lower maximum amount of money spent on cigarettes), and reduced breakpoint (ceasing smoking all together at a lower cigarette price), predicted greater odds of abstinence on Quit Day. At 1-month post-quit, an interaction showed that reduced demand for cigarettes from baseline to Quit Day predicted abstinence only for people randomized to placebo, not to varenicline, with abstainers decreasing demand over the week before Quit Day while taking placebo. At 3-months post-quit, few participants remained abstinent and neither cigarette demand nor medication predicted smoking outcomes. CONCLUSIONS: Behavioral economic approaches may provide important predictive utility during smoking cessation but varenicline did not differentially affect demand, except to prevent demand from being a predictor of 1-month smoking abstinence.

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POS1-59

PREDICTIVE VALIDITY OF THE PENN STATE NICOTINE DEPENDENCE INDEX (PSNDI)

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SIGNIFICANCE: No existing measures of nicotine dependence were specifically designed to facilitate comparison of dependence across different nicotine products. The PSNDI was developed for this purpose and the e-cig version of the PSNDI was previously shown to predict the nicotine concentration of e-liquid used by exclusive vapers as well as other markers of e-cig nicotine delivery (Foulds et al, 2015). This study aimed to assess the concurrent and predictive validity of a 10-item cigarette version of this questionnaire in the context of a smoking cessation trial. METHODS: 225 adult smokers of ≥ 5 cigarettes per day who were willing to make a quit attempt had baseline nicotine dependence measured via the FTND, HONC, Tobacco Dependence Screener (TDS) and PSNDI, in addition to baseline carbon monoxide, blood nicotine and blood cotinine. Abstinence was measured one month later, with the main outcome being self-reported seven-day point-prevalence confirmed by $CO < 10$ parts per million. In this population of adult smokers, baseline PSCDI was compared to baseline FTND, HONC and TDS on a number of baseline and outcome measures: baseline CO, blood nicotine, and blood cotinine; and tobacco abstinence at 28-day follow-up. RESULTS: The 28-day quit rate was 52%. The PSCDI compared favorably with the HONC and TDS on these measures and similarly to the FTND. Unlike the HONC and TDS, baseline PSCDI was correlated with baseline blood nicotine ($p = 0.0012$) and cotinine ($p = 0.0001$). The PSNDI at baseline was a significant predictor of 28-day abstinence ($p = 0.014$) even



when controlling for other baseline predictors including cigarettes per day, and was a better predictor than the other measures. 5 of the items were significant univariate predictors of 28-day abstinence and others contributed to prediction. **CONCLUSIONS:** The cigarette version of the PSNDI has validity in terms of its relationship with other markers of dependence, and ability to predict which smokers have difficulty achieving short term abstinence in a quit attempt. This questionnaire is designed to be easily adapted to measure dependence on other nicotine products.

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POS1-60

A SECOND UPDATE ON SUSCEPTIBILITY GENES FOR NICOTINE DEPENDENCE IDENTIFIED BY GENOME-WIDE LINKAGE, CANDIDATE GENE ASSOCIATION, GENOME-WIDE ASSOCIATION, AND TARGETED SEQUENCING APPROACHES

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Tobacco smoking is a severe health hazard worldwide, as nearly one-third of the global adult population smokes tobacco products, and these have been associated with numerous serious health problems. This high prevalence of tobacco use highlights the importance of studying the genetic determinants of nicotine dependence (ND). To identify genetic factors for ND, various approaches have been used, including genome-wide linkage, candidate gene-based association, genome-wide association (GWAS), and targeted sequencing analysis. In this study, we systematically analysed the findings from all the abovementioned approaches according to rigorous selection criteria for each included study such as sample size, statistical significance, and independent replication. Our analysis revealed 14 regions nominated by genome-wide linkage analysis and 34 significantly associated loci in 43 genes by candidate gene-based association. The GWAS and meta-GWAS revealed 11 genome-wide significant loci; however, only the loci on chromosomes 8, 15, and 19 have received independent replication. Although it is still in early stages, limited targeted sequencing studies using next-generation techniques have implicated 18 variants in the aetiology of ND. Together, we identified 14 linkage regions and 47 unique loci in 60 genes involved in the development of ND, which forms our current understanding of the susceptibility map for ND. Because almost all of these loci and genes have received replication by independent approaches in different samples, they should be considered high priorities for future functional study of ND.

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POS1-61

ESTABLISHMENT OF A STRONG LINK OF SMOKING WITH CANCER PATHOGENESIS THROUGH DNA METHYLATION ANALYSIS

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Tobacco smoking is a well-documented risk factor for various cancers, which are regulated by complex mechanisms, including DNA methylation and other epigenetic reprogramming. Previous epigenome-wide association studies revealed a large number of methylation sites associated with smoking. However, to date, no study has established a link between smoking-associated DNA methylation and cancer. To attack this issue, we identified two sets of methylated genes by smoking from the blood and buccal samples, and then determined whether these methylated genes were enriched in pathways implicated in the pathogenesis of cancers. For the methylated genes from the blood samples, we identified 57 significantly enriched pathways; many of them were reported to be associated with different types

of cancers. Among these pathways, eleven including RAR activation, actin cytoskeleton signalling, and aryl hydrocarbon receptor signalling were also significantly overrepresented by the methylated genes in the buccal samples. Furthermore, our findings indicated that the aryl hydrocarbon receptor signalling pathway played an essential role in the initiation of smoking-attributable cancer. Based on the findings from the current study and prior biological evidence, we propose a schematic model to elucidate the biological effects of smoking on cancer pathogenesis. Finally, we constructed a subnetwork consisting of 48 non-redundant genes in the 11 oncogenic pathways detected in both the blood and buccal samples. Of them, several genes, such as *DUSP4*, *AKT3*, *SMARCA4*, and *SMAD6*, showed strong evidence for involvement in smoking-related lung cancer. In conclusion, our findings provide the first robust and systematic evidence supporting the idea that smoking is indeed an important inducer of cancer at an epigenetic level.

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POS1-62

PROGESTERONE FOR SMOKING RELAPSE POSTPARTUM

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BACKGROUND: Maternal smoking is associated with poor pregnancy outcomes and increased infant morbidity and mortality. Close to half of women who were smokers prior to conception quit smoking in pregnancy, when endogenous progesterone levels are high. However, at least half resume pre-pregnancy smoking levels within weeks after delivery and when progesterone levels drop. Prior work has shown that exogenous administration attenuates both craving for cigarettes and the subjective rewarding effects of smoking among recently abstinent female smokers. The current pilot study tested the efficacy of postpartum progesterone replacement in preventing relapse to smoking in postpartum women with a history of pre-pregnancy smoking. **METHOD:** This was an 8-week, double-blind, parallel, randomized, placebo-controlled pilot trial. 41 pregnant women who smoked before pregnancy and achieved abstinence by 32 weeks of gestation were randomized to receive oral micronized progesterone (200 mg twice daily) or placebo for 8 weeks following delivery. The primary outcome was the 7-day point prevalence abstinence at week 8. Continuous abstinence for weeks 1 through 8 was examined as a secondary outcome. Abstinence was determined by self-report via Timeline Followback at weekly visits, confirmed by an expired carbon monoxide (<8 ppm). Differences in abstinence rates were analyzed using logistic regression and Cox proportional hazards regression was used to compare the hazard of relapse. **RESULTS:** Women taking progesterone were twice as likely to be abstinent at week 8 compared to women taking placebo, this difference did not reach statistical significance (OR= 2.1, 95% CI= 0.58, 0.42, p= 0.26). Similarly, the progesterone group was 1.7 times more likely, but not statistically significantly so, than the placebo group to remain abstinent throughout the 8-week treatment period (OR=1.67, 95% CI= 0.42, 6.54, p= 0.47). The median time to relapse for the placebo group was 38 days, compared to 52 days for the progesterone group. The progesterone group had a 28% delay in time to relapse (Hazard Ratio = 0.72) compared to the placebo group, but this difference was not significant (p=0.45). **SUMMARY:** These preliminary findings support the promise of progesterone treatment in postpartum smokers and could constitute a therapeutic breakthrough. If these preliminary findings can be evaluated and replicated in a larger study with sufficient power, this may constitute an acceptable and safe smoking relapse prevention strategy for use during lactation.

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POS1-64

SEX DIFFERENCES IN DORSOLATERAL PREFRONTAL CORTEX DOPAMINE RELEASE AND THE RELATIONSHIP TO TOBACCO SMOKING TREATMENT OUTCOMES

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SIGNIFICANCE: Sex differences exist in the behavioral and molecular mechanisms underlying tobacco smoking. For example, men tend to smoke for the reinforcing effects of nicotine whereas women tend to smoke for stress and mood regulation. While the mesolimbic dopamine (DA) system drives the reinforcing effects of tobacco smoking, the mesocortical dopamine system—including dorsolateral prefrontal cortex (dlPFC)—is critical for inhibitory control, which is compromised by stress. Guanfacine, an α_2 -adrenergic agonist, enhances inhibitory control and reduces prefrontal cortical DA release. The goals of this study were to investigate sex differences in amphetamine-induced cortical DA release in tobacco smokers and to examine whether the magnitude of DA release predicts treatment outcomes. **METHODS:** In this study, twenty-five tobacco smokers (12 females) participated in two same-day [^{11}C]FLB-457 positron emission tomography (PET) scans before and 3 hours after amphetamine administration (0.3-0.4mg/kg PO). After their PET scans, subjects participated in a 3-week guanfacine (3mg PO, daily) trial. Toward the end of the guanfacine trial, in order to model the ability to resist smoking, subjects underwent a smoking-lapse paradigm following a psychological stressor. We measured time lapsed before the first cigarette. We compared percent change in binding potential (%BP), an indirect measure of dopamine release, between males and females in dlPFC. **RESULTS:** Female smokers show smaller amphetamine-induced DA release in dlPFC (%BP=2.60 \pm 3.19%) than male smokers (%BP=18.26 \pm 5.91%), $p=0.033$. In female smokers, smaller amphetamine-induced DA changes were associated with shorter time to delay smoking following a stressor, $p=0.026$. This relationship was not found in male smokers. **CONCLUSIONS:** Preliminary analyses suggest that female smokers may have a blunted amphetamine-induced DA response compared to male smokers in the dorsolateral prefrontal cortex and the more blunted the DA response in females, the greater the inability to delay smoking. This finding is consistent with previous literature showing that blunted DA responses predict poorer treatment outcomes.

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POS1-65

A DOUBLE-BLIND, RANDOMIZED, PLACEBO-CONTROLLED, PHASE-2, DOSE SELECTION STUDY OF LORCASERIN HYDROCHLORIDE FOR SMOKING CESSATION: DIFFERENT ANALYSES PRODUCE MARKEDLY DIFFERENT RESULTS

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BACKGROUND: Lorcaserin hydrochloride (HCl) is a selective serotonin (5-HT_{2C}) receptor agonist which decreases food intake and body weight through its actions in the central nervous system. We are reporting on the study results solely from our research center. **METHODS:** Seventy-five (75) male and female smokers were screened for entry into the trial. Fifty-nine (59) eligible smokers were randomly assigned to one of three treatment groups: lorcaserin 10 mg once daily; lorcaserin 10 mg twice daily, or placebo in a 3:3:2 ratio. Randomized patients took study medication for two weeks before attempting to quit on Study Day 15, "Target Quit Date." The primary efficacy endpoint was end-expiratory carbon monoxide- (CO-) confirmed Continuous Abstinence Rate (CAR) from study weeks 9-12, defined as zero reported smoking via Nicotine Use Inventory (NUI) with exhaled CO measurement ≤ 10 ppm. **RESULTS:** Utilizing the protocol-specified statistical analyses, none of our initial results were statistically significant. Analyses based on less stringent "success criteria" produced several statistically significant results. Using either NUI = 0 or CO ≤ 10 ppm, high dose lorcaserin demonstrated significantly better efficacy when compared to placebo ($p < 0.02$) as well as low dose lorcaserin ($p < 0.005$). We looked at "harm/risk reduction" as defined by NUI values of ≤ 5 and a CO value of ≤ 10 ppm and lorcaserin 20 mg was significantly more efficacious than placebo

($p < 0.02$) and low dose lorcaserin ($p < 0.01$). When we analyzed for NUI ≤ 5 or CO ≤ 10 ppm at Week 12/Endpoint, high dose lorcaserin again demonstrated significant superiority over placebo ($p < 0.01$) and low dose lorcaserin ($p < 0.01$). Finally, we also analyzed baseline vs. endpoint Body Mass Index (BMI) values, comparing successful quitters and non-quitters, as well as by treatment group, and there were no statistically significant findings. **CONCLUSIONS:** Different statistical analyses produced markedly different results. Lorcaserin 10 mg once daily and twice daily did not demonstrate statistically significant results when analyzed vis-à-vis the pre-specified protocol criteria. However, when re-analyzed utilizing our re-defined "harm reduction" criteria, high dose lorcaserin was statistically significantly superior to both placebo and low dose lorcaserin at multiple time points, including Endpoint/Week 12. High dose lorcaserin appears to have clinical and commercial potential as an efficacious smoking cessation agent – without associated weight gain – and, we believe, warrants further investigation.

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POS1-66

THE UTILITY OF DEFINITIONS OF SMOKING IN PREDICTING SMOKING ONSET AND CESSATION AMONG YOUNG ADULTS

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SIGNIFICANCE: Previous measures of smoking identity have been appropriate only for administration to smokers. In contrast, the Subjective Assessment of Smoking scale is a new measure that assesses how people (regardless of their tobacco use) define what it is to be a smoker. In this report we demonstrate for the first time that one's view of what defines smoking predicts both smoking onset and smoking cessation two years later. **METHODS:** Data were drawn from the Memphis Health Project, a longitudinal study of risk factors for smoking onset. Of the 3,049 participants being followed after high school, 2,598 provided data for all variables analyzed. These young adults ranged from 22 to 25 years of age, and 68% were African American whereas 32% were Caucasian. Given our large sample of African Americans, it should not be surprising that considerable smoking uptake was occurring in young adulthood. All measures were obtained through a self-report survey. The Subjective Assessment of Smoking scale consisted of four items, such as "A person should be considered a smoker if they only smoke during stressful times." Each item was rated on a 4-point scale (0 to 3), and scores were then summed, so that the measure ranged from 0 to 12. High scores indicated the belief that one must smoke heavily and consistently to be considered a smoker. To examine smoking onset, we restricted the sample to those who were nonsmokers and divided them into those who remained nonsmokers vs. those who were using tobacco two years later. To examine smoking cessation, we selected smoking participants and divided them into those who continued to smoke vs. those who quit two years later. **RESULTS:** In analyses of changes in smoking status, we found that nonsmokers who viewed only heavy, consistent use of tobacco as "smoking" were more likely to take up tobacco two years later, $p < .001$, than nonsmokers who believed any tobacco use made one a smoker. Further, smokers who believed only consistent and substantial tobacco use was true smoking were less likely to quit within the next two years than those who viewed any tobacco use as smoking, $p < .05$. **CONCLUSIONS:** Young adults at risk for new onset smoking and those at risk for continued smoking were more likely to believe that intermittent and/or low levels of tobacco use is not "real" smoking. Their definition of smoking suggests that they believe a few cigarettes won't hurt them. We hope that this research sparks further study of how definitions of smoking are formed, how they are related to beliefs about harm, and how they predict changes in tobacco use in adolescents.

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POS1-67

FUTURE AND PAST DELAY DISCOUNTING DISTINGUISHES SMOKERS WITH AND WITHOUT OTHER DEPENDENCIES FROM CONTROLS

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SIGNIFICANCE: Behavioral economic indices have been extensively used to understand the characteristics of smokers. Considerable evidence suggests that delay discounting of future monetary rewards can delineate smokers from non-smokers, although discounting for other commodities (e.g., cigarettes, health) and temporal ranges (e.g., discounting of past or future monetary rewards) have not been compared among tobacco-dependent individuals with (i.e., poly-dependent smokers) and without other drug dependencies. **METHODS:** Delay discounting for future monetary rewards, cigarettes, health, and past monetary rewards was compared in two experiments. First, discounting was compared between satiated and deprived sessions in smokers ($n = 31$) and poly-dependent smokers ($n = 93$). Second, discounting among smokers ($n = 31$) and poly-dependent smokers ($n = 93$) was compared to the discounting of control participants ($n = 41$). **RESULTS:** In the first experiment, a mixed effect model was fit that regressed the $\ln(k)$ values (i.e., discounting rate) on demographic (i.e., gender, race, age, education, income) and independent variables (i.e., condition, cue order). A random effect was placed on each participant due to the repeated measurements. Smokers and poly-dependent smokers discounted both cigarettes ($p = 0.005$) and health ($p = 0.002$) more when deprived compared to when satiated. In the second experiment, a model was fit that regressed the $\ln(k)$ values on the demographic variables and the independent variable of group (i.e., smokers, poly-dependent smokers, and controls). Smokers and poly-dependent smokers discounted future monetary gains ($p = 0.04$), health ($p = 0.006$), and past monetary gains ($p < 0.0001$) more than controls, while the smoking groups did not discount differently from each other ($p > 0.05$). **CONCLUSIONS:** These results suggest that: 1) the discounting of cigarettes and health is influenced by current state (i.e., deprivation) in smokers, 2) smokers and poly-dependent smokers discount monetary gains and health similarly, and 3) delay discounting of many commodities and temporal ranges can distinguish controls from tobacco-dependent participants with and without other drug dependencies.

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POS1-68

MATERNAL SMOKING AND PSYCHOSOCIAL FUNCTIONING: IMPACT ON SUBSEQUENT BREASTFEEDING

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SIGNIFICANCE: Breastfeeding is an important protective factor for infant health and development; however, women who smoke during pregnancy have been found to be less likely to breastfeed or to breastfeed for a shorter duration. The American Academy of Pediatrics recommends that women breastfeed even if they are smoking. Little is known about specific factors associated with smoking that may explain why women are less likely to breastfeed. Importantly, smoking during pregnancy is associated with maternal psychopathology and with being less nurturing. The present study examined potential risk and protective factors predicting breastfeeding among a low-income, diverse sample of pregnant smokers and demographically similar non-smokers. **METHODS:** The sample consisted of 258 mother-infant dyads recruited prenatally and assessed during pregnancy and at 2 months. Tobacco exposure was assessed using maternal self-report and biologically verified via salivary assay. During pregnancy, the following were assessed: maternal anger and hostility with the Buss Perry Aggression Questionnaire, maternal depression with the Beck Depression Inventory, maternal stress with the Perceived Stress Scale, and fetal attachment with the Cranley Maternal Fetal Attachment Scale. **RESULTS:** Within hierarchical linear regression analyses predicting duration of breastfeeding, maternal age was predictive of longer duration of breastfeeding at step 1 [$\beta = 0.17$, $p = .02$; $F(1,210) = 5.86$, $p = .02$; $R^2 = 0.03$]. At step 2, maternal age significantly predicted breastfeeding duration above and beyond the role of maternal stress, anger and hostility, depression, and fetal attachment [$\Delta F(4,206) = 1.99$, $p = .10$; $\Delta R^2 = 0.04$]. At step 3, average number of cigarettes smoked per day during the pregnancy [$\beta = -0.14$, $p = .04$; $\Delta F(1,205)$

$= 3.96$, $p = .04$; $\Delta R^2 = 0.02$] significantly predicted breastfeeding duration above and beyond the other predictors except maternal age, which remained significant. **CONCLUSIONS:** Results highlighted the important role of considering a diversity of factors in subsequent parenting practices. Women who are younger and who smoke during their pregnancies may be important populations to target for future research and for intervention.

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POS1-69

RESTING-STATE FUNCTIONAL CONNECTIVITY BEFORE AND AFTER SMOKING CESSATION TREATMENT WITH NICOTINE REPLACEMENT

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BACKGROUND: Smokers demonstrate changes in resting state functional connectivity (rsFC) which may correlate with duration of smoking history and underlie persistent smoking in dependent individuals. Smokers may have aberrant rsFC within the salience (SN) and default mode networks (DMN); increased SN-DMN network strength has been associated with smoking abstinence and may be reversed in satiety. Although studies have associated the strength of these functional circuits at baseline with quit outcomes during smoking cessation attempts, the influence of smoking cessation treatment with nicotine replacement therapy (NRT) on these circuits remains unclear. We seek to measure changes in rsFC across NRT treatment during a randomized, controlled study evaluating the efficacy of personalized nicotine patch dosing. **METHODS:** During a 12-week treatment study, smokers unable to quit within a two-week run in on 21mg/day nicotine patch receive either (A) personalized nicotine patch dosing or (B) 21 mg/day nicotine patch treatment plus breakthrough oral nicotine mouth-spray. Participants undergo 3 fMRI scans following overnight abstinence: at baseline, end of treatment, and at 6-month follow-up. Participants complete an rsFC paradigm during which they are instructed to focus their gaze on a rest cross while allowing their mind to wander freely. **RESULTS:** To date 20 baseline, 15 end-of-treatment, and 12 follow-up scans have been completed. Participant follow-up is on-going. We will continue recruiting towards our target of 50 participants over the next 6 months. We will present preliminary results of rsFC analyses exploring the influence of smoking cessation treatment with NRT and quit status on functional network strength at end of treatment. **CONCLUSIONS:** NRT efficacy may be mediated through changes in functional network strength.

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POS1-70

WILL DELAY DISCOUNTING PREDICT INTENTION TO QUIT SMOKING?

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BACKGROUND AND AIMS: Intention to quit cigarette smoking is significantly associated with attempting to quit and actual quitting. Delay discounting is significantly associated with smoking initiation and success in quitting. To our knowledge, no studies have investigated the relationship between delay discounting and intention to quit cigarette smoking within groups of smokers. The current study examines the relationship between discounting rates and intention to quit cigarette smoking. **METHODS:** Two separate observational, cross-sectional experiments were conducted. Experiment 1 used data collected online and an adjusting-delay discounting procedure; Experiment 2 used data collected in the laboratory and an adjusting-amount discounting procedure. Descriptive statistics, chi-square, t-test analyses and stepwise linear regression were used to determine the frequencies



and associations between sample characteristics and intention to quit smoking with delay discounting rates. Statistical analysis was conducted using Stata 13.1 at a significance level of 0.05. RESULTS: A total of 242 participants and 153 participants completed the online and on laboratory questionnaires, respectively. For the online experiment; Intention to quit smoking [coef. -0.125 CI: -0.240 -0.010] gender [coef. 0.732, CI: 0.203 1.261] and ethnicity [coef. -1.968, CI: -3.069 -0.551] were significantly associated with delay discounting rates. In the laboratory experiment; intention to quit [coef. -0.275, CI: -0.461 -0.089], and education [coef. -0.353, CI: -0.608 -0.099] were significantly associated with discounting. Smokers with proximal intention to quit in the next 6 months (based on the stage-based model of behavioral change) had significantly ($P=0.002$) lower mean of delay discounting rates (-3.80) compared to those with no intention to quit (-2.42). CONCLUSIONS: Delay discounting significantly predicted intention to quit cigarette smoking. Smokers with higher intention to quit smoking have lower delay discounting rates compared with those with no intention to quit. Efforts to decrease discounting rates might increase intention to quit and therefore increase quit attempts and actual quitting.

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POS1-71

IMPULSIVITY IN CIGARETTE SMOKERS VS. CO-USERS OF CIGARETTE AND MARIJUANA

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SIGNIFICANCE: Cigarette smoking is the leading preventable cause of morbidity and mortality in the United States. Co-use of cigarettes and marijuana is steadily increasing. Research has shown that cigarettes and marijuana are both independently associated with higher impulsivity, however, it is unknown how impulsivity differs between co-users and cigarette only smokers. Our goal was to examine whether co-users showed higher impulsivity compared to cigarette only smokers during ad libitum smoking. METHODS: This is a subset of a larger ongoing tobacco cessation clinical trial. Participants consisted of two groups, each group containing men and women between the ages of 18-60 years who smoked at least 5 cigarettes/day, were motivated to quit smoking and had no other sources of nicotine. Group 1 only smoked cigarettes. Group 2 were "non-daily" users of marijuana (at least 1x/wk but <daily). Impulsivity outcomes were measured by three questionnaires: The Barratt Impulsiveness Scale (BIS), the Behavioral Activation/Inhibition Scale (BIS/BAS) and the Brief Self Control Scale (BSCS). Impulsivity scores were compared between the two groups using ANOVA. RESULTS: Comparisons of demographic and baseline variables between co-users ($N=30$) and cigarette-only smokers ($N=177$) showed that cigarette-only smokers were more likely to be Caucasian ($p=0.034$), have fewer quit attempts ($p=0.025$) and consume fewer alcoholic drinks per week than co-users ($p=0.007$). Co-users showed significantly higher impulsivity compared to cigarette only smokers on the BIS scale (Mean=67.2(\pm SD 7.4) vs 63.7(\pm 7.0) respectively; p -value: 0.01). However, there wasn't a significant difference between the means on the BIS/BAS scale ($p=0.37$) or the BSCS scale ($p=0.27$). When adjusted for gender, race and the significant baseline variables, impulsivity on the BIS scale remained significant ($p=0.021$). CONCLUSION: Co-users show a higher level of impulsivity when compared with cigarette only smokers. This suggests that co-users may encounter greater difficulty in quitting smoking or quitting marijuana and may have higher rates of relapse. More research is needed to further explore this phenomenon.

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POS1-72

SMOKING ENVIRONMENT CUES REDUCE ABILITY TO RESIST SMOKING AS MEASURED BY A DELAY TO SMOKING TASK

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Environments associated with smoking may promote lapse and relapse in smokers attempting to quit. Here we examined the effects of exposure to visual smoking environment cues on smoking urge and the ability to resist smoking, as measured with a delay-to-smoking task in which monetary contingencies are provided for resisting smoking. Adult daily smokers ($n=22$) completed two experimental sessions, each following 6 hr smoking abstinence. Sessions differed only in the type of cue participants were exposed to (smoking environments vs. nonsmoking environments). Participants completed subjective ratings of smoking urge, withdrawal and other reactions (i.e. craving, affect). Behavioral outcomes on the delay-to-smoking task included latency to first cigarette, number of cigarettes smoked and average number of puffs per cigarette. Exposure to smoking environments as compared to the nonsmoking environments resulted in greater craving, faster initiation of smoking, and more smoked cigarettes. Greater craving was associated with a shorter time to initiate smoking, but this effect did not differ across sessions. In contrast, withdrawal was more strongly associated with number of cigarettes smoked during smoking environment sessions. Together, these results suggest smoking environments increase smoking urge and promote smoking behavior. Further research is necessary to examine the specific and interactive effects of smoking-related environments on real-world smoking lapse and relapse.

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POS1-73

DEPENDENCE BEHAVIORS AND NICOTINE PHARMACOKINETICS IN ELECTRONIC CIGARETTE USERS

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BACKGROUND: Research suggests that experienced e-cigarette users use their products differently, and are exposed to more nicotine, than inexperienced users. However, it remains unknown how use behaviors and nicotine exposure among experienced users are impacted by different e-cigarette products and e-liquids with varying nicotine content. METHODS: We conducted a randomized, double-blind, crossover, multiple dose study where current e-cigarette users were randomized to use their own (O) brand e-cigarette and two commercially-available rechargeable e-cigarettes with high (H) and low (L) nicotine strengths on three study days after verified overnight tobacco abstinence. Twenty participants (including both exclusive e-cigarette and dual traditional cigarette users) completed the study. Participants used the products several times each day during six, 20 minute ad-libitum use sessions; each session was separated by an hour. We measured use behaviors (including topography), subjective effects (including nicotine withdrawal), dependence, and nicotine pharmacokinetics (PK) and pharmacodynamics. A separate ANOVA model was fitted to each PK parameter. Fixed effects for product (H, L, and O products) and use group (exclusive or dual user) were included. All products were analyzed for actual nicotine content. RESULTS: Study e-liquids contained approximately 40% less nicotine than indicated on the manufacturer's product label. Participants were nicotine dependent based on Hooked on Nicotine Checklist scores. Participants used the H and L products differently than their O products (i.e., greater total puff volume), indicating some behavioral compensation based on product and/or e-liquid nicotine content. Three PK parameters (C_{max} , C_{max} last bout, and AUC) were significantly higher for O products compared to the L study product and among exclusive users compared to dual users. Despite differences in use behaviors and PK results, all products reduced withdrawal symptoms (based on Minnesota Nicotine and Withdrawal Scale) to a similar extent. CONCLUSIONS: Nicotine content and familiarity with e-cigarette products are important factors that can influence e-cigarette use behavior and nicotine exposure.

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POS1-74

TEXT2STAYQUIT: PILOT RANDOMIZED TRIAL OF BRIEF AUTOMATED SMOKING CESSATION TEXTING INTERVENTION FOR INPATIENT SMOKERS DISCHARGED FROM HOSPITAL

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SIGNIFICANCE: Inpatient hospitalization offers an opportunity for health care professionals to provide information to smokers about smoking cessation. Text messaging may provide a method for delivering smoking cessation support as well as a way for hospitals to monitor inpatient smoking status post-discharge. **METHODS:** Participants were inpatients who self-identified as tobacco users at the time of admission. Those who accepted cessation counseling as part of usual care were screened for study inclusion. Eligible participants smoked > 20 cigarettes in the 30 days prior to admission, were willing to give up all forms of tobacco, had a cell phone with them capable of receiving text messages, and were willing to send/receive text messages. Participants were randomized to receive 5 smoking status questions (control) or 5 smoking status questions plus daily motivational messages (intervention). Text messages began the day the participant was discharged from the hospital and continued until phone call follow-up at one month post-discharge. Quit status was based on self-report seven day point prevalence abstinence. **RESULTS:** 140 participants, 70 receiving the intervention and 70 controls were included in this analysis. Participants were 60% female, 81% white, an average of 42 years old, smoked an average of 14 cigarettes per day, and had an average hospital stay of 5 days with no significant differences between the intervention and control group. Intent-to-treat analysis found that 37% (n=26) of control participants and 44% (n=31) of intervention participants were quit at 1 month post-discharge (p=0.39). Overall, 56% (n=78) of participants responded to at least 4 of the 5 smoking status questions. Of those who completed the follow up phone call (n=114), 75% (n=46) of intervention participants and 58% (n=31) of control participants rated the helpfulness of the text messages 'good' or 'excellent' (p=0.05). **CONCLUSION:** Although quit rates between the intervention and control groups did not reach statistical significance in this pilot study, text messaging may provide a feasible method to encourage inpatient smokers to stay quit and monitor their smoking status post-discharge.

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POS1-75

DEVELOPING AND TESTING AN ONLINE INTERVENTION FOR HARDWARE SMOKERS: A PROJECT OVERVIEW

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SIGNIFICANCE: Hardcore smokers have little to no intention to quit smoking. These 'hardcore smokers' are hard to reach by current tobacco control measures, and are particularly vulnerable to death and disease. In our multi-study research project, we developed and tested an online intervention that involves hardcore smokers in tobacco control. **METHODS:** and results: In study 1, based on survey data from a population representative sample, we found that the prevalence of hardcore smoking in the Dutch general population decreased from 12.2% in 2001 to 8.2% in 2012. In study 2, we conducted 11 focus groups among current and former hardcore smokers, and distinguished 6 themes in the pros and cons of smoking and quitting: Finance, Health, Intrapersonal Processes, Social Environment, Physical Environment, and Food and Weight. In study 3, we used a latent profile analysis of survey data (n = 510) to find 3 subgroups among hardcore smokers: receptive, ambivalent and resistant hardcore smokers. In study 4, we experimen-

tally validated a self-affirmation manipulation for hardcore smokers. In study 5 we experimentally tested an online, tailored intervention for hardcore smokers, that contains a self-affirmation manipulation and multiple elements that use motivational interviewing techniques to tackle dysfunctional beliefs about smoking. The intervention increased hardcore smokers' receptivity to information about smoking cessation. **CONCLUSIONS:** Hardcore smokers are a special group of smokers that require special attention in tobacco control. Contrary to common perception, they are not completely unwilling to quit and could be involved in tobacco control.

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POS1-76

EVALUATION OF NICOTINE PHARMACOKINETICS AND SUBJECTIVE EFFECTS FOLLOWING USE OF A NOVEL NICOTINE AEROSOL SYSTEM

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Novel nicotine aerosol systems represent an evolving part of the tobacco harm reduction strategy. We present the first in human data from the clinical assessment of a novel nicotine aerosol system based on the *in situ* formation of an aerosol of submicron airborne particles consisting of a nicotine salt delivered to the lungs through inhalation. This open-label, ascending nicotine levels study, conducted in 16 healthy smokers, investigated the plasma nicotine pharmacokinetic profile, subjective effects, and the safety and tolerability of the nicotine delivery system in relation to the Nicorette® inhalator. The study was conducted in New Zealand and registered at www.clinicaltrials.gov (NCT02532374). Three different nicotine delivery levels (50, 80 and 150 µg/puff) were evaluated in ascending order on different days, following initial use of the Nicorette® inhalator. Subjective effects related to the novel nicotine aerosol system or the Nicorette® inhalator were assessed using a Visual Analog Scale for Craving Assessment, the Questionnaire of Smoking Urges in its abbreviated form (QSU-brief), the modified Cigarette Evaluation Questionnaire (mCEQ) and a cough assessment questionnaire. Inhalation of the aerosol delivered by the novel nicotine aerosol system, resulted in a rapid rise in nicotine plasma concentrations, suggesting a pulmonary absorption route. Craving reduction, as assessed by the VAS craving score, was faster than for the Nicorette® inhalator. The mean QSU-brief total scores were similar for both products. Product satisfaction scored higher than the Nicorette® inhalator and the aerosol delivered by the novel nicotine aerosol system was well tolerated as indicated by the adverse events collection, safety measurements and cough assessment. This novel nicotine aerosol system shows potential over existing nicotine delivery systems by delivering nicotine with kinetics close to cigarettes without exogenous carrier substances as used in current electronic cigarettes.

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POS1-77

BARRIERS TO SMOKING CESSATION AMONG ADULTS WITH OPIOID USE DISORDER

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Adults in treatment for substance use disorders are 3-4 times more likely to smoke than the general population. Those with opioid use disorder have particularly elevated rates of smoking and poor smoking cessation outcomes. Although several studies have examined barriers to engaging in smoking cessation in alcohol-dependent samples, little is known about barriers among those with opioid use disorder. The aim of the current study was to characterize barriers to smoking cessation among treatment-seeking adults with opioid use disorder. In addition, we examined whether those with higher anxiety sensitivity--the fear of the symptoms of anxiety--would be associated with more perceived barriers to smoking cessation.



A sample of 109 adults (24% female) receiving treatment for opioid use disorder were enrolled in a one-time survey study. Of this sample, 87% were lifetime smokers and 77% were current smokers. On average, they smoked 16.7 cigarettes (SD=9.2) per day and reported only moderate interest in changing smoking behaviors. Participants completed the Barriers to Quitting Smoking Scale, which assesses the presence of 11 perceived barriers to smoking cessation. Participants reported an average of 6 barriers. The most commonly reported barriers to quitting smoking were feeling anxious, feeling tense/irritable, and difficulty staying sober. Anxiety sensitivity was associated with more barriers ($B=0.05$, $SEB=.02$, $t = 2.74$, $p=.008$), even controlling for sociodemographic variables and nicotine dependence severity. This study suggested that adults with opioid use disorder report a high number of perceived barriers to smoking cessation, with anxiety as a particular concern. Anxiety sensitivity was associated with barriers to smoking cessation, consistent with findings from the general population. Anxiety vulnerabilities may be important therapeutic targets when trying to engage adults with opioid use disorder in smoking cessation treatment. Notably, 70% of participants reported that quitting smoking would make it harder to stay sober from other substances, in contrast to the literature suggesting that smoking cessation does not worsen substance use disorder outcomes.

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POS1-78

CHANGES IN PATIENT SMOKING BEHAVIOUR FOLLOWING A SMOKE-FREE PSYCHIATRIC HOSPITALISATION

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SIGNIFICANCE: Admission to an inpatient psychiatric facility with a smoke-free policy may act as an opportunity to initiate positive changes in smoking behaviours among smokers with a mental disorder. **METHODS:** This study examined changes in smoking behaviour among 101 smokers discharged from an inpatient psychiatric facility with a complete smoke-free policy in New South Wales, Australia. Generalised linear mixed models were used to assess changes in smoking behaviours from pre-admission (baseline) to one week, two, four and six months post-discharge, including: continuous (from baseline) and seven-day point prevalence abstinence; daily cigarette consumption; quit attempts (primary outcomes); nicotine dependence; and use of nicotine replacement therapy (NRT; secondary outcomes). Generalised linear mixed models were used to examine factors associated with such changes. **RESULTS:** No significant changes in continuous or seven-day point prevalence abstinence, quit attempts or nicotine dependence were identified from baseline to six months post-discharge. However, daily cigarette consumption declined significantly from baseline to six months post-discharge ($F(4,294) = 7.093$, $p < .001$). Participants with lower nicotine dependence at baseline were three times more likely to reduce their cigarette consumption post-discharge (Odds ratio [OR] = 3.09, 95% Confidence interval [CI] = 1.30-7.32). Participants in the contemplation stage for quitting at baseline (OR = 2.64, 95%CI: 1.16-6.02), and those who made use of smoking cessation treatment post-discharge, including NRT (OR: 5.18, 95%CI: 2.48-10.75), and telephone support (OR: 3.70, 95%CI: 1.04-13.16) were between two and six times more likely to make a quit attempt post-discharge. **CONCLUSION:** Admission to a smoke-free psychiatric facility may result in short term positive changes in cigarette consumption; however access to smoking cessation treatment post-discharge is likely needed to maintain abstinence.

FUNDING: This trial was funded by a Commonwealth Department of Health and Ageing (DoHA) Grant (G1000335), Australian Rotary Health (G0188134) and the Hunter Medical Research Institute (HMRI; G0188473). The trial was registered on the Australian New Zealand Clinical Trials Registry ACTRN1260900046525. ES is supported by a National Health and Medical Research Council (NHMRC) early career fellowship (1104600).

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POS1-79

A MEASUREMENT STUDY TO REVISE THE PROCESSES OF CHANGE FOR SMOKING

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A psychological scale, the Processes of Change - Smoking Version (POC-S; Prochaska et al., 1988) was developed 25 years ago to measure the emotional experiences, thoughts, and actions that occur for people when quitting smoking. However, since the scale's creation, there have been many changes in tobacco products, tobacco cessation treatments, and economic, marketing, and legal factors that have likely affected the process of quitting smoking and the original measure may not adequately capture all components of behavior change for smokers today. Although a literature review indicated that the constructs of the 10 processes may remain sound, the individual items may be outdated or could include other activities. The current study developed a revised scale in two phases. Phase 1 involved a 6-step, iterative, item-development process that included reviews of conceptual definitions and items by smoking behavior change experts and focus groups with current and former smokers, yielding a combination of 60 original, revised, and new items for a revised scale. Phase 2 involved testing the 60 items in a sample of 400 current and former smokers and then evaluating the scale with regard to structure, psychometric properties, and relation to variables of interest in the Transtheoretical Model of Behavior Change. A principal component analysis (PCA) indicated that an 8-component solution was the best fit for the data and theoretically, seven subscales were retained for a 33-item POC-SR that included four experiential processes (Emotional Arousal, Environmental Reevaluation, Self-Reevaluation, and Social Liberation) and three behavioral processes (Self-Liberation, Stimulus Control, and Helping Relationships). The findings indicated that while many of the items and processes were still relevant, three of the processes were not found to be distinct and some of the original items did not work well for today's smoking cessation process. Although sample size limited the power to recommend a new scale or rule out use of the original POC-S, the current study's results indicated that further research on a revision is warranted and the 60-item scale could be used as a starting point.

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POS1-80

PHYSICAL ACTIVITY ENJOYMENT INFLUENCES THE ACUTE AFFECTIVE EXPERIENCE OF PHYSICAL ACTIVITY IN SMOKERS WITH ELEVATED DEPRESSIVE SYMPTOMS

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SIGNIFICANCE: While exercise as an adjunctive intervention strategy for smoking cessation has received mixed results, stronger effects have been observed on cessation outcomes when smokers demonstrate greater adherence to exercise. Physical activity enjoyment (PAE) is one of the most robust and consistent predictors of long-term adherence to exercise. The aims of the current study were twofold: (1) to examine the association between PAE and mood symptoms among smokers with elevated depressive symptoms and (2) to examine whether PAE was related to the acute changes in affect following a 1-mile walk. **METHOD:** Treatment-seeking smokers ($N=246$; 66% female; $M_{age}=43.4$ years) with scores ≥ 6 on the Center for Epidemiological Studies Depression Scale-Revised (CES-D) were recruited for a cessation trial. Participants completed the Physical Activity Enjoyment Scale (PACES) during a baseline assessment. A subset ($N=171$) of participants completed a treadmill version of the Rockport 1-mile walk test and reported affect before, during, and after the test. **RESULTS:** PAE was not significantly related to cigarettes/day or level of tobacco dependence. There was significant association between PAE and level of depressive symptoms ($r = -.24$, $p < .001$) and anxiety sensitivity ($r = -.20$, $p < .01$); more severe depressive symptoms and anxiety sensitivity were associated with lower PAE. Higher PAE was associated with more positive affect during the walk test ($r = .23$, $p < .01$), and predicted greater increases in positive mood ($F(1,159)=16.48$, $p < 0.001$) and decreases in anxiety ($F(1,159)=8.56$, $p = 0.004$) following the walk test. These results were significant above the effects of gender and tobacco dependence. **CONCLUSIONS:**

Depression symptoms and anxiety sensitivity appear to be related to PAE. Given higher PAE may facilitate positive affective experience during and after exercise, PAE could be targeted to increase the pleasurable experience of exercise. This may improve adherence and in turn, promote better cessation outcomes.

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POS1-81

IMPULSIVITY AND APPROACH TENDENCIES TOWARDS CIGARETTE STIMULI: IMPLICATIONS FOR CIGARETTE SMOKING AND CESSATION BEHAVIORS AMONG YOUTH

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BACKGROUND: Impulsivity is associated with smoking, difficulties quitting smoking, and approach tendencies towards cigarette-related cues among adolescents. We examined the moderating effects of impulsivity on (1) the association between approach tendencies towards smoking cues and adolescents' smoking status and (2) the effectiveness of Cognitive Bias Modification (CBM), a smoking cessation intervention focused on changing approach tendencies towards smoking cues, among adolescent smokers. **METHODS:** We conducted a secondary analysis of two previous published studies: Study 1: a cross-sectional study comparing the relationship between impulsivity and approach tendencies towards cigarettes between adolescent smokers ($n = 66$) and non-smokers ($n = 58$); Study 2: an intervention study that randomized 60 adolescent smokers to receive either CBM or sham. Impulsivity was measured using the Barratt Impulsiveness Scale (BIS) and the Experiential Discounting Task (EDT). **RESULTS:** Higher impulsivity, as determined by the BIS but not the EDT, increased adolescents' odds of being smokers compared to being non-smokers ($b=0.04$, $p=0.05$). We observed that the interaction between EDT and approach tendencies also significantly predicted smoking status, however, post-hoc comparisons were not significant. Adolescents with higher BIS scores receiving CBM had increased odds of being abstinent at the end of treatment ($b=0.42$, $p<0.05$), but we found no association between EDT and treatment outcome. **CONCLUSION:** Our findings suggest that CBM may be more effective in adolescent smokers who are impulsive. Differences in findings for BIS and EDT highlight the complexity of the construct of impulsivity. Future studies with larger samples are needed to further disentangle the effects of different aspects of impulsivity on smoking behaviors and cessation outcomes among youth.

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POS1-82

CHARACTERIZATION OF BEHAVIORAL THERAPY DURATION THRESHOLDS FOR EFFECTIVE ABSTINENCE RESPONSES IN SMOKERS

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SIGNIFICANCE: While the clinical practice guidelines robustly support the use of behavioral therapy for smoking cessation, little is known about the ideal "packaging" of this intervention or the potential interactive effects with pharmacotherapy. **METHODS:** In this study we attempted to characterize the dose-response relationship between duration of behavioral therapy and probability of abstinence and investigate the synergistic potential of behavioral therapy with pharmacotherapy. We analyzed 399 participants from two RCTs for smoking cessation that offered smokers up to 240 minutes of behavioral therapy as well as 12 weeks of varenicline or placebo pharmacotherapy. **RESULTS:** The duration of behavioral therapy and abstinence exhibited a sigmoidal relationship (S-shaped curve) where 80% of

abstinence occurred between 116-181 minutes of behavioral therapy. The maximum response in abstinence (70%) was observed at approximately 211 minutes of behavioral therapy, beyond which we did not see any additional benefit in abstinence. Conversely, less than 100 minutes of behavioral therapy did not produce a response in abstinence. In addition, the sigmoidal relationship between behavioral therapy and abstinence was different between the varenicline and placebo groups ($F = 14.68$, $p < 0.01$), with approximately 35% higher rates of abstinence at the maximum efficacy of behavioral therapy for those in the varenicline group as compared to the placebo group, suggesting a synergistic effect of pharmacotherapy and behavioral therapy. **CONCLUSIONS:** The results of the present study can be summarized as follows: Smokers in combined pharmacotherapy and behavioral cessation therapy are more likely to abstain given longer durations of behavioral therapy (up to a point) and exhibit a duration-dependent response to behavioral therapy captured by a sigmoidal curve. Moreover, the duration-abstinence curves differ for the placebo and varenicline groups, exhibiting significant differences in the maximum efficacy in abstinence given the value of duration of behavioral therapy at which the maximum is achieved. These differences suggest that behavioral therapy may be more effective in achieving abstinence in the presence of varenicline.

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POS1-83

EXPERIMENTAL TEST OF IMPLEMENTATION INTENTIONS IN A LABORATORY ANALOGUE OF RELAPSE

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SIGNIFICANCE: Cigarette smoking is a highly engrained and automatized behavior with negative long-term health consequences. Most smokers report wanting to stop smoking and more than half of smokers have made a quit attempt; however, less than 10% of smokers are successful at quitting. Effective interventions to promote change toward smoking reduction and cessation are needed. Implementation intentions (II), a behavioral intervention that links critical situations (e.g., craving a cigarette in the morning) with prescribed, healthier reactions (e.g., reading a book), in conjunction with monetary incentives (MI) for abstinence were assessed in a laboratory analogue of relapse. **METHODS:** Cigarette deprived heavy smokers ($n=36$) completed four delay of cigarette smoking conditions over four laboratory visits. The II interventions entailed linking situations with reactions (active) or selecting but not linking these situations and reactions (control). The MI started at 15 cents and decreased by \$0.002 cents every 2 minutes (functionally reducing by 1 cent every 10 minutes) until the participant smoked for a maximum incentive of \$5.46 for abstaining the entire 120-minute session. Time waited to initiate smoking, an analogue of smoking relapse, was compared across sessions. The four conditions: active II without MI, active II with MI, control II with MI, and control II without MI occurred in randomized order. A 2x2 analysis of variance (ANOVA) with II (active and control) and MI (present or absent) as within-subjects factors was conducted. **RESULTS:** The omnibus ANOVA indicated a significant main effect of II ($F_{(1,35)}=5.17$, $p<0.03$, $\eta_p^2=0.13$) and MI ($F_{(1,35)}=26.37$, $p<0.01$, $\eta_p^2=0.43$). These main effects were not qualified by an interaction between II and MI conditions ($F_{(1,35)}=0.11$, $p=0.75$, $\eta_p^2<0.01$, *ns*). **CONCLUSIONS:** Both II and MI show efficacy as experimental analogues to reduce relapse by delaying smoking initiation following a period of abstinence. II may be an efficacious treatment strategy to reduce cigarette smoking or, in conjunction with other treatments, to quit smoking. Future research should evaluate II in a more naturalistic setting.

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**POS1-84****BRIEF SMOKING CESSATION ADVICE AND ACTIVE REFERRAL TO SMOKING CESSATION SERVICES: A CLUSTER RANDOMIZED CONTROLLED TRIAL**

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BACKGROUND AND OBJECTIVES: Although most smokers are aware of smoking cessation (SC) services, many have never used SC services. We aimed to develop simple, practical and sustainable interventions to increase SC service use in the 2015 COSH "Quit to Win" Contest. **METHODS:** A single-blinded, parallel three-armed cluster randomized controlled trial randomly allocated biochemically validated daily smokers proactively recruited in the community into SC services referral (Group A) (n=402), brief advice (Group B) (n=416) and control group (Group C) (n=408). Smokers in both intervention groups (A & B) received brief SC advice (AWARD model) and a health warning leaflet. Smokers in Group A further received a pocket size SC referral card and were actively referred to SC service providers for a quick appointment. The control group received very brief general SC advice and a 12-page self-help booklet. Follow-up telephone SC advice was provided for the intervention groups at 1 and 2 months. Primary outcome was self-reported 7-day point prevalence quit rate at 6 months. Secondary outcomes were biochemically validated quit and smoking reduction rates (daily cigarette consumption reduced by $\geq 50\%$; excluding quitters). **FINDINGS:** Overall retention rate at 6 months was 72.3%. By intention to treat, the quit rate was 17.2% in Group A, 9.4% in Group B and 11.5% in Group C (A vs. B, $p < 0.001$; A vs. C, $p = 0.02$; B vs. C, $p = 0.31$). Corresponding biochemically validated quit rates were 9.0%, 5.0% and 5.1% (A vs. B, $p = 0.03$; A vs. C, $p = 0.03$; B vs. C, $p = 0.95$). Smoking reduction rates were similar in the 3 groups (A: 22.9%, B: 23.3% and C: 24.5%, $p = 0.85$). Logistic regression analysis found that smoking fewer cigarettes (odds ratio [OR] 0.95, 95% CI: 0.92-0.97), started smoking in later age (OR 1.03, 95% CI 1.00-1.07) and having more confidence for quitting (per unit OR increase 1.12, 95% CI 1.02-1.24) were associated with quit at 6-month. **CONCLUSION:** This study showed that proactive intervention with brief advice and active referral to SC service for smokers recruited in the community setting was effective in increasing quitting.

FUNDING: Hong Kong Council on Smoking and Health, Hong Kong SAR, China

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POS1-85**CIGARETTE CUES CAPTURE ATTENTIONAL RESOURCES OF SMOKERS AND NEVER-SMOKERS, BUT FOR DIFFERENT REASONS**

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In the laboratory, smokers reliably show higher reactivity to cigarette versus neutral cues. However, never-smokers also show enhanced brain responses to cigarette cues, albeit less than smokers. It has been hypothesized that for never-smokers, reactivity to cigarette cues might be attributed to an overall more negative attitude toward smoking, rather than to their motivational relevance. The late positive potential (LPP) is a component of the event-related potential (ERP) that reliably measures emotional arousal. The LPP is larger for motivationally salient cues relative to neutral ones, even when the same stimuli are repeated multiple times. We recorded ERPs during a repetitive picture-viewing paradigm to assess the effects of stimulus repetition on the amplitude of the LPP in a sample of 34 smokers (SMO) and 34 never-smokers (NEV). We predicted higher LPP amplitude to cigarette cues in SMO, and habituation of the LPP response to cigarette cues in NEV, as a function of stimulus repetition. This pattern of amplitude modulation would suggest that cigarette cues are motivationally relevant stimuli only for SMO. When viewed for the first time, we observed greater LPP amplitude to pleasant, unpleasant, and cigarette cues relative to neutral (all $p < 0.0001$) for all subjects. Following stimulus repetition, we observed greater LPP amplitude to pleasant and unpleasant cues relative to neutral, in both SMO (all $p < 0.001$) and NEV (all $p < 0.008$). Supporting our hypothesis, we observed greater LPP amplitude to cigarette cues relative to neutral in SMO ($p = 0.025$), but not in NEV ($p = 0.1$). While there were no group differences in self-reported ratings of pleasure and arousal for emotional or neutral stimuli (all $p < 0.0001$), NEV rated smoking cues as unpleasant ($p < 0.0001$). These

findings suggest that cigarette cues capture attentional resources of SMO and NEV, but for different reasons. For NEV, cigarette cues are perceived as unpleasant, and elicit an initial enhanced LPP to cigarette cues that habituates with stimulus repetition. For SMO, cigarette cues have acquired significance through repeated pairing with nicotine and evoke an emotional response, even when repeated.

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POS1-86**THE RELATIONSHIP BETWEEN SMOKING STATUS, NICOTINE DEPENDENCE AND OUTCOMES OF PATIENTS ENROLLED IN THE NATIONAL LUNG SCREENING TRIAL**

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Smoking causes nearly 90% of all lung cancer deaths. In addition to primary prevention (tobacco control), secondary prevention through early detection is another strategy to reduce lung cancer death rates. Lung cancer screening (LCS) with low-dose CT scans identifies lung cancer at an earlier, more treatable stage in patients with extensive smoking histories. We undertook this study to better understand the behavior of smokers within a screening cohort, to correlate those variables with downstream outcomes, and to identify predictors of continued smoking such that effective tobacco treatment efforts can be incorporated into lung cancer screening programs. This is a secondary analysis of the American College of Radiology Imaging Network (ACRIN) dataset from the National Lung Screening Trial (NLST). The objective was to evaluate the effect of nicotine dependence (as measured by FTND and HSI) and smoking status on rates of smoking cessation, lung cancer, and mortality in high-risk individuals who participated in lung screening through NLST. Of the 14,125 participants screened for lung cancer, 7,057 were current smokers at baseline (the remainder consisted of former smokers). Lung cancer screening patients who had higher FTND scores had higher rates of cancer (2.2% very low dependence smokers vs. 4.1% very high dependence, $p < 0.01$), higher rates of mortality (5.4% very low dependence smokers vs. 8.9% very high dependence, $p < 0.01$), and higher rates of lung cancer-specific mortality (0.7% very low dependence smokers vs. 2.5% very high dependence, $p < 0.01$). Similar patterns emerged for the HSI. Further, those who were smoking at the time of LCS and had high dependence scores were less likely to quit smoking after LCS (very high dependence vs very low dependence; Odds Ratio = 0.53, 95% Confidence Interval = 0.44-0.65). These data show that level of nicotine dependence contributes to clinical cancer and mortality outcomes. Quitting smoking may minimize the incidence of lung cancer and mortality in this high-risk group of patients. Strategies to assist with tobacco treatment in the context of LCS are of vital importance, especially for high dependence smokers who may be less likely to quit after LCS.

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POS1-87**TUNABLE AUTOMATED PASSIVE DIFFUSION TRANSDERMAL INDIVIDUALIZED NICOTINE DELIVERY TECHNOLOGY FOR SMOKING CESSATION**

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INTRODUCTION: Chrono Therapeutics, Inc. has developed a wearable automated passive diffusion transdermal nicotine delivery technology for smoking cessation that generates a 3-peak nicotine blood plasma profile over the course of a day; it also includes adherence tracking and real-time behavioral coaching through a connected smartphone application. **METHODS:** Two Phase I, nicotine PK studies in healthy Caucasian male volunteers who are smokers (n=12, [BMI] 20 to 30 kg/m², 18 to 50 years of age; >11 cigarettes per day). Nicotine was delivered using an engineering prototype at various times throughout the day and blood samples col-

lected over a 30 hour period. RESULTS: In the first study, a 3-peak nicotine blood plasma profile was observed (4, 9 and 15 hr.), the mean C_{max} was 11.8 ± 5.68 , 26.4 ± 8.62 , and 31.4 ± 4.95 ng/mL, respectively (*Ascending Profile*). The mean $AUC_{0-\infty}$ was 443 ± 78.2 hr*ng/mL which compared well with the published mean $AUC_{0-\infty}$ of 443 hr*ng/mL for the NicoDerm 21 mg transdermal patch. The mean $t_{1/2}$ was 4.12 ± 0.36 hr., (NicoDerm $t_{1/2} = 3.8$ hr.). In the second study, a 3-peak nicotine blood plasma profile was observed (4, 9 and 15 hr.), the mean C_{max} was 26.7 ± 11.5 , 29.5 ± 7.26 , and 25.0 ± 5.17 ng/mL respectively (*Level Profile*). The mean $AUC_{0-\infty}$ was 397 ± 79.5 hr*ng/mL which compared well with the published mean $AUC_{0-\infty}$ of 443 hr*ng/mL for the NicoDerm 21 mg transdermal patch. The mean $t_{1/2}$ was 4.52 ± 1.05 hr., (NicoDerm $t_{1/2} = 3.8$ hr.). CONCLUSION: The shape of a nicotine blood plasma profile can be tuned using a wearable automated passive diffusion transdermal delivery technology by varying the times at which the boluses of nicotine are delivered throughout the day. An Ascending Profile will be appropriate for the smoker who smokes more cigarettes in the afternoon and evening, whereas a Flat Profile is appropriate for a smoker who smokes evenly throughout the day.

JUSTIFICATION: This study indicates that the Chrono automated passive diffusion transdermal nicotine delivery technology is safe and can deliver nicotine transdermally in a manner that could provide nicotine levels at key points in the day that map to a patient's cyclical peak cravings.

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POS1-88

THE EFFECT OF EXERCISE ON CRAVING AND WITHDRAWAL: DOES IT VARY BY GENDER?

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BACKGROUND: Previous studies have shown gender differences in the efficacy of smoking cessation methods, with women responding better to behavioral interventions and men to most pharmacotherapies. Additionally, women also report experiencing more withdrawal symptoms compared to men. Exercise, a form of behavioral intervention, overall, has been shown to reduce craving, however, this has yet to be explored by gender. PURPOSE: This study aimed to evaluate whether exercise influences craving and withdrawal symptoms differently in men and women smokers. It was hypothesized that exercise would reduce both craving and withdrawal symptoms overall, and that there would be a gender difference. METHODS: Adults, ages 18-40, who smoked at least five cigarettes a day for the past six months underwent a VO2 max test, representing a brief bout of exercise. Participants were asked to abstain from smoking for at least three hours prior to the VO2 max test, putting them in an acute state of withdrawal. The Questionnaire for Smoking Urges-Brief (QSU) and the Minnesota Nicotine Withdrawal Scale (MNWS) were administered before and after the VO2 max test. Paired t-tests were conducted to compare pre- and post-exercise MNWS and QSU scores overall and by gender. RESULTS: The sample ($n=38$; 61% women) was, on average 30.0 ± 0.9 years old and smoked 13.0 ± 0.8 cigarettes per day. Withdrawal levels, per the MNWS, decreased by 43% in men and by 35% in women after the VO2 max test compared to before ($p=0.008$ and $p=0.013$, respectively). In men, but not women, the strong desire to smoke significantly decreased after the VO2 max test (Men: -0.77 ± 0.23 , $p=0.005$; Women: -0.66 ± 0.37 , $p=0.09$). In contrast, in women, but not men, the anticipated relief of negative affect decreased after the VO2 max test (Women: -0.45 ± 0.20 , $p=0.032$; Men: -0.41 ± 0.26 , $p=0.13$). CONCLUSION: Overall, while exercise significantly reduced craving and withdrawal in both men and women, there may be gender differences in the reduction of smoking urges. Additional research into the role of gender in the efficacy of exercise as a behavioral intervention for smoking cessation is needed.

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POS1-89

EFFECTS OF ELECTRONIC CIGARETTES ON SELF-REPORTED CRAVING AND WITHDRAWAL, AND VIRTUAL-REALITY-INDUCED CUE REACTIVITY, IN CIGARETTE SMOKERS

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SIGNIFICANCE: Recent surveys indicate dramatic increases in the use of electronic cigarettes (e-cigs) and users often state that e-cigs reduce tobacco craving and withdrawal symptoms. In the current project, we evaluated the effects of e-cigs, as compared to the participant's own cigarette, on baseline craving and withdrawal, as well as virtual reality (VR)-induced cue reactivity. METHODS: Using a within-subjects, placebo-controlled study design, 15 tobacco-dependent participants (self-reported inexperienced e-cig users) maintained abstinence overnight then during 4 separate visits completed distinct phases of this outpatient protocol. Specifically, participants were randomized to an "eGo" 3.3-Volt e-cig device containing one of 3 e-cig doses (0, 18 or 36 mg, Avail Liquids) or their own cigarette, with study visits being separated by at least 7 days. Study sessions were ~3 hours in duration and included assessments of withdrawal, craving, and VR-induced cue reactivity. RESULTS: Participants were 50.6 ± 7.5 (mean \pm S.D.) years of age and the majority were Black (67%) and male (67%). They had FTND scores of 6.6 ± 1.1 , a baseline CO of 18.5 ± 7.9 , smoked 19.3 ± 8.1 cigarettes per day, and smoked for 32.1 ± 7.1 years. At the beginning of each session, participants abstained overnight as required (all COs ≤ 4 ppm). Smoking an own cigarette, but no e-cig dose, resulted in a significant increase in breath CO ($p < .0001$). At baseline, participants were evenly matched on their QSU scores and after smoking 10 puffs of their own cigarette or any e-cig dose these symptoms were markedly reduced (~60%), but there were no significant differences between groups. After the procedure, participants completed an e-cig questionnaire and they did not report that any dose of e-cig was considered "rewarding" or that they "matched the feeling" of smoking their own cigarette. Lastly, VR data did not reveal differences among any e-cig dose vs. own cigarette for craving or thinking about a cigarette in either the party or paraphernalia conditions (all p 's $> .10$). CONCLUSIONS: The current experiment provides novel data showing the effects of e-cigs on tobacco craving in cigarette smokers. As hypothesized, smoking an own cigarette reduced craving, but unexpectedly these effects were equivalent to all e-cig doses, including 0 mg. Importantly, participants did not indicate that any dose of e-cig was perceived as "rewarding", and did not answer affirmatively to questions that would indicate that these products would be adopted by these participants.

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POS1-90

EXAMINING EMOTION DYSREGULATION AS AN UNDERLYING FACTOR EXPLAINING ASSOCIATIONS OF ANXIETY SENSITIVITY WITH ALCOHOL CONSUMPTION, PROBLEMS, AND MOTIVES FOR USE AMONG ADULT DAILY SMOKERS

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Smoking is associated with increased alcohol consumption among those with or without alcohol use disorders (AUDs). Smokers are at increased risk for developing AUD, relative to non-smokers. Further, alcohol use is associated with a significant portion of smoking lapses. Anxiety sensitivity is a risk factor associated with hazardous as well as coping- and conformity-oriented drinking, both in the general population and among smokers, although little is known about mechanisms underlying such associations. One potential explanatory factor is emotion dysregulation. The current study sought to examine whether emotion dysregulation explained associations between anxiety sensitivity and alcohol consumption, alcohol problems, and coping/conformity motives for alcohol use. Data from 467 adult daily smokers (51.8% male; $M_{age} = 36.7$ years, $SD_{age} = 13.6$) participating in a large multi-site randomized controlled trial examining two smoking cessation interventions were



available for analysis. Participants reported an average of 16.5 cigarettes per day ($SD=10.0$) and had been regularly smoking for 18.4 years ($SD=13.4$). Self-report measures of smoking history, anxiety sensitivity, emotion dysregulation, alcohol use/problems and motives for alcohol use were collected. Covariates included gender, racial/ethnic minority status, cigarettes per day, and negative affectivity. Indirect effects were examined with the PROCESS macro for SPSS. Bootstrapping with 99% confidence intervals was conducted to examine significance of indirect effects. There were significant indirect effects of anxiety sensitivity via emotion dysregulation in relation to alcohol consumption, alcohol problems, as well as coping and conformity motives for alcohol use. Effects were medium sized in each case. Reverse models testing the indirect effect of emotion dysregulation via anxiety sensitivity and anxiety sensitivity via alcohol outcomes were violated in each case adding confidence to the hypothesized model of anxiety sensitivity via emotion dysregulation. The findings suggest that emotion dysregulation may be an important factor to consider with regards to alcohol use/problems among smokers interested in quitting. Targeting emotion dysregulation prior to or during smoking cessation treatment may help to reduce anxiety sensitivity and, in turn, alcohol use, which may enhance smoking cessation outcomes.

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POS1-91

PATIENT PERCEPTIONS OF NICOTINE METABOLITE RATIO (NMR)-GUIDED SMOKING CESSATION PHARMACOTHERAPY AMONG PATIENTS ENROLLED IN A SMOKING CESSATION TRIAL

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BACKGROUND: The nicotine metabolite ratio (NMR) is a biomarker of nicotine metabolism, which predicts odds of cessation and modifies response to varenicline among smokers attempting to quit. However, smokers' attitudes toward and acceptance of using NMR to personalize and guide cessation treatment are unknown. Individual smoker characteristics could influence willingness to adhere to an NMR-guided intervention. **METHODS:** Adult daily smokers were recruited from a clinical setting and enrolled in a pilot RCT of personalized (NMR-guided) vs. guideline-based selection of pharmacotherapy for smoking cessation. Participants rated their baseline endorsement of NMR-guided care in terms of general approval of using information about nicotine metabolism to guide care, desire to know NMR results, worry that this knowledge could impair motivation to quit, hinder chances of quitting, or be frightening: e.g., "I would want to know if the way my body breaks down nicotine makes it harder for me to stop smoking compared to some other people." Fischer's exact and Kruskal-Wallis tests assessed differences in acceptance of NMR-guided care by baseline socio-demographic factors, heaviness of smoking index (HSI), depression (PHQ-2), and alcohol use (AUDIT-C). **RESULTS:** 72 participants were median age 54 years [IQR:46.75-60.25], 43% female, 32% black, and had widely ranging household income: <\$15K (17%), \$15K- \$35K (26%), >\$35K-\$75K (31%), >\$75K (11%) and education (not shown). Half of participants had a heavy HSI, 15% screened positive for depression, and 26% for problem drinking. 90% of smokers endorsed multiple aspects of NMR-guided care, although 17% worried about consequences for chances of quitting, and 13% expressed fear of knowing. Lower education was associated with the former ($p=.04$) and higher AUDIT-C with the latter ($p=.03$). Higher income was associated with general approval ($p=.02$). **CONCLUSIONS:** Overall, diverse smokers in a clinical setting expressed high approval of and willingness to adhere to NMR-guided care, although a minority were concerned. Future research should determine whether NMR-guided care promotes greater adherence and smoking cessation.

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POS1-92

DAILY POST-CESSATION SMOKING STATUS IS RELATED TO MOMENTARY MEASURES OF URGE, STRESS, CIGARETTE AVAILABILITY, CESSATION MOTIVATION, ALCOHOL USE, AND INTERACTING WITH SOMEONE SMOKING

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SIGNIFICANCE: Real-time prediction of smoking lapse has the potential to significantly improve the delivery and effectiveness of smoking cessation therapies. Previous research has shown that a novel lapse risk score, calculated using momentary assessments of current smoking urge, stress, recent alcohol consumption, interaction with someone smoking, cigarette availability, and cessation motivation is predictive of imminent smoking lapse. The purpose of this study was to determine which individual risk factors reported via ecological momentary assessment (EMA) were predictive of daily smoking status among socioeconomically disadvantaged adults receiving an adjunctive, smartphone-based smoking cessation treatment. **METHODS:** Participants recruited from a safety-net smoking cessation clinic in Dallas, TX received a tailored, smartphone-based smoking cessation intervention (Smart-T). The Smart-T app prompted one daily diary assessment and four random assessments each day. Event sampling assessments were initiated by participants during periods of smoking urge and before/after smoking lapse. A generalized linear mixed model with a binary logistic response function of daily smoking status was used to simultaneously evaluate the relationships between smoking urge, stress, recent alcohol consumption, interaction with someone smoking, cigarette availability, and cessation motivation with within-day smoking. **RESULTS:** Participants ($N=57$) were on average 52.0 years old, female (54.2%), African-American (52.5%), earned less than \$16,000 per year (69.0%), and smoked 20.3 cigarettes per day at baseline. All six variables were significantly associated with daily smoking status ($p < .01$). The odds of smoking relapse were significantly higher with higher smoking urge, stress, cigarette availability, when interacting with someone smoking, when alcohol had been consumed in the previous hour, and when motivation to quit was low. **CONCLUSIONS:** Psychosocial and socio-environmental factors were strongly predictive of smoking lapse. Future smoking cessation interventions may benefit from tailoring just-in-time treatments to help smokers avoid and/or cope with these lapse risk factors.

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POS1-93

BEHAVIORAL ECONOMICS OF VARENICLINE AND NALTREXONE AND THEIR COMBINATION IN HEAVY DRINKING SMOKERS

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SIGNIFICANCE: Behavioral economic approaches have become an indicator of decision-making processes in addiction, as well as a proxy measure of craving. Previous research has shown that varenicline, the gold standard treatment for nicotine addiction, attenuates demand for cigarettes on the Cigarette Purchase Task (CPT) which assesses the number of cigarettes participants would consume at a range of prices. However, little is known about behavioral economics in heavy drinking smokers, nor has this task been examined in individuals who received a combination treatment of varenicline and naltrexone. **METHODS:** A community sample ($N=120$) of non-treatment seeking daily smokers (>10/day), who also reported drinking outside of NIAAA guidelines, were recruited for participation in a pharmacology study. Participants were randomized to one of four medication conditions: varenicline, naltrexone, placebo, or a combination of varenicline and naltrexone. After nine days, participants completed a laboratory paradigm and completed the CPT at baseline, after a priming dose of alcohol (BrAC = 0.06 g/dl), and after smoking their first cigarette of the day. Intensity, the number of cigarettes consumed if they were free, was determined at each time point. **RESULTS & CONCLUSIONS:** Participants reported mean Fagerström Test of Nicotine Dependence scores of 3.7 and smoking 14.4 cigarettes/day across medication conditions.



Moreover, they drank on 21 days in the past month and, on average, drank 6.5 drinks per drinking day (DPDD). Baseline means for intensity were not significant by medication group ($F = 0.35$, $p > 0.05$). The interaction of trial \times medication after alcohol administration was not significant ($F = 1.45$, $p > 0.05$). There was a trend level interaction of trial \times medication ($F = 2.44$, $p = 0.07$) when comparing alcohol to cigarette administration, and controlling for baseline intensity and DPDD, such that the combined varenicline and naltrexone group and naltrexone monotherapy group showed decreased intensity whereas all other groups increased intensity. Together, these findings provide preliminary evidence that the combination of varenicline and naltrexone may decrease demand for cigarettes when individuals are exposed to alcohol and nicotine.

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POS1-94

COMPARISON OF A PREFERRED VERSUS NON-PREFERRED WATERPIPE TOBACCO FLAVOR: SUBJECTIVE EXPERIENCE, SMOKING BEHAVIOR, AND TOXICANT EXPOSURE

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INTRODUCTION: One possible reason for the rapid proliferation of waterpipe (WP) smoking is the pervasive use of flavored WP tobacco. To begin to understand the impact of WP tobacco flavors, the current study examined the impact of a preferred WP tobacco flavor compared to a non-preferred tobacco flavored control on user's smoking behavior, toxicant exposure, and subjective smoking experience. **METHOD:** Thirty-six current WP smokers completed two, 45-minute *ad libitum* smoking sessions (preferred flavor vs. non-preferred tobacco flavor control) in a randomized crossover design. Participants completed survey questionnaires assessing subjective smoking experience, exhaled carbon monoxide (eCO) testing, and provided blood samples for monitoring plasma nicotine. WP smoking topography was measured continuously throughout the smoking session. **RESULTS:** While participants reported an enhanced subjective smoking experience including greater interest in continued use, greater pleasure derived from smoking, increased liking and enjoyment, and willingness to continue use after smoking their preferred WP tobacco flavor ($ps < .05$), no significant differences were observed in nicotine and CO boost between flavor preparations. While not significant, topography measures of flow rate, interpuff interval (IPI), and total number of puffs were trending towards significance ($ps < .10$), with decreased IPI and greater total number of puffs during the preferred flavor session. **DISCUSSION:** The current study is the first to examine flavors in WP smoking by measuring preferred versus control preparations to understand the impact on subjective experience, smoking behavior, and toxicant exposure. The pattern of results suggests that even this relatively minor manipulation resulted in significant changes in subjective experience. These results have implications for regulation of flavors in WP smoking.

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POS1-95

COPD AND SMOKING CESSATION: DATA FROM THE FLEX TRIAL

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SIGNIFICANCE: Smoking cessation is an urgent priority in smokers with chronic obstructive pulmonary disease (COPD), yet few studies have examined the use of pharmacological cessation aids in this population. **METHODS:** Using secondary analysis from the FLEX randomized controlled trial, we characterized demographic factors and evaluated smoking abstinence in a cohort of COPD patients ($n = 92$), who had been randomly assigned to one of three pharmacotherapy

regimens: nicotine replacement monotherapy (NRT), extended use of combined nicotine replacement therapy (NRT+), or extended varenicline (VR). The primary outcome was carbon monoxide-confirmed continuous abstinence rate (CAR) from weeks 5-52. Secondary outcomes included CAR from weeks 5-10 and 5-22, and 7-day point prevalence (7PP) at weeks 10, 22, and 52. Logistic regression models were used to estimate the likelihood of cessation for each treatment group after controlling for demographic and tobacco related variables. **RESULTS:** Treatment groups did not differ significantly in terms of CARs from weeks 5-52. For secondary outcomes, VR was superior to NRT at weeks 5-10 in both unadjusted (OR, 3.85; 95.0% CI, 1.19-12.47) and adjusted (OR, 3.62; CI, 1.10-12.01) regression models for CARs. In addition, VR was superior to NRT from weeks 5-22 in the unadjusted model (OR, 8.80; CI, 1.01-76.71). All treatments were well tolerated. Dermatologic symptoms were the most common adverse event (AE) reported in the NRT and NRT+ groups, while fatigue and digestive symptoms were the most commonly reported AEs in the VR group. There was no difference in the frequency of severe AEs between treatment groups. **CONCLUSIONS:** Varenicline improved abstinence in the short- and medium-term compared to NRT, but no significant long-term differences were observed between treatments. Clinicians encouraging smoking cessation in smokers with COPD should consider the many challenges faced by this population when attempting to quit, and consider the use of pharmacotherapy and more intensive interventions.

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POS1-96

DIFFERENCES IN TOXICANT EXPOSURE AND PUFF TOPOGRAPHY BETWEEN WATERPIPE TOBACCO SMOKING MEN AND WOMEN

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BACKGROUND: Waterpipe tobacco smoking (WTS) continues to be popular among young adults. WTS exposes users to many of the same toxicants found in cigarette smoke in greater amounts and is associated with acute and long term adverse health effects. This study's purpose was to assess differences in WTS toxicant exposure and user puffing behavior between men and women. **METHODS:** A secondary data analysis from three WTS laboratory studies was conducted. In each study, individual waterpipe tobacco smokers who reported WTS at least two times per month ($n=99$, 38 women) completed a 45-minute *ad lib* WTS session after 12-hour, objectively verified tobacco/nicotine abstinence. Participants' plasma nicotine concentration and exhaled carbon monoxide (CO) were measured at baseline and after completion of the WTS session. Puff topography was measured throughout the WTS session. Mixed ANOVAs were conducted for plasma nicotine and CO, and independent samples *t*-tests were conducted to compare puff topography measures between men and women. **RESULTS:** Average plasma nicotine concentrations increased significantly during sessions [$F(1,97)=108.7$; $p<.05$] from 2.1 ng/ml ($SD=0.4$) to 8.8 ng/ml ($SD=6.6$). There was a significant gender \times time interaction for plasma nicotine [$F(1,97)=5.3$; $p<.05$] with men having higher concentrations ($M=10.0$, $SD=7.1$) than women ($M=6.9$, $SD=5.2$) after WTS. For CO, the main effect of time was significant [$F(1,97)=149.0$; $p<.05$], but not the main effect of gender or the interaction. On average, men took significantly larger puffs than women [$t(97)=4.3$, $p<.05$] resulting in a larger total puff volume with men inhaling 59.9 ($SD=40.7$) liters of smoke and women inhaling 38.8 ($SD=27.8$) liters of smoke [$t(97)=2.8$, $p<.05$]. **CONCLUSIONS:** Compared to women, men inhaled nearly 1.5 times more smoke during a WTS session and had higher plasma nicotine concentrations. Topography and CO were consistent with cigarette smoking data with women taking smaller puffs than men but not resulting in differential CO exposure. Increased puff volume may be responsible for the higher nicotine exposure observed for men, but other gender differences also may explain this observation.

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POS1-97

BIVARIATE LATENT DIFFERENCE SCORE MODELING TO EXAMINE THE RELATIONSHIP BETWEEN CONDUCT PROBLEMS AND CIGARETTE SMOKING AMONG ADOLESCENTS

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The relationship between adolescent conduct problems and tobacco use is well-documented, but poorly characterized. The goal of the present study is to use advanced statistical methods to characterize the change relationship between conduct problems and cigarette smoking. Specifically, Latent Difference Score (LDS) models provide a useful framework for analyzing longitudinal change. LDS models will be used to test whether conduct problems at the beginning of high school predict increased changes in cigarette smoking across the first two years of high school. The current study utilized four waves of data that were collected six-months apart from the Happiness and Health Study of 722 adolescents (Baseline M age = 14.1; 50.7% females) who reported any cigarette use. Four bivariate LDS growth models were fit to the repeated measurements of conduct problems and cigarette use to test alternative hypotheses about how change in conduct problems is coupled with change in cigarette use. The models included: no coupling, a unidirectional model predicting changes in tobacco use from prior levels of conduct problems, a unidirectional model of changes in conduct problems from prior tobacco use, and a bidirectional model. The best fitting model was the no-coupling model ($X^2 = 57.5$, $df = 22$, $CFI = .93$, $RMSEA = .05$). The no-coupling model does not directly test causal relations between previous level of conduct problems and change scores of cigarette use, but instead examines the relations between the initial level and constant change factor (i.e. slope of change scores) of each variable. Estimates from this model indicated that relative to the baseline assessment at the beginning of grade 9, cigarette use increased by an average of .12 (.25) per semester ($p < .001$). Conversely, conduct problems decreased by an average of -.12 (.29) per semester ($p < .001$). In regards to bivariate associations, the initial level of conduct problems was not significantly associated with the constant change factor of cigarette use ($\beta = .01$, $p = .8$). However, the initial level of cigarette use was significantly associated with the constant change factor of conduct problems across the waves ($\beta = -.05$, $p < .05$). Given these results and the fit of the no coupling model, results indicate that conduct problems and cigarette use are changing over time; however, they do not appear to be causally linked. Results emphasize the utility of applying modern statistical techniques that allow researchers to more precisely characterize the trajectories of important developmental risk factors of smoking.

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POS1-98

EMOTION DYSREGULATION EXPLAINS THE RELATION BETWEEN INSOMNIA SYMPTOMS AND NEGATIVE REINFORCEMENT SMOKING COGNITIONS AMONG DAILY SMOKERS

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Insomnia co-occurs with smoking. However, mechanisms that may explain their comorbidity are not well known. The present study tested the hypothesis that insomnia would exert an indirect effect on negative reinforcement smoking processes via emotion dysregulation among 126 adult daily smokers (55 females; $M_{age} = 44.1$ years, $SD = 9.72$). Dependent variables included negative reinforcement smoking outcome expectancies, negative reinforcement smoking motives, and two negative expectancies from brief smoking abstinence (somatic symptoms and harmful consequences). Insomnia symptoms yielded a significant indirect effect through emotion dysregulation for negative reinforcement smoking outcome expectancies, negative reinforcement smoking motives, and harmful consequences expectancies from brief smoking abstinence. In contrast to prediction, however, insomnia was not associated with somatic symptom expectancies from brief smoking abstinence through emotion dysregulation. These data may suggest that the indirect effect of emotion dysregulation is more relevant to cognitive-affective negative reinforcement processes rather than somatic states. Overall, the present findings contribute to a growing body of literature linking emotion dysregulation as

an explanatory mechanism for insomnia and smoking and uniquely extends such work to an array of clinically significant negative reinforcement smoking processes.

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POS1-99

SIMPLE COMPUTERIZED STRATEGIES TO MOTIVATE YOUNG ADULT SMOKERS WITH SEVERE MENTAL ILLNESS

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SIGNIFICANCE: About 50% of young adults with schizophrenia and other severe mental illnesses (SMI) smoke, leading to treatment complications, disease, and early mortality. Education and motivational interventions to engage young smokers with SMI into cessation treatment have not been tested. We developed a web-based motivational decision support system tailored for smokers with SMI (*Let's Talk About Smoking for Young Adults*). The brief program includes a video peer host, motivational exercises, video quit stories and simple information about treatments. METHODS: We conducted a randomized pilot among 58 young adult smokers with SMI. We compared *Let's Talk About Smoking for Young Adults* to standard education from the National Cancer Institute (NCI) that was computerized with simplified format and audio to control for computer delivery method and time on computer. We also enrolled a quasi-experimental comparison group (N=20) that received minimal tobacco assessment at baseline and no intervention. All subjects were assessed at baseline and 3 months. All had access to standard community-delivered cessation treatment. RESULTS: Participants (N=78) were stable in outpatient mental health treatment. Over half (53.1%) were diagnosed with schizophrenia-spectrum disorders, 63.0% were male, mean age was 24.8 years, mean education was 11.6 years. The group smoked 13.9+/-10.4 cigarettes/day. Demographics, diagnosis and smoking did not differ by condition. Participants rated both interventions highly, but subjects who received *Let's Talk About Smoking For Young Adults* had more positive attitudes about cessation medications after the intervention than those who received computerized NCI education ($p \leq .05$). Those who received either intervention reported more smoking cessation activity than those in the minimal assessment control condition: they reported more quit attempts (53% vs. 26%; $p = .05$), more cessation treatment use (37% vs 0%; $p = .00$) and had more biologically verified abstinence (10% vs. 0%; $p = .000$). CONCLUSIONS: This pilot study suggests that providing tobacco assessment and computer-based education or motivational intervention increases cessation activity and abstinence in young smokers with SMI. Additional research is needed to test strategies to incorporate technology-based approaches into effective cessation treatment for vulnerable young adult populations.

FUNDING: National Cancer Institute

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POS1-100

AUSTRALIAN HEALTH PRACTITIONERS' ADHERENCE TO THE 5A'S OF SMOKING CESSATION AND BARRIERS TO DELIVERING SMOKING CESSATION ASSISTANCE TO SMOKERS WITH SEVERE MENTAL ILLNESS

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INTRODUCTION: Reducing the burden of physical illness among people living with severe mental illnesses (SMI) is a key priority. The high smoking prevalence among people with SMI contributes to their lower life expectancy. Smoking cessation advice and assistance from mental health practitioners could assist with reducing smoking-related harms in this group. METHODS: This study examined Australian mental health practitioners' adherence to the 5As (ask, assess, advise,

assist and arrange follow up) of smoking cessation and barriers experienced in providing quit smoking advice to smokers with SMI. RESULTS: We surveyed 267 Australian mental health practitioners using a cross-sectional, online survey. Invitations to participate were distributed through government and non-government organisations and peak bodies. Most practitioners (77.5%) asked their clients about smoking and provided health education (66.7 %) but fewer provided direct assistance (31.1%-39.7%). Practitioners trained in smoking cessation were more likely (OR 2.9, CI 1.5-5.9) to help their clients to stop smoking. Community mental health practitioners (OR 0.3, CI 0.1-0.9) and practitioners who were current smokers (OR 0.3, CI 0.1-0.9) were less likely to provide all 5As of smoking cessation. The most common barriers to providing smoking cessation assistance to smokers with SMI were insufficient knowledge about current best practices of prescribing nicotine replacement therapy (54.3%), considering smoking a useful coping strategy for stress and anxiety for mental health consumers (42.3%) and insufficient financial compensation to address smoking with mental health consumers (36.3%). CONCLUSION: The results of this study emphasize the importance and need for providing smoking cessation training to mental health practitioners to increase confidence, skills and engagement in helping people with SMI quit smoking.

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POS1-101

PATTERNS OF AND REASONS FOR ELECTRONIC CIGARETTE USE IN PRIMARY CARE PATIENTS

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INTRODUCTION: E-cigarette use is rising in both the general population and in clinical populations, including hospitalized patients and cancer patients. Little is known about e-cigarette use among patients in other clinical settings, particularly in primary care where physicians report discussing e-cigarette use with patients. We aimed to identify how and why smokers in primary care use e-cigarettes. METHODS: We used cross-sectional data from current cigarette smokers (within the past 7 days) enrolled in a randomized controlled trial of a tablet intervention to deliver the 5As for smoking cessation in primary care clinics in San Francisco, CA (N=718). We recruited patients from 3 sites: a primary care clinic at a University hospital, and a primary care clinic and HIV care clinic at a University-affiliated public safety-net hospital. We asked patients about sociodemographics, cigarette smoking, and ever and current use of e-cigarettes during the post-intervention assessment. We also asked reasons they have used or would use e-cigarettes. ICD-9 codes for comorbidities were extracted from electronic medical records. RESULTS: 57% (n=408) of patients reported ever using an e-cigarette and 21% (n=154) reported past 30 day use. Ever e-cigarette users were more likely to be younger, white, more educated, daily smokers, have smoked for more years, and more nicotine dependent than never users. Ever e-cigarette users had higher prevalence of mental illness than never users. The most and second most common reasons for e-cigarette use among current and former e-cigarette users were to cut down on and quit cigarette smoking, respectively. These were also the most common reasons never e-cigarette users reported for why they would use e-cigarettes. The mean number of days of e-cigarette use in the past 30 was 7, increasing with duration of e-cigarette use. Most current e-cigarette users did not know the nicotine content of their e-cigarettes. CONCLUSION: Over half of smokers in primary care use e-cigarettes, with 1 in 5 reporting current use. E-cigarette use is intermittent in this population, with most reporting non-daily use. Most patients report using e-cigarettes to cut down or quit cigarettes. Screening of patients for e-cigarette use may help identify those interested in changing their smoking habits and provides an opportunity for providing evidence-based smoking cessation treatment and counseling.

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POS1-102

NUMERACY AS A FUNCTION OF SMOKING STATUS AND DEMOGRAPHIC FACTORS IN RELATION TO PERCEIVED SMOKING HEALTH RISKS

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SIGNIFICANCE: The ability that people have to understand basic probability and mathematical concepts, known as numeracy, can be associated with how people perceive their personal health risks. Since health providers often communicate health risks in percentages and fractions, numeracy may have important consequences for decision making. This study explored numeracy among a group of participants with basic smoking characteristics and their perceived health risks. METHODS: A total of 3,001 adult participants (ages 18-65) drawn from a commercial Internet panel completed a survey in 2015. In addition to questions about smoking behavior and risks, 8 numeracy questions were asked to analyze participant's ability to correctly answer questions on risks and probability. Numeracy scores were calculated as the number of questions participants answered correctly out of the 8 questions (0-8), and then compared to smoking status, perceived risks and overall health risks attributable to smoking, as well as basic demographics of participants. RESULTS: Those that never smoked (3.39), or had quit (3.65), had higher numeracy scores than smokers (2.67; $p = 0.000$). Among smokers, participants that waited more than 60 minutes upon waking to smoke their first cigarette of the day, as opposed to sooner in the day, and those that smoked less than 10 cigarettes per day, as opposed to a greater amount of cigarettes per day, also had higher numeracy scores ($p = 0.000$). A series of health risk questions were summed for reliability testing and found a slight positive correlation in numeracy score vs. health risk, with a Cronbach's Alpha of 0.96 (Pearson Correlation = 0.108, $p = 0.000$). A series of questions on perceived risks for selected diseases associated with smoking were also summed, and overall found a slight negative association vs. numeracy scores (Pearson Correlation = -0.197, $p = 0.000$). More females (55%) than males were on study, with males scoring higher on the numeracy scale (3.27 vs. 2.89, $p = 0.000$). CONCLUSION: Smokers and nonsmokers appear to differ in numeracy, which has important implications for risk communication efforts, particularly when addressing relative risks across products.

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POS1-103

COMPARATIVE ANALYSIS OF PATCH, VARENICLINE, AND COMBINATION NICOTINE REPLACEMENT THERAPY EFFECTS ON LATENT ABSTINENCE AND ADHERENCE CLASSES

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SIGNIFICANCE: A recent comparative effectiveness trial of nicotine patch, varenicline, and combination nicotine replacement therapy (NCT01553084) failed to detect differences in long-term abstinence rates across conditions. This secondary analysis of data from this three-arm trial aims to extend understanding of the comparative effects of these pharmacotherapies by modeling treatment effects on early abstinence and adherence patterns. METHODS: Repeated measures latent class analyses (RMLCA) of binary abstinence status and medication adherence for the first 27 days of a quit attempt and of abstinence for the first 84 days of the quit attempt were run. Treatment effects on latent class membership were examined. Distal outcome analysis compared CO-confirmed intent-to-treat 6-month abstinence rates among latent classes. RESULTS: In 27-day abstinence models, combination treatment promoted early abstinence and recovery from early smoking better than did varenicline. When both abstinence and adherence were considered, varenicline and combination NRT promoted abstinence among adherent classes better than did patch alone, but adherence was also less likely for these more intensive treatments than to patch monotherapy. Combination NRT promoted abstinence better than varenicline among latent classes that were not fully adherent. In the 84-day models, combination NRT and varenicline promoted early, sustained partial change rather than cessation failure better than did patch monotherapy. In all models, latent class was significantly predictive of 6-month abstinence. CONCLUSIONS: Combination NRT is superior to varenicline in promoting initial abstinence and recovery from cessation failure, and promotes abstinence better among those who are not fully adherent. Both varenicline and combination



NRT are better at promoting partial, sustained change than is patch monotherapy, but adherence to these more intensive regimens is lower.

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POS1-104

UNDERSTANDING THE SMOKING CESSATION TREATMENT NEEDS OF LOW SOCIOECONOMIC STATUS CERVICAL CANCER SURVIVORS

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Smoking prevalence is high among cervical cancer survivors, with rates approaching 50%. Survivorship care planning should include the delivery of smoking cessation treatment designed to address the specific treatment needs of these women. This study investigated the treatment needs of cervical cancer survivors to inform the adaptation of a theoretically- and empirically-based Motivation and Problem-Solving (MAPS) approach to facilitating smoking cessation in this vulnerable population. Individual in-depth interviews were conducted with 10 female smokers with cervical cancer (80% non-Latino white; 50% >high school education; 80% <\$30,000 annual household income). Interviews were audio-recorded and transcribed, and analyzed using NVivo 10. Thematic analyses revealed that cervical cancer significantly impacted participants' lives; it resulted in changes to their outlook on life and led to worry about other potential health problems. Participants did not believe that smoking and cervical cancer were associated, and attributed their diagnosis solely to human papillomavirus (HPV). Participants reported smoking out of habit and to cope with negative affect, particularly stress. They were interested in quitting, as a means for saving money and improving health, but concerned about coping with withdrawal and negative affect. It was suggested that smoking cessation treatment for cervical cancer survivors should be individualized, but include: psychoeducation about the impact of smoking on health and various cancers including cervical cancer, pharmacotherapy, and benefits of quitting; planning for quitting; strategies for coping with withdrawal and negative affect; real-time support; social support; and relapse prevention. Participants suggested the following components to include in a wellness program: stress management; physical activity and healthy eating; coping with what it means to be a cervical cancer survivor; and managing side effects of cancer and treatment. Results highlight the unique treatment needs of smokers with cervical cancer and will be used to adapt an existing evidence-based intervention to encourage smoking cessation in cervical cancer survivors.

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POS1-105

IDENTIFYING SMOKING CESSATION INFORMATION PREFERENCES IN THE SETTING OF LUNG CANCER SCREENING: A NEW VENUE FOR INTERVENTION

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BACKGROUND: Lung cancer screening is a recent recommendation in the U.S. and offers a unique opportunity to assess readiness for smoking cessation in high-risk smokers who are engaging in a health promoting behavior. This new venue is an ideal teachable moment for smoking cessation. There are a number of evidence-based smoking cessation interventions; however, we do not know what type of smoking cessation information will be most successful in this new venue.

The purpose was to identify current smokers' information preference type (i.e., digital versus traditional) and potential sociodemographic differences for smoking cessation information in a lung cancer screening setting. **METHODS:** This was a descriptive, cross-sectional study using survey methods ($N=159$) of a convenience sample of long-term current smokers eligible for lung cancer screening (age 55-77 with >30 pack-year history). Data were collected online measuring sociodemographic variables and cessation information preference dichotomized as digital (i.e., social media; supportive text messages) versus traditional support (referral to quit line; face-to-face counseling). **RESULTS:** Participant mean age was 65.1 years (SD 5.6). Majority were female (62%) and Caucasian (74.1%; $n=118$); 21.7% had a family history of lung cancer. Preference for digital support was higher among White (41.0%; $n=48$) compared to Black participants (14.6%; $n=6$). Race was a statistically significant predictor of cessation information preference with White participants having 4 times greater odds of digital support preference (OR: 4.06; $p = 0.004$; univariable analysis; OR: 4.18; $p = 0.004$; age & gender-adjusted multivariable analysis). **CONCLUSION:** Lung cancer screening offers a teachable moment for health behavior change in tobacco smoking by providing a venue where long-term smokers are thinking about risks related to tobacco use. As lung cancer screening programs are implemented, understanding patient preferences for cessation interventions is critical. This study offered an initial step in understanding patient preferences. Ultimately, tailoring cessation information to an individual's preference may positively impact quit rates.

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POS1-106

SAFETY AND EFFICACY OF VARENICLINE MONOTHERAPY VS. COMBINATION WITH BUPROPION AND/OR NRT IN THE VETERANS AFFAIRS LOMA LINDA HEALTHCARE SYSTEM (VALLHCS), LOMA LINDA, CA 2007-2015

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BACKGROUND: Post-marketing surveillance raised safety concerns regarding neuropsychiatric adverse events (AEs) of varenicline, requiring a "black box" warning about neuropsychiatric AEs, 2009. The EAGLES Study (2016) shows that varenicline is not associated with increased neuropsychiatric AEs. Our purpose is to evaluate the safety and efficacy of varenicline alone or in combination (bupropion or NRT) in a retrospective, observational, continuously collected treatment protocol at the Loma Linda VA. **METHODS:** We reviewed all prescribed & dispensed varenicline 377/2200 (17.1%) in the VA pharmacy database & tobacco clinic records (2007-2015). The primary endpoints are clinically documented AEs and abstinence rates based on carbon monoxide readings and self-report in the VALLHCS Computerized Patient Record System. We created 4 treatment groups: varenicline mono-therapy (V), varenicline & bupropion (VB), varenicline & NRT (VN) and varenicline & bupropion & NRT (VBN). Chi-square test or Fisher's test (where applicable) was used with descriptive analysis for the documented safety and efficacy endpoints. **RESULTS:** A total of 219/377 (58.1%) veterans reported at least one AE while on treatment. The comparison of the 4 subgroups shows adverse effects include: 1) V group ($n=298$), depression 9.2%, suicidal ideation 1.3%, & anxiety 4.4%; 2) VB group ($n=39$): depression 7.6%, suicidal ideation 2.6%, & anxiety 12.8%; 3) VN group ($n=33$): depression 15.2%, suicidal ideation 0%, & anxiety 12.1%; 4) VBN group ($n=7$), depression 0%, suicidal ideation 0%, & anxiety 28.6%. The 6-month abstinence rate was: 1) V group 25.8% ($n=77/298$); 2) VB group 33.3% ($n=13/39$); 3) VN group 21.2% ($n=7/33$); 4) VBN group 42.8% ($n=3/7$, NS). Comparing psychiatric adverse events between the above groups showed no significant differences between varenicline mono-therapy and the above combination therapies. **CONCLUSION:** Varenicline mono-therapy vs. combination with bupropion or NRT did not show any significant change in neuropsychiatric adverse events, consistent with the EAGLES study findings. The addition of bupropion to varenicline increased 6 month abstinence rates with similar AE profiles. NRT & varenicline abstinence rates were lower than that of varenicline alone. Limitations included small sample size in subgroups, but covered all prescriptions over an 8 year period comprehensively, the largest in the VHA system. These long term outcomes in a veteran population are remarkable considering there high-risk tobacco dependence levels and mental status disorders.

FUNDING: No Funding

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POS1-107

THE IMPACT OF NICOTINE DOSE AND DOSE EXPECTANCY ON AUTOMATIC EVALUATIONS OF CIGARETTE STIMULI

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SIGNIFICANCE: It is unclear whether nicotine and perceived nicotine exposure can influence automatic evaluations of cigarette stimuli. **METHODS:** We investigated the effects of nicotine dose and expected dose on automatic motivational responses to smoking cues. Overnight nicotine-deprived smokers (n=40; 22 women) completed an Implicit Association Test (IAT) at 4 laboratory sessions after smoking cigarettes in a balanced-placebo design that crossed nicotine dose (Given-NIC vs. Given-DENIC) with instructed dose expectancy (Told-NIC vs. Told-DENIC). During the IAT, participants were instructed to quickly classify target pictures (cigarette [CIG] vs. neutral [NEU]) and words (pleasant vs. unpleasant) into one of two paired categories, classified as either congruent (i.e., smoking/bad, nonsmoking/good) or incongruent (i.e., smoking/good, nonsmoking/bad). We measured reaction time (RT) and the early posterior negativity (EPN) component of the event-related potential (ERP) to the target pictures and words. **RESULTS:** We found that congruent trials resulted in greater RT classification accuracy, reduced RT latency, and greater EPN compared to the incongruent trials. Given-NIC conditions showed increased accuracy, increased latency, and decreased EPN compared to Given-DENIC. Similarly, Told-NIC produced increased accuracy and decreased EPN compared to Told-DENIC, but latency was reduced. CIG pictures produced greater EPN than NEU pictures. There were no significant EPN findings for word targets. **CONCLUSIONS:** Both the RT and EPN results support the notion that smokers have negative attitudes toward smoking. While both nicotine dose and expected dose facilitated stimulus categorization, there was no evidence that either factor altered automatic evaluations of cigarette stimuli.

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POS1-108

SYSTEMATIC REVIEW AND META-ANALYSES OF GENETIC ASSOCIATIONS WITH TREATMENT RESPONSE FOR SMOKING CESSATION

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SIGNIFICANCE: There is growing evidence of multiple gene by treatment interactions from analyses of smoking cessation randomized clinical trials (RCTs), but replication is rare and there have been no comprehensive systematic reviews with meta-analyses. **METHODS:** We searched the Cochrane Tobacco Addiction Review Group register, PubMed, trial registers, abstracts and unpublished data for smoking cessation RCTs. Selection criteria: RCTs with data on a priori genome-wide significant single nucleotide polymorphisms (SNPs), replicated non-SNP variants and/or the nicotine metabolite ratio (NMR). Meta-analyses were conducted of active vs. placebo within genotype groups and within treatment arms between genotype groups generating pooled risk ratios using a Mantel-Haenszel random-effects model. Heterogeneity between trials was assessed using I². **RESULTS:** Out of 224 identified records, 72 unique papers were eligible for inclusion, corresponding to 32 RCTs. Data (genotype counts by abstinence status, treatment arm & race/ethnicity) was retrieved from 18 RCTs for 9 SNPs (rs1051730 (*CHRNA3*), rs16969968, rs588765 and rs2036527 (*CHRNA5*), rs3733829 and rs7937 (*EGLN2*, near *CYP2A6*), rs1329650 and rs1028936 (*LOC100188947*), rs215605 (*PDE1C*)), 2 VNTRs (*DRD4*, *SLC6A4*) and NMR; placebo-controlled trials of nicotine replacement therapy (NRT) (k=5), bupropion (k=5), NRT, bupropion & NRT + bupropion (k=1), bupropion & NRT + bupropion (k=1); and RCTs with at least one arm of NRT (k=10), bupropion (k=7), varenicline (k=2), NRT + bupropion (k=2), or placebo (k=13) – resulting in 40 active vs. placebo and 64 between genotype

comparisons. There was statistical heterogeneity between genotypes for only one drug (NRT vs. placebo) in NHW for rs1051730 [A] (risk ratios (RR), 95% CI: G/A: 2.1[1.5, 2.9]; A/A: 2.1[1.0, 4.5]) and rs16969968 [A](RR, 95% CI: G/A: 1.8[1.3, 2.5]; A/A: 1.80[0.45, 7.23]) at end of treatment (EOT); and statistical heterogeneity was also observed for rs16969968 in NHB at EOT and 6-months but sample sizes for some genotype subgroups n<10/group rendering these results unreliable. **CONCLUSIONS:** Although evidence suggested superior short-term efficacy of NRT in some rs1051730 and rs16969968 genotype subgroups in NHW, the lack of significant genotype differences within treatment arms limits confidence in the validity of these findings. Data from more trials, open data sharing by investigators and industry, and inclusion of more minority participants are needed to improve reliability of point estimates and equity of clinical translation.

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POS1-109

NICOTINE POPULATION PHARMACOKINETICS IN HEALTHY ADULT SMOKERS

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BACKGROUND AND OBJECTIVE: Characterizing nicotine pharmacokinetics in adult smokers is challenging due to the presence of background exposure. We performed a retrospective population pharmacokinetics analysis of 8 clinical trials with exposure to the aerosol generated by heated tobacco products, smoke from cigarettes, as well as nicotine nasal spray and oral nicotine gum. **METHOD:** Data from 4 single product use trials were used to develop a population pharmacokinetics model with the Phoenix NLME and derive exposure parameters. Data from 4 separate *ad libitum* use studies were used for model validation. **RESULTS:** Two-compartment linear disposition combined with zero-order absorption were adequate to describe nicotine pharmacokinetics and a mono-exponentially decreasing background component to account for nicotine carry-over effects. Bioavailability was product-specific and absorption duration was prolonged with nicotine gum. Nicotine apparent clearance was typically 0.407 L/min in males and higher (0.515 L/min) in females (68% inter-individual variability). The derived typical initial and terminal half-lives were 1.35 and 17 hours, respectively. The presence of menthol did not impact determinants of exposure. **CONCLUSIONS:** The population pharmacokinetics model was able to describe the nicotine pharmacokinetics after single product use and after 4 days of *ad libitum* use of products with various routes of administration (inhalation, oral and nasal) in different populations (Americans, Japanese and Europeans).

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POS1-110

THE USE OF FLAVORING IN CO-ADMINISTERED TOBACCO AND MARIJUANA PRODUCTS

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The use of co-administered tobacco and marijuana products (use of both substances in the same product), including blunts (hollowed out cigar wrappers filled with marijuana) and spliffs (marijuana and tobacco cigarettes), presents potential for nicotine exposure and may lead to exclusive tobacco use patterns, nicotine addiction, and compounded health effects. Flavored tobacco is of particular concern given the appeal to youth. Little research has examined flavoring in co-administered tobacco and marijuana products. This study aimed to gather preliminary evidence on the use of flavoring in blunts and spliffs used by U.S. adults (N=105) who smoked cigarettes daily and used marijuana on ≥ 20 of the past 30 days.



Participants were recruited through Amazon Mechanical Turk (an online crowd-sourcing service) and completed a 30-minute survey on tobacco and marijuana use behaviors. Participants were, on average, 32 years old; 53% were female and 76% were white. Approximately 75% and 70% of the sample reported ever smoking blunts and spliffs, respectively. Eighty-three percent of participants who had ever smoked blunts and 50% of those who had smoked blunts in the past 30 days used a flavored cigar wrapper when smoking blunts. Twenty-seven percent of participants who had ever smoked spliffs and 15% of those who had smoked spliffs in the past 30 days used flavored tobacco to smoke spliffs. Among those who had ever used a flavored cigar wrapper to smoke a blunt, 75% used a fruit/wine flavored cigar wrapper, 9% used a chocolate/vanilla flavored cigar wrapper, 8% used a menthol/mint flavored cigar wrapper, and 8% used a wrapper of another flavor to smoke a blunt. Among those who had ever used flavored tobacco to smoke a spliff, 58% used menthol/mint tobacco and 42% used fruit/wine flavored tobacco to smoke a spliff. Results from this preliminary study suggest that flavored tobacco products are often used when co-administering tobacco and marijuana in blunts and spliffs. Additional research is warranted to understand how the co-administration of flavored tobacco and marijuana may affect use behavior, initiation, cessation, and toxicant exposure.

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POS1-111

ENDBRONCHIAL OPTICAL COHERENCE TOMOGRAPHY (EB-OCT) FOR EVALUATING SMALL AIRWAY DISORDERS AFTER SMOKING CESSATION FOR 1 YEAR: A SELF-CONTROLLED STUDY

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BACKGROUND: Smoking readily results in small airway disorders at early stage which has not been frequently detected with routine tests such as spirometry and chest computed tomography. Our pilot study confirmed that EB-OCT more directly reflected lesions of small airway mucosa which matched well with pathological changes. **OBJECTIVE:** To explore small airway disorders measured with EB-OCT in continuous smokers and ex-smokers after cessation for 1 year, and its correlation with changes of lung function before and after smoking cessation. **METHODS:** We recruited 12 male smokers with smoking index greater than 10 pack years. Measurement of spirometry [the ratio of forced expiratory volume in one second to forced vital capacity (FEV1/FVC)], impulse oscillometry [airway resistance (R5), central airway resistance (R20)] and EB-OCT were performed. Inner luminal area (Ai), Airway wall area (Aw) and percentage of airway wall area [Aw/(Ai+Aw)×100%] of generation 3 to 9 were measured with EB-OCT. All patients were followed-up during a 1-year intervention. Patients were classified as 7 ex-smokers [smoking cessation for 1 year, Global Initiative for Chronic Obstructive Lung Disease (GOLD) classification: stage I n=1; stage II n=2; stage III-IV n=2] and 2 smokers with normal lung function] and current smokers [GOLD stage (stage II: n=2) and 4 smokers with normal lung function]. **RESULTS:** Mean differences of EB-OCT before and after 1 year were greater in ex-smokers [Aw3-6% (-2.46 vs 0.69), Aw3-9% (-3.41 vs 1.13), Aw7-9% (-14.67 vs 1.71)], indicating decreased and increased bronchial wall thickness in ex-smokers and current smokers, respectively. Both groups had similar changes (all p<0.05) in lung function before and after 1 year [ex-smokers: FEV1/FVC: 50.6 vs 54.2, R5: 1.92 vs 1.69, R20: 1.50 vs 1.45; current smokers: FEV1/FVC: 73.61 vs 74.42, R5: 0.92 vs 0.86, R20: 0.91 vs 0.92]. Aw3-6% correlated significantly with R5 and R20 (baseline: r=-0.64 and -0.672, post-1 year: r=-0.791 and -0.805, p<0.05). **CONCLUSION:** EB-OCT can be used to evaluate small airway disorders for justifying smoking cessation. Further studies with larger sample size, prolonged follow-up period are needed.

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POS1-112

FACTORS ASSOCIATED WITH STUDY ATTRITION IN A PILOT RANDOMISED CONTROLLED TRIAL TO EXPLORE THE ROLE OF EXERCISE ASSISTED REDUCTION TO STOP (EARS) SMOKING IN DISADVANTAGED GROUPS

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SIGNIFICANCE: Study attrition has the potential to compromise a trial's internal and external validity. The aim of the present study was to identify factors associated with participant attrition in a pilot trial of the effectiveness of a novel behavioural support intervention focused on increasing physical activity to reduce smoking, to inform the methods to reduce attrition in a definitive trial. **METHODS:** Disadvantaged smokers who wanted to reduce but not quit were randomised (N=99), of whom 61 (62%) completed follow-up assessments at 16 weeks. Univariable logistic regression was conducted to determine the effects of intervention arm, method of recruitment, and participant characteristics (socio-demographic factors, and life-style, behavioural and attitudinal characteristics) on attrition, followed by multivariable logistic regression on those factors found to be related to attrition. **RESULTS:** Participants with low confidence to quit, and who were undertaking less than 150 minutes of moderate and vigorous physical activity per week at baseline were less likely to complete the 16-week follow-up assessment. Exploratory analysis revealed that those who were lost to follow-up early in the trial (i.e., by 4 weeks), compared with those completing the study, were younger, had smoked for fewer years and had lower confidence to quit in the next 6 months. Participants who recorded a higher expired air carbon monoxide reading at baseline were more likely to drop out late in the study, as were those recruited via follow-up telephone calls. Multivariable analyses showed that only completing less than 150 minutes of physical activity retained any confidence in predicting attrition in the presence of other variables. **CONCLUSION:** The findings indicate that those who take more effort to be recruited, are younger, are heavier smokers, have less confidence to quit, and are less physically active are more likely to withdraw or be lost to follow up.

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POS1-113

ELECTRONIC CIGARETTES' EFFECTS ON SMOKING, CO AND MOTIVATION: A PILOT STUDY

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More empirical information is needed about potential effects of switching from cigarettes to electronic cigarettes (ECIGs) in terms of reduced exposure to combustible tobacco and expired carbon monoxide (CO), and on whether effects continue after ECIGs are no longer provided. This pilot study investigated feasibility and acceptability of asking smokers to switch to ECIGs for 6 weeks with a 4-week follow-up, and studied effect sizes for changes in smoking, CO levels, and motivation to quit smoking. **METHODS:** Non-treatment seeking daily smokers (n = 18; 10+ cigarettes/day, mean age 45.1, 92% White) were recruited from the community. All were provided with ECIGs (3.3v eGo battery, 1.5 Ohm, dual coil cartomizer) and e-liquid (18 mg/ml nicotine) in four flavors for 6 weeks with interviews at 6, 8 and 10 weeks. We assessed daily ECIG and cigarette use, expired CO, and Contemplation Ladder (motivation to quit smoking). **RESULTS:** All were retained through the 6 week product switching period and 17 completed 10 week follow-up. Participants averaged 3.4 cartomizers in Week 1, reaching 4.6 in Week 6, and continued to use M = 3.1/wk in the 4 weeks after we stopped providing ECIGs. Cigarettes per day reduced from M = 19.6 at baseline to 6.7 in Week 6 (effect size d = 1.64, t(17) = 6.9, p < .001), with reductions maintained at Week 8 (M = 8.3, d = 1.29, t(17) = 5.46, p < .001) and Week 10 (M = 8.8, d = 1.12, t(17) = 4.62, p < .001).



.005). CO levels decreased significantly from $M = 17.3$ at baseline to 9.7 in Week 6, ($d = .95$, $p < .001$), with reductions maintained at Weeks 8 ($M = 11.6$, $d = .69$, $t(17) = 4.0$, $p < .02$) and 10 ($M = 11.2$, $d = .82$, $p < .004$). From baseline to Week 6, Contemplation Ladder scores increased from $M = 5.17$ to 7.17 , $t(17) = 5.53$, $d = 1.31$, $p < .001$, and were maintained at Week 10, $M = 6.94$, $t(16) = 4.34$, $d = 1.05$, $p < .001$. CONCLUSION: These data show excellent preliminary evidence for beneficial effects of switching non-treatment seeking smokers to ECIGs, with reductions in cigarettes/day and expired CO concentrations and increases in motivation to quit, with large statistical effect sizes, all maintained for at least 4 weeks after free ECIGs were discontinued.

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POS1-114

EARLY WEIGHT GAIN AFTER STOPPING: PREDICTOR OF OVERALL LARGE WEIGHT GAIN?

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BACKGROUND: Most people gain weight on stopping smoking but the extent of weight gain varies. Interventions aimed at all quitters to prevent weight gain on cessation have proven unpopular. Targeting interventions at people with the greatest risk may improve uptake and cost-effectiveness. OBJECTIVE: To examine whether early large post-cessation weight gain predicts overall large weight gain following smoking cessation. METHODS: The population comprised 1050 CO-validated continuous abstainers treated at the Centre for Tobacco-Dependent in Prague, Czech Republic, between 2005 and 2013. The population comprised 511 women (48.7%) and 511 (51.3%) men, with the mean age of $46 (\pm 14.4)$ years. Weight was measured prior to stopping smoking and at each visit after smoking cessation. RESULTS: The mean weight gain in the first month ($N=763$) was 0.79% ($\pm 2.03\%$), in the second month ($N=646$) was 1.49% ($\pm 2.58\%$), for the third month ($N=566$) 2.33% ($\pm 3.44\%$) and 4.1% ($\pm 5.31\%$) after one-year follow-up ($N=1050$), $P < 0.001$ for all above mentioned changes. There was no significant association between higher early weight gain and subsequent weight gain, with a regression coefficient per 1% rise in the first three months of $+0.13\%$ (95% confidence interval -0.04% to 0.30%). A receiver operating curve analysis showed that patients gaining more than 2.35% of their baseline weight during first three months had a sensitivity of 0.426 and specificity of 0.725 for gaining 7% or more weight by 12 months. CONCLUSION: People who stop smoking and gain a larger amount of weight early after quitting are not more likely to gain excessively at one year.

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POS1-115

THE ACUTE EFFECTS OF NICOTINE AND EXERCISE ON COGNITIVE PERFORMANCE

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BACKGROUND: Nicotine, an alkaloid found in tobacco leaves, has been used by humans for its psychoactive properties for centuries. Nicotine, for instance, has been shown to improve cognitive performance (Heishman, Kleykamp, & Singleton,

2010). Similarly effects also been shown with exercise (Chang, Labban, Gapin, & Etnier, 2012). PURPOSE AND METHOD: The purpose of the present study was to examine whether a 20 min bout of moderate-intensity exercise enhances cognitive performance (i.e., working memory) as effectively as 4 mg of NICOR-ETTE® gum in a non-smoker population. Twenty-three non-smokers (M age = 25.87; 13 female) underwent a three-week randomized counterbalanced procedure. The N-Back Task (Jonides, Schumacher, Smith, Lauber, Awh, Minoshima, & Koeppel, 1997) was used to measure working memory [both accuracy (number of errors) and reaction time (RT)] at baseline and after administration of nicotine and exercise. RESULTS: Findings showed a significant improvement in RT after both treatments [exercise— $t(22) = 3.204$, $p = .004$, $\eta^2 = 0.31$; nicotine— $t(22) = 3.099$, $p = .005$, $\eta^2 = 0.30$]. This equates to RT being 12.34% faster after exercise and 12.59% faster after nicotine. Accuracy significantly improved for exercise— $t(22) = 4.357$, $p = .000$, $\eta^2 = 0.46$, but not for nicotine— $t(22) = .866$, $p = .396$, $\eta^2 = 0.03$. This equates to an increase in accuracy (i.e., reduction in number of errors) of 31.25% after exercise and 6.5% after nicotine. CONCLUSIONS: The authors recommend exercise over nicotine as safe and effective strategy for non-smokers to enhance working memory cognitive performance. Implication for future studies are discussed.

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POS1-116

FACILITATED EXTINCTION TRAINING TO IMPROVE PHARMACOTHERAPY FOR SMOKING CESSATION: A PILOT FEASIBILITY TRIAL

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SIGNIFICANCE: Varenicline reduces cravings to smoke and smoking satisfaction during the pre-cessation run-in period, which should contribute to the extinction of cue-provoked cravings and smoking behavior. Prior research indicates that the efficacy of varenicline is enhanced when the pre-quit run-in period is increased from 1 to 4 weeks, providing a longer opportunity for extinction to occur. We hypothesized that efficacy could be further enhanced by harnessing basic and applied research to facilitate the extinction process. This study developed a pre-cessation extinction-facilitating behavioral intervention and tested its feasibility in a pilot randomized controlled trial (RCT). METHODS: The Facilitated Extinction (FE) intervention was developed by experts in pre-cessation varenicline and extinction theory, and pre-tested in a group of 5 treatment-seeking smokers. FE treatment included instructions to smoke at a normal rate across a variety of contexts and cues during the run-in period, as well as the use of an extinction cue to enhance generalizability of extinction. Participants in the RCT were randomized to 1 of 3 varenicline interventions: standard (1-week run-in), extended (4-week run-in), and extended + FE. Interventions were delivered prior to the target quit date (TQD). Assessments were conducted in weeks 1 and 4 pre-TQD, as well as 1 and 3 months post TQD. Feasibility indices were assessed. RESULTS: Recruitment and retention goals were met ($N=58$). Treatment satisfaction was very high for all groups. The majority of FE participants adhered to FE instructions and maintained their pre-quit smoking rate during the run-in period. Greater decreases in craving and smoking satisfaction ratings were observed among participants in both of the extended groups vs. the standard group (p 's $< .002$). CONCLUSIONS: In sum, all elements of the RCT feasibility were successfully demonstrated. Participants adhered to the FE intervention, thereby optimizing the total number of extinction trials across contexts while experiencing reductions in craving and smoking satisfaction. These findings support the feasibility of testing the efficacy of the novel FE smoking cessation intervention in a fully-powered clinical trial.

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POS1-117

ACCEPTABILITY AND COMPLIANCE WITH A REMOTE MONITORING SYSTEM TO TRACK SMOKING AND RELAPSE AMONG ADOLESCENTS AND EMERGING ADULTS

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SIGNIFICANCE: Adolescent and emerging adult smokers are highly likely to continue smoking into adulthood, resulting almost inevitably in smoking-related illnesses. Understanding the process of relapse to smoking is critical for the development of efficacious interventions, yet little is known about the natural course of relapse in this group. A technology-based remote monitoring system would allow for the detailed analysis of smoking and relapse and is a fruitful avenue to explore. The aim of this study was to assess compliance and acceptability with a remote system that uses breath carbon monoxide (CO) samples to detect smoking combined with real-time assessments of context, craving, and affect. **METHODS:** A mobile application (app; My Mobile Monitor) was developed and combines breath CO with ecological momentary assessment, delivered via a smartphone platform. Participants (N=16) were daily cigarette smokers between the ages of 15-25. Participants used the app for 11 days, which included two days of naturalistic smoking, a two day quit attempt, and seven days of relapse monitoring. CO sessions were randomly prompted twice per day during the study. Acceptability, compliance, abstinence, and relapse were measured and post-study key informant interviews were conducted. **RESULTS:** Participants averaged 22.3 ± 2.0 years old, 25% were male, and 88% were Caucasian. Participants smoked an average of 13.0 ± 6.1 cigarettes per day and had baseline breath CO values of 16.3 ± 13.3 . Readiness to quit (10-point scale; 1=not ready, 10=extremely ready) was 5.8 ± 2.2 . During the study, participants completed 73% of CO monitoring sessions. During the quit attempt, 24% of participants quit for two days, while 31% did not quit (all others had at least one abstinent CO sample). All abstinent participants had relapsed within two days. On a 100-point scale (1=not favorable, 100=favorable), participants rated their willingness to use the app in the future (65 ± 34), for a longer period of time (69 ± 33), and rated their liking of CO monitoring (72 ± 21). Themes that emerged from interviews included: importance of the speed of the app, need for personalization, and more user controls. **CONCLUSIONS:** This study found that compliance with a mobile remote monitoring app was moderate and acceptability was favorable, though suggestions for improvements were discussed. The use of remote monitoring to detect smoking represents a step forward in the improvement of cessation strategies, but it is vital to be aware of the user experience and tailor appropriately.

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POS1-118

EMOTIONAL DISORDER SYMPTOM SEVERITY AS A PREDICTOR OF TOBACCO WITHDRAWAL SYMPTOMATOLOGY AMONG AFRICAN AMERICAN SMOKERS

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SIGNIFICANCE: The association between emotional psychopathology and tobacco withdrawal is well-documented in general smoker populations. African Americans—a group subject to health disparities in both psychopathology and tobacco use—may exhibit associations between mental health and smoking behavior that differ from other racial groups, leaving unclear whether psychopathology-withdrawal associations generalize to African Americans smokers. The present laboratory study investigated symptom dimensions of emotional psychopathology as a predictor of tobacco withdrawal symptomatology during acute smoking deprivation among African Americans daily cigarette smokers. **METHODS:** African Americans smokers (N = 459; 40% female; M age = 49 years old) completed a baseline visit that assessed for depressive and anxiety symptom severity utilizing the self-report measure, Inventory for Depression and Anxiety Symptoms (IDAS). Participants then attended two counterbalanced visits (16-hr abstinence vs. non-abstinent) where they completed self-report measures of urge to smoke, nicotine withdrawal, and affect states. **RESULTS:** Baseline levels of emotional psychopathology

predicted larger abstinence-provoked increases in urges to smoke and nicotine withdrawal symptom composites, reductions in positive affect states, and elevated negative affect states ($Betas = .07-.22$; $ps < .05$). Psychopathology-withdrawal associations extended across broad syndrome dimensions (i.e., general depression, panic, social anxiety) and several domain-specific symptom dimensions (Dysphoria [anhedonia, sadness, psychomotor disturbance, worthlessness, worry, cognitive difficulty], Lassitude [anergia, hypersomnia], and Ill Temperament [anger]). **CONCLUSIONS:** The association between emotional psychopathology and increased susceptibility to exacerbations of tobacco withdrawal symptomatology during acute smoking abstinence appears to generalize to African Americans smokers. Psychopathology is a worthwhile consideration in clinical strategies and etiological research addressing withdrawal in African Americans smokers, and may hold promise for offsetting racial and psychiatric disparities in tobacco use.

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POS1-119

EXERCISE DOSE AND SELF-EFFICACY FOR SMOKING CESSATION; A WIN-WIN

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SIGNIFICANCE: Although more men than women smoke, women have a more difficult time quitting. Research shows that engaging in exercise while trying to quit smoking can be beneficial for women, as exercise can reduce a number of withdrawal symptoms that often lead to relapse. An area less studied, however, is the effect exercise has on factors independently associated with quitting. **METHODS:** The present study examined data collected in the exercise arm (N=166) of a randomized controlled community-based exercise and smoking cessation trial. Female smokers (N=330, M_{age}=44.1 years [SD=9.9], M=17.4 cig/day [SD=8]). were randomly assigned to a 12-week cognitive-behavioral smoking cessation program plus either exercise or contact control. Dose of exercise was defined as total days (over 12 weeks) of any reported activity (aerobic and/or resistance). Regression models were used to examine effect of dose on quitting, fitness, and psychosocial outcomes. **RESULTS:** Participants reported an average of 9.6 (SD=10) days of exercise. There was a significant association between exercise dose and 7-day PPA at end of treatment (OR=1.05, 95% CI 1.01-1.08), such that greater dose of exercise completed was associated with higher odds of being quit. There were significant associations between dose and fitness, such that an additional day per week of activity over 12 weeks was associated with a mean increase in estimated VO_{2max} of 0.96 mL/kg ($p=0.001$) and a mean decrease in treadmill time of 0.96 minutes ($p=0.005$). There were significant associations between dose and psychosocial outcomes such that an additional day per week of exercise was associated with mean increases in smoking self-efficacy (0.84, $p=0.04$) and physical activity self-efficacy (0.24, $p=0.002$) and an 84% increase in the odds of increasing smoking stage of change over 12 weeks ($p=0.01$). **CONCLUSIONS:** Data suggest that dose of exercise is positively associated with smoking cessation self-efficacy and physical activity self-efficacy among women engaging in exercise as part of a comprehensive smoking cessation program. Because self-efficacy is a predictor of success in smoking cessation, engaging in more exercise may be helpful.

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POS1-120

EFFECTS OF NICOTINE VERSUS PLACEBO E-CIGARETTE USE ON SYMPTOM RELIEF DURING TOBACCO ABSTINENCE

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Electronic cigarettes ("e-cigarettes") containing nicotine may be able to aid tobacco cessation in a manner similar to that of FDA-approved NRT. To help assess nicotine intake via e-cigarettes for possible efficacy in smoking cessation, we compared abstinence symptoms during two separate 4 day long quit periods due to ad lib use of first-generation e-cigarettes ("Prime Vapor") that either did (labeled as 36 mg/ml) or did not (i.e. placebo, 0 mg/ml) contain nicotine. Measures were



withdrawal (MNWS) and craving (QSU) following 24-hr abstinence (verified by Vitalograph BreathCO CO<5 ppm) during these brief testing weeks. All subjects were those who intended to quit tobacco permanently within the next 2 months, and they were given brief counseling to aid cessation initiation, along with \$15 per quit day as motivation. Of 17 adult dependent smokers enrolled, 10 (6 M, 4 F) were able to quit for at least 24 hr during both testing weeks, so that symptom relief due to the e-cigarette's nicotine content could be compared on those quit days. Mean (SD) characteristics were 28.5 (11.1) years old and 11.6 (2.2) cigs/day, and none had current or past history of regular e-cigarette use. On study weeks 1 and 3, all were given their designated nicotine or non-nicotine e-cigarette brand on Mon and instructed to try and quit across Tues-Fri of each week. CO and symptoms were assessed at daily visits. Order of e-cigarette conditions was counter-balanced, and each was provided without identifying labels (i.e. blind). Week 2 involved resumption of ad lib tobacco smoking (i.e. "washout"). Results of two-tailed paired t-tests showed trends for attenuated symptoms from nicotine vs placebo e-cigarette use, respectively, as withdrawal (mean±SEM difference of -8.2±4.6, 20.7 vs 28.9; $p=.11$) and craving (-7.3±3.4, 30.9 vs 38.2; $p=.06$), especially QSU factor 1 (reflecting positive smoking reward, -8.9±3.8, 38.0 vs 46.9; $p<.05$), were reduced. These data suggest that, compared to placebo e-cigarettes, short-term use of nicotine-containing e-cigarettes may acutely reduce tobacco withdrawal symptoms, although long-term testing of quit success is needed to more fully determine their efficacy.

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POS1-121

EFFECTS OF ELECTRONIC CIGARETTES ON HEART RATE, RESPIRATION, SELF-REPORTED CRAVING, AND CIGARETTE SMOKING AMONG TOBACCO CIGARETTE SMOKERS

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SIGNIFICANCE: Awareness and use of electronic nicotine delivery systems (e-cigarettes) have increased dramatically in recent years. The purpose of the current study was to assess how smoking an e-cigarette (0 or 16 mg, Blu) vs. a tobacco cigarette affected tobacco craving and likelihood of smoking tobacco cigarettes. **METHODS:** We utilized a balanced, repeated-measures design. Participants (N=6) consisted of non-treatment seeking, tobacco cigarette smoking volunteers that reported they were inexperienced e-cigarette users. Participants remained smoking abstinent prior to sessions, and sessions were separated by at least 7 days. At each session, participants smoked one of two e-cigarettes (0 or 16 mg, Blu) or their own preferred brand of tobacco cigarette in a standardize manner (10 puffs, 30 s inter-puff interval). Craving and breath CO were assessed prior to and following each smoking session. Several hours later, participants were exposed to smoking-related cues using virtual reality (VR) and engaged in a standardized smoking procedure. Participants were then exposed to a dual-component (latency to smoke, number of cigarettes smoked) self-administration procedure using their preferred brand of cigarettes. **RESULTS:** Participants were able to maintain overnight tobacco smoking abstinence as demonstrated by breath CO<4 ppm. During the initial standardize smoking procedure, repeated measures ANOVA revealed a significant TIME X DRUG INTERACTION ($p<.001$) for heart rate. Heart rate increases over time were significantly greater in the own cigarette condition, compared to either e-cigarette dose. No differences were observed between the two e-cigarette doses. One-way ANOVA on non-linear respiration data was conducted using area under the curve, revealing no significant differences across the three smoking sessions. Craving significantly decreased following smoking their tobacco cigarette ($p=.007$), but significant changes were not observed with either e-cigarette dose. During the dual-component self-administration session, no significant differences were observed in either latency to smoke a cigarette or number of cigarettes smoked. **CONCLUSIONS:** Overall, results from heart rate, respiration, craving, and self-administration suggest that e-cigarettes, including the 16 mg dose, did not deliver nicotine. Similar results have been reported previously in the literature, although whether or not the lack of nicotine delivery was due to the device used or lack of experience in our participants cannot be determined at this time.

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POS1-122

RELATIONSHIPS AMONG PSYCHIATRIC AND SUBSTANCE USE SYMPTOMS AND READINESS TO QUIT SMOKING, CONFIDENCE IN QUITTING AND HISTORY OF SMOKING CESSATION AMONG SMOKERS WITH SERIOUS MENTAL ILLNESS

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The current study examined the relationships between readiness/motivation to quit, past quit attempts and psychiatric symptoms as well as substance use among 124 adult smokers with serious mental illness (SMI) receiving psychiatric inpatient care and enrolled in a smoking cessation study. Of 124 participants, 55 (44.4%) reported that their current goal is "to quit completely," 22 (17.7%) "to quit smoking, but realize a slip is possible," 18 (14.5%) "to smoke occasionally, when the urge is strong," 1 (0.8%) "to quit smoking for a limited time," 19 (15.3%) "to be able to control how much I smoke," and 9 (7.3%) having "no goal." Regression analyses showed that greater depressive symptoms significantly predicted reduced confidence in quitting (likelihood of success) and greater anticipated difficulty of quitting smoking, controlling for gender and nicotine dependence. Readiness to quit, desire to quit, or willingness to work hard at quitting did not differ as a function of depressive symptoms. Severity of anxiety, psychotic, or emotional lability symptoms did not predict any of these motivation variables. On the other hand, those with more frequent emotional/psychological problems caused by alcohol use reported significantly greater willingness to work hard at quitting, greater number of past serious quit attempts and quit attempts that lasted over 24 hours, controlling for gender and nicotine dependence. However, frequency of emotional problems due to alcohol did not significantly predict the longest duration of abstinence in the past quit attempts. None of the psychiatric symptoms predicted the number of or the longest duration of past quit attempts. These findings indicate that over 60% of individuals receiving psychiatric hospitalization have quitting smoking as a goal, suggesting their receptivity to smoking cessation treatment and highlighting the importance of developing efficacious tobacco cessation intervention approaches for this SMI population. Findings also suggest the importance of approaches to engender greater self-efficacy and resilience during quitting for smokers with higher levels of depressive symptoms.

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POS1-123

WHAT DO YOUNG ADULTS CONSIDER TO BE "VAPING?" ADAPTING THE SASS FOR ELECTRONIC CIGARETTE USERS

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SIGNIFICANCE: Use of electronic cigarettes, also known as vaping, is becoming increasingly prevalent among young adults. A dearth of empirical literature exists addressing how individuals define "being a vaper," which may be an important factor in how vapers receive prevention and cessation messages. The purpose of this study was to adapt the Subjective Assessment of Smoking Scale, a measure of what young adults consider to be smoking with utility in predicting cessation and smoking uptake, to electronic cigarette users. **METHODS:** Data were drawn from a university-based study of 238 Caucasian and African American college students (78.7% female; 40.2% African American, $M = 22.33$ years old) that assessed electronic cigarette attitudes and behaviors in vapers and non-vapers. A factor analysis and Chronbach's alpha were performed to assess if the scale was measuring a single construct and to evaluate internal reliability. **RESULTS:** All four questions produced a Cronbach's alpha of .952 and were retained. The items were then subjected to factor analysis using maximum likelihood estimation. Inspection of the correlation matrix revealed that all coefficients were above 0.3. The Kaiser-Meyer-Olkin value obtained (.86) exceeded the recommended value of .60 and Bartlett's Test of Sphericity reached statistical significance ($p < .001$), suggesting that the correlation matrix could be subjected to factor analysis. Factor analysis revealed the presence of one component with an eigenvalue exceeding one explaining 87.5% of the variance. **DISCUSSION:** The resulting measure, known as the Subjective Assessment of Smoking Scale - Electronic Cigarettes (SASS-E),



could range from zero to twelve, with high scores indicating the belief that one must vape heavily and consistently in order to be considered a vaper. Low scorers believed people who vaped small amounts in limited situations to still be vapers. CONCLUSION: Assuming it further demonstrates adequate psychometric properties, this measure may clarify the processes that leads to identification as a vaper and clarify which groups resist the term despite their electronic cigarette use.

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POS1-124

DEPRESSIVE SYMPTOMS MEDIATE THE RELATIONSHIP BETWEEN SUBSTANCE USE AND CIGARETTES PER DAY AMONG SUBSTANCE USERS IN RESIDENTIAL TREATMENT

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BACKGROUND: An estimated 45.3 million people in the United States smoke cigarettes, and smoking is the leading cause of preventable death in the U.S. (CDC, 2010). Cigarette smoking is especially problematic in low income substance users, with prevalence rates higher than the national average, ranging from 70-90% (Budney et al., 1993; Kalman et al., 2005). However, mechanisms by which to explain the relationship between substance use and cigarette smoking remain unclear among this vulnerable population. Depressive symptoms are common among substance users, and have been shown to predict cigarette smoking (Brown et al., 2000). We examine depressive symptoms as a mediator of the relationship between substance use (SU) and cigarettes per day (CPD) in a sample of low-income adult smokers in a residential treatment facility. METHOD: Participants completed the Drug Use Availability (DUA; Daughters, Lejuez, Bornovalova, et al., 2005) which queries drug use frequencies over the past year (a composite score of Marijuana, Cocaine, Alcohol, and Opioid use was used in all analyses indicating SU severity), the Beck Depression Inventory (BDI), and an item regarding how many CPD they would smoke on a daily basis when they could smoke freely. Our sample was comprised of 799 participants (30% female, 94% African American, Mage=43, SDage=11.71) who reported smoking one or more cigarettes on a daily basis (Mcigs=8.6). RESULTS: The relationship between SU and depressive symptoms was significant ($\beta=-.351$, $F(1,797)=15.73$, $R^2=.02$, $p=.000$). The relationship between depressive symptoms and CPD was significant ($\beta=.1163$, $F(2,796)=29.97$, $R^2=.07$, $p=.000$), and there was a significant indirect effect of depressive symptoms in the relation between substance use and cigarettes per day ($\beta=.04$, $SE=.0157$, $p=.000$, CI [.0162-.0797]). CONCLUSION: Results suggest that the relationship between past year substance use and cigarettes occurs, in part, via the pathway of depressive symptoms. Results highlight the need for treatments targeting substance use and mood in order to reduce cigarette smoking among inpatient substance users.

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POS1-125

REACHING LATINO SMOKERS USING A CULTURALLY AND LINGUISTICALLY TAILORED TEXT MESSAGING PROGRAM

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BACKGROUND: Latinos have the highest use of text messaging in the United States. Effective text-messaging programs might have the potential to reduce disparities in uptake of smoking cessation resources by Latinos. This study examined the impact of a culturally and linguistically tailored text-message smoking cessation intervention (Latino Kick Butts) which included text-based case management along with text-supported access to NRT. METHODS: Latino community members in Kansas City guided the cultural and linguistic adaptation of an existing evidence-based text-message library and supported recruitment of 50 smokers. Participating Latino smokers were offered a 28-week text-message intervention

which was segmented into 5 stages: decision-making, pre-quit, quit-date, post-quit intensive, and maintenance. The program offered scheduled behavioral support messages, automated keyword-driven message responses, and interactive text-messages with a cessation counselor. The program prompted smokers to request up to 12 weeks of nicotine replacement therapy (NRT) at no cost. Participants completed surveys at baseline and Weeks 1, 3, and 12. RESULTS: The average age of participants was 44.8 years (SD 9.8); 34% were female, 82% were born in Mexico, and 84% primarily spoke Spanish. Although most participants (72%) were employed, only 22% reported having health insurance. The majority of participants (72%) were light smokers (1-10 cpd); 72% were motivated to quit smoking in the next week and 70% had tried to quit smoking in the previous year. At Week 3, 95.2% had made a quit attempt. All participants requested the first fill of NRT, and 66% requested a refill. As far as utilization of text-messages, 90% used keywords and 98% sent at least one text-message to their counselor; only 6% discontinued the program prior to completion. Verified self-reported 7-day point-prevalence abstinence at Week 12 was 28%. CONCLUSION: Latino Kick Butts, a culturally and linguistically tailored text-message intervention, demonstrated promise in linking Latino smokers with evidence-based pharmacotherapy and supporting them in their quit attempt.

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POS1-126

CHARACTERISTICS OF DAILY ELECTRONIC CIGARETTE USERS IN THE UNITED STATES

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SIGNIFICANCE: While electronic cigarettes (ECs) represent a heterogeneous category of devices with multiple possible configurations, settings, and liquids, daily user preferences are not well characterized. METHODS: Participants from a non-EC Internet marketplace who were US citizens, 18 years or older, and used ECs as their primary source of nicotine, were monetarily compensated for completing a 46-question survey during the spring of 2016. Demographics, EC settings, and nicotine concentration of liquids were assessed. RESULTS: Five-Hundred and twenty-three individuals (291 females, 55.6%), with an average age of 33.0 years ($SD=10.2$), completed the survey. Average time of EC use was 13.9 months ($SD=7.9$). Most participants (59.1%) currently used some form of tobacco, and 84.8% of tobacco users reported using ECs as a smoking cessation tool. Participants typically used their EC at 3.1 volts ($SD=2.0$), 1.1 ohms ($SD=.8$), and 18.2 watts ($SD=18.8$), and used an average of 22.9 ($SD=26.0$) ml of liquid per week at an average nicotine concentration of 9.1 mg/ml ($SD=7.2$). Multiple factors motivating liquid selection were rated on a scale from 0 ("least important") to 100 ("most important") and the most important factor was "good taste" ($m=88.0$, $SD=13.6$), followed by "availability" of the product ($m=73.8$, $SD=13.6$) and "decreased health risks, avoid certain ingredients" ($m=73.4$, $SD=26.9$). Participants that "pay attention to" the amount of propylene glycol (PG) and vegetable glycerin (VG) in their EC liquids ($N=239$, 47.23%) reported typically using liquids with more VG ($m=62.9\%$, $SD=21.5$) than PG ($m=36.0\%$, $SD=21.0$). When asked to rate whether a series of common EC effects were more closely associated with PG or VG, participants indicated that PG causes significantly greater "dry mouth," "sore throat," "headache," and feeling "dizzy," while VG produces a "bigger cloud," "better smell," and "better taste." CONCLUSIONS: Key findings are that taste is the primary variable driving liquid selection, greater concentrations of VG are typically used, and VG and PG are associated with different profiles of EC effects. These data add to a sparse literature on characteristics of daily EC user preferences.

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**POS1-128****PANIC ATTACK HISTORY AND SMOKING TOPOGRAPHY**

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SIGNIFICANCE: Consistent evidence indicates that panic psychopathology and cigarette smoking co-occur. Panic psychopathology appears to be related to smoking, in part, due to negative reinforcement smoking motivation. Puffing topography provides a behavioral index of the value of smoking reinforcement. The current study examined smoking style during the course of ad libitum smoking of a single cigarette among adult daily smokers with and without a history of panic attacks. **METHODS:** Participants ($n = 124$, $M_{age} = 43.9$, $SD = 9.7$; 44.4% female) were non-treatment seeking daily smokers. Lifetime panic attack history was assessed via clinical diagnostic assessment; 28.2% ($n = 35$) of the sample met criteria for a cue or uncued panic attack history. All participants smoked one cigarette of their usual brand during an outdoor ad libitum smoking trial. Puff volume, duration, and inter-puff interval were measured using the Clinical Research Support System (CRSS) pocket device. **RESULTS:** Panic attack status was not associated with significant differences in puff volume, duration, or inter-puff interval when these indices were averaged across the cigarette. Examination of puff-level data revealed that there was a significant quadratic time x panic effect for puff volume ($b = .061$, $SE = .014$, $CI_{95\%} = .034-.090$, $z = 4.36$, $p < .001$) and puff duration ($b = .001$, $SE = .0004$, $CI_{95\%} = .0006-.002$, $z = 3.66$, $p < .001$). Smokers with a history of panic attacks demonstrated a slower rate of decline in puff volume and duration over the course of smoking, relative to those without panic attacks. There was a non-significant effect of time x panic effect for inter-puff interval. **DISCUSSION:** Smokers with lifetime panic attacks may be at risk for continued smoking and tobacco dependence based on their topographical profile. This group of smokers appears to demonstrate more persistent efforts to self-regulate the delivery of nicotine, and may require more nicotine to be satiated. Lifetime panic attack history is important to assess and consider in the delivery of smoking cessation intervention. Tailored treatment that addresses reliance on nicotine and bolsters alternative affect-regulatory strategies may be recommended.

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POS1-129**LOW-DOSE COMPUTED TOMOGRAPHY LUNG CANCER SCREENING: HIGH-RISK COMMUNITY AND PRIMARY CARE PROVIDERS' BARRIERS AND FACILITATORS**

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Lung cancer remains the leading cause of cancer death. Until recently, there has not been a valid and reliable screening test available for lung cancer. Results from National Lung Cancer Screening Trial (NLST) revealed that as compared to chest x-ray, low-dose computed tomography (LDCT) lung cancer screening demonstrated greater sensitivity resulting in lung cancer diagnosis at an earlier stage, and reduced lung cancer mortality among high-risk individuals by 20%. Based on NLST findings, the United States Preventative Services Task Force (USPSTF) recommends LDCT screening for high risk individuals (people ages 55 to 80, at least a 30-pack year smoking history). Despite a supportive landscape (e.g., USPSTF guidelines, insurance coverage), LDCT uptake is suboptimal. In this study, we examined barriers and facilitators, including knowledge and attitudes about LDCT screening for lung cancer, among an ethnically/racially diverse sample of high risk (HR) community members, including both current and former smokers, and primary care providers (PCP). Focus groups were conducted in-person with HR community members ($N = 38$) and by telephone with PCPs ($N = 23$). Focus groups were audio-taped and transcribed verbatim. The constant comparison method and content analysis were used to analyze results. The majority of HRs had never heard of lung LDCT screening and had never had a healthcare provider recommend it to them. Perceived barriers included fear of results (bad news) and financial costs. The primary perceived benefit was early detection. The majority of PCPs stated they had limited knowledge of LDCT screening and were not referring patients for LDCT screening. However, they also said they would recommend it to their

patients, if they had more information. PCPs recommended pop-up reminders in the electronic medical record to facilitate referrals. PCPs cited barriers to referral included: cost/insurance barriers and the potential for false positives. PCPs perceived the main benefit to be early detection of lung cancer. Understanding the barriers to lung screening across diverse community populations is necessary to improve screening rates and shared decision-making.

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POS1-130**PREDICTORS OF REFERRAL TO A HOSPITAL-BASED TOBACCO CESSATION PROGRAM**

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SIGNIFICANCE: Tobacco cessation programs that are initiated during a patient's hospital stay and include at least one month of follow-up post discharge are effective [1]. Few studies explore factors predicting referral to inpatient tobacco cessation programs. The current study examines whether patient demographic factors or health diagnoses play a role in determining which hospitalized patients are referred for tobacco cessation intervention in a large university hospital setting. Implications for reaching this at-risk subset of patients who smoke are discussed. **METHODS:** The analytic dataset was derived from electronic medical records for 19,201 current smokers admitted one or more times to the hospital between July 2011 and September 2015. A total of 30,505 hospital admission records were employed in the analyses. The outcome of interest was referral to the inpatient tobacco cessation program (0=no referral; 1= referral), which was predicted using a mixed modeling framework in SAS PROC GLIMMIX. **RESULTS:** Participants, who all endorsed current smoking at the time of hospital admission, were most typically male (55.3%), white (61.8%), middle-aged ($M=45.7$, $SD=15.7$), and privately insured (30.6%). Individuals who were younger (OR , age in decades=1.14, $p<.0001$), male ($OR=1.08$, $p=.06$), and on Medicare ($OR=1.32$, $p<.0001$) were all more likely to be referred for treatment. Also of note, a hospital admission associated with one or more cancer-related ICD-9 codes was significantly more likely to result in referral to treatment ($OR=1.32$, $p<.0001$). Hospital visits coded with circulatory system ($OR=0.54$, $p<.0001$) or respiratory system ($OR=0.76$, $p<.0001$) ICD-9 codes had lower odds of referral to treatment. **CONCLUSIONS:** This data raises questions about who is more likely to receive best practice tobacco treatment and why. The results have implications for how to reach at-risk smoking populations and they strengthen the argument for institutionalizing best practice tobacco treatment for hospitalized patients who smoke. 1) Rigotti NA, Munafò MR, Stead LF. Interventions for smoking cessation in hospitalized patients. Cochrane Database of Systematic Reviews 2007, Issue 3, Art. No.: CD001837.

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POS1-131**A LONGITUDINAL EXAMINATION OF DISTRESS TOLERANCE IN RELATION TO CIGARETTE SMOKING WITHDRAWAL SYMPTOMS**

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SIGNIFICANCE: Smokers lower in distress tolerance (DT) are less likely to engage in smoking cessation treatment and more likely to lapse and relapse following a cessation attempt. As such, DT has been proposed as a risk factor for smoking maintenance and a treatment target. However, scant research has found a relation between DT and smoking withdrawal. Moreover, research in this area is lacking in vivo, repeated, and comprehensive measurements of cigarette smoking withdrawal. The current study examined the relation between DT and withdrawal symptoms, over time, within and across four acute deprivation periods. **METHODS:** Daily smokers ($N=36$; 56.8% male) were recruited to participate in a withdrawal exposure and withdrawal regulation cessation trial comprised of four 4-hour sessions, during which they refrained from smoking while practicing strategies to regulate withdrawal. Withdrawal ratings were made every 30 minutes for a total



of nine ratings per session. Multi-level mixed models were conducted to test the main effect of DT, time, and their interactions in predicting anger, anxiety, concentration difficulty, craving, hunger, and sadness. RESULTS: During the first session, a significant quadratic time by DT interaction was observed, indicating that smokers lower in DT evidenced significantly greater increase and slower decrease in anger ($p < .05$) and sadness ($p < .01$). The same pattern approached significance for anxiety ($p = .08$) and craving ($p = .09$). DT did not significantly affect changes in within session withdrawal over time during sessions two through four. Across session models revealed a linear time by DT interaction in terms of both end-of-session ($p = .05$) and mean anxiety ($p < .05$) ratings. Smokers lower in DT evidenced a less steep decline in anxiety across the four intervention sessions. All findings were observed after covarying for corresponding baseline withdrawal symptoms and smoking dependence motives. CONCLUSION: These findings suggest that smokers low in DT have more difficulty regulating acute smoking withdrawal, but that regulation training may mitigate this effect. However, DT appears to specifically impair reductions in anxiety symptoms, which may require more targeted regulation strategies.

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POS1-132

THE EXPERIENCE OF SMOKING CESSATION IN PREGNANT WOMEN: A QUALITATIVE EXPLORATION OF THE ROLE OF PARTNER DYADS IN A ROMANIAN POPULATION

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SIGNIFICANCE: Quitting smoking during pregnancy is extremely beneficial for both the mother and the infant. However, in Romania, half of pregnant women who smoke continue smoking throughout pregnancy. In the development of a couple-focused behavioral intervention to support pregnant women in smoking cessation, a qualitative study to explore smoking and smoking cessation in pregnant women was conducted, with the objective of exploring the role of partner dyads in this process, including the dyadic efficacy for smoking cessation. METHODS: Semi-structured interviews were conducted with 13 pregnant women who were current smokers ($n=7$) or had quit smoking during pregnancy or in preparation for the pregnancy ($n=6$). Women were approached and recruited by trained operators from two large academic hospitals in Cluj-Napoca, Romania, while attending prenatal care. All participating women were 18 or older, and married or living with a stable partner. Interviews were conducted face-to-face or via telephone, and audio-recorded after obtaining informed consent. Verbatim transcripts were analyzed using thematic analysis assisted by NVivo 11. RESULTS: The major themes are structured across the involvement of the partner and the role of the dyad in the decision making process regarding quitting smoking, the perceived importance of working as a team in navigating the process of smoking cessation as well as the dynamics between partners in the attempt. Barriers and facilitators in smoking cessation were also major themes discussed, as well as the context of smoking for pregnant women in Romania. DISCUSSION: To our knowledge, this is the first qualitative study to explore the role of dyadic efficacy in the smoking cessation process among pregnant women, which brings important insights in developing couple-focused interventions to support quitting tobacco smoking.

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POS1-133

THE INTERACTION OF HISTORY OF DEPRESSION AND CRAVING IN SMOKING RELAPSE AMONG TREATMENT SEEKING SMOKERS

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SIGNIFICANCE: There is an interconnection between history of major depressive disorder (HMDD) and smoking. However, there has been relatively limited scientific attention oriented on the interplay between HMDD and smoking maintenance processes. The current study sought to address whether HMDD and post-cessation craving interact in the prediction of relapse 12 months after quitting among treatment-seeking smokers (from Spain). Separate models were evaluated as a function of sex. METHODS: Participants ($n = 319$, Mage = 41.7, 62.1% female) were treatment-seeking smokers who were abstinent at the end of six weekly one hour sessions involving psychosocial treatment for smoking cessation. Participants completed a baseline assessment [sociodemographic and smoking history variables, and Major Depressive Episode Screener (MDES; Muñoz, 1998)] and reported post-cessation craving [Questionnaire Smoking Urges-brief (QSU-brief; Cox, Tiffany, and Christen, 2001) and biochemical measures of abstinence at 1-, 2-, 3-, 6- and 12- months follow-up. RESULTS: There was a significant interactive effect evident for females ($B = .05$, $OR = 1.05$, $p = .013$), but not males. The form of the interaction indicated females with HMDD and greater post-treatment craving evinced the highest rate of relapse. CONCLUSIONS: Findings suggest that HMDD and post-treatment craving are related to increased risk of relapse for female, but not male, smokers. Sex differences in the interplay of HMDD and smoking craving should be considered in smoking cessation clinical practice.

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POS1-134

THE EFFECT OF FINANCIAL INCENTIVES ON QUIT RATES IN TOBACCO SMOKING EMPLOYEES: A STUDY PROTOCOL

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BACKGROUND: Stimulating successful smoking cessation among employees has multiple benefits. Employees who quit smoking are healthier, more productive, less absent from work, and longer employable than employees who smoke. The aim of this study is to evaluate whether adding a financial incentive (compared with no additional incentive) is effective and cost-effective in increasing abstinence rates in tobacco smoking employees participating in a smoking cessation group training. METHODS/DESIGN: In this cluster-randomized trial employees in the intervention and control group both participate in smoking cessation group training consisting of seven weekly counseling sessions of ninety minutes each. In addition to the training, employees in the intervention group receive a voucher as an incentive for being abstinent from smoking immediately after the training (50 euro), after three months (50 euro), after six months (50 euro), and after one year (200 euro). The control group does not receive any incentive. The primary outcome is carbon monoxide validated 12 months continuous abstinence from smoking (Russell's standard). Additionally, a cost-effectiveness analysis is performed from a societal and an employer perspective. DISCUSSION: The present paper describes the methods and design of this cluster-randomized trial in detail. We hypothesise that the financial incentive for abstinence in the form of vouchers increases abstinence rates over and above the group training.

Trial registration: Dutch Trial Register: NTR5657

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POS1-135

PROTOTYPE TESTING OF *BREATHE FREE*: A SMARTPHONE VIDEOGAME-BASED SMOKING CESSATION INTERVENTION

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Cigarette smoking remains the number one cause of preventable morbidity and mortality in the U.S. One third to one half of smokers attempt to quit at least once; however, approximately 94% of quit attempts fail. One of the most powerful, evidence-based interventions is contingency management (CM), which consists of delivering incentives (typically money) contingent on objective evidence of smoking abstinence (e.g., exhaled carbon monoxide [CO]). We developed a prototype of a mobile videogame-based contingency management intervention for smoking cessation called *Breathe Free*. The goals of the game were to decrease costs, improve sustainability, and increase accessibility of CM for smoking cessation. To increase access, all aspects of the intervention were made to be available via Android or iOS smartphones used in conjunction with a small, portable breath CO monitor. To decrease costs and improve sustainability, the mobile game was developed to replace monetary incentives typically used in CM interventions with in-game "virtual rewards" that can immediately be used to help players meet game goals, as well as with social reinforcement, prompted and incentivized in the context of the game. We tested a prototype of the game with treatment seeking-smokers (N = 22) during a 1-hour session. Participants submitted a CO sample and then played several levels of the *Breathe Free* prototype. They were then given the choice to end the session or play one more level of the game. At the end of the session a user satisfaction survey was completed and participants were paid \$40. Participants rated the prototype favorably on the survey, with the majority reporting that they would play the fully developed game (90%), recommend it to a friend (95%), find it helpful in helping themselves (76%) or others quit (90%), and they thought the game was fun (100%). More than half of participants (58%) decided to play an extra level of the game, even though it meant delaying access to getting paid and smoking their next cigarette. These results suggest that *Breathe Free* has great potential as an alternative, rigorous, yet enjoyable, smoking cessation intervention.

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POS1-136

MARIJUANA USE ON CIGARETTE WITHDRAWAL, CRAVING AND MOOD

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SIGNIFICANCE: Research has shown that co-use of marijuana and cigarettes has increased significantly among adults in the United States with nearly 18% of cigarette smokers reporting past-month marijuana use. Despite this, little is known about how marijuana use affects cigarette-related symptomatology. Specifically, this study will explore how marijuana use is associated with cigarette withdrawal and craving, perceived stress and mood during ad libitum smoking. **METHODS:** Participants were men and women aged 18-60 years who were enrolled in a large tobacco cessation clinical trial. They had to currently smoke ≥ 5 cigarettes/day, be in stable mental and physical health and be motivated to quit smoking cigarettes (≥ 7 on a Likert-type-scale). The co-user group consisted of "non-daily" marijuana users (≤ 6 days/week). During ad libitum smoking (baseline), participants completed the Fagerström Test for Nicotine Dependence (FTND), Minnesota Nicotine Withdrawal Scale (MNWS), Questionnaire for Smoking Urges (QSU), Beck Depression Inventory (BDI), Perceived Stress Scale (PSS) and Profile of Mood States (POMS). Chi-Square or Fisher's Exact Tests were used to compare demographic variables between groups; ANOVA or Kruskal-Wallis tests were used to compare the withdrawal, craving and mood variables. **RESULTS:** Co-users (n=30) were more likely than cigarette-only smokers (n=177) to be non-white (58.6% vs. 37.7%, respectively), consumed more alcoholic drinks per week (5.3 \pm 7.6 vs. 3.0 \pm 5.6, p=0.007; respectively) and had more cigarette quit attempts (8.7 \pm 10.2 vs.

6.1 \pm 9.3, p=0.025; respectively). Co-users also showed lower MNWS craving scores (3.3 \pm 0.9 vs. 3.7 \pm 0.9, p=0.03; respectively). This association remained significant after adjusting for the above baseline variables (p=0.021). No other significant differences were observed. **CONCLUSIONS:** These findings suggest that marijuana use may play a role in cigarette-related symptomatology. Specifically, cigarette craving during ad libitum smoking may be alleviated by the non-daily use of marijuana. More research is needed to confirm these observations.

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POS1-137

GREATER MAGNITUDE AND DURATION OF REDUCTION IN CIGARETTES PER DAY PROSPECTIVELY PREDICT INCREASED QUIT ATTEMPTS: A SECONDARY ANALYSIS OF A NATURAL HISTORY STUDY

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INTRODUCTION: Reducing cigarettes per day (CPD) increases quitting when aided by nicotine replacement therapy (NRT). However, it is unclear whether this is due to NRT use, reduction in CPD, or both. If this is due to reduction per se, then the magnitude and duration of reduction in CPD should prospectively predict quit attempts (QA). We tested this in a sample of smokers not receiving NRT. **METHODOLOGY:** Smokers who intended to quit in the next 3 months completed nightly calls to report CPD and QAs over 12 weeks. We provided no treatment. An overall mean CPD was calculated for each subject based on regular smoking days (i.e., days not trying to quit or reduce). We identified episodes of reduction (i.e., reduced CPD by $\geq 10\%$) and tested whether the magnitude or the duration of the reduction predicted participants' self-reported QAs. **RESULTS:** 130 participants provided 1,338 reduction episodes and made 175 QAs (many lasted < 24 hours) during the 12 weeks. Participants reduced CPD by a median of 20% and reductions lasted a median of 1 day. In a multilevel logistic regression, both greater magnitude (F=71.1, p<.0001) and longer duration (F=26.5, p<.0001) of reduction in CPD predicted increased likelihood of QAs. There was also an interaction in which a greater magnitude and longer duration of reduction in CPD had a synergistic effect to predict an increased likelihood of QAs (F=8.0, p<.01). For example, a magnitude of reduction of 25% CPD for a duration of 1 day was associated with a 6.1% probability of making a QA and a reduction of 25% CPD for 5 days was associated with a 9.6% probability of making a QA. A magnitude of reduction of 50% CPD for a duration of 1 day was associated with a 12.4% probability of making a QA and a reduction of 50% for 5 days was associated with a 32.1% probability of making a QA. **CONCLUSIONS:** Although analyses are based on self-selected groups, greater and longer reductions in CPD prospectively predict QAs. Reducing CPD per se may be an effective strategy for smokers who intend to quit at some point in the next 3 months.

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POS1-138

TOBACCO INTERNET INTERVENTION FOR CANCER SURVIVORS

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INTRODUCTION: Smoking is among the main lifestyle risk factors related to cancer and second cancers. Therefore, brief interventions for smoking cessation may contribute considerably to the prevention of cancer among at risk populations, such as cancer survivors, in addition to improving their general well-being. There is accumulating evidence for the effectiveness of internet-based brief interventions for smoking cessation (Civljak, 2013) in diverse populations. Reach of vulnerable target populations has however been sub-optimal. **OBJECTIVE:** To develop and tailor an internet-based brief self-help intervention for smoking cessation which suits the needs of cancer survivors, based on existing evidence-based treatment models. Currently, this intervention is being tested in a randomised controlled trial (RCT). **METHODS:** In a web-based survey and four focus groups, cancer survi-

vors have been involved in the development of the intervention. In addition, oncologists and other healthcare professionals have been consulted in interviews and an expert meeting has been organized to help optimize the intervention. An RCT is ongoing to test the (cost-)effectiveness of this smoking cessation intervention against information-only controls. RESULTS: A total of 240 cancer survivors participated in the web-based survey. Twenty cancer survivors participated in the four focus groups. Seven professionals were interviewed and another seven participated in the expert meeting. Cancer survivors indicated interest in a positive framing of the intervention, a need for information on the exact relation and mechanisms of harm between smoking and cancer, and possibilities to have contact with other participants as well as with professionals while participating in the intervention. Interviewed professionals noted that involvement of end-users is essential in the design and implementation of the intervention, and made suggestions on how to improve intervention recruitment and adherence. DISCUSSION: Tailoring interventions to specific vulnerable populations may help improve reach and engagement of internet-based brief interventions. The ongoing RCT will inform to what extent this also leads to a (cost-)effective internet brief intervention to help cancer survivors quit smoking.

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POS1-139

CIGARETTE SMOKING AND MUSCULOSKELETAL PAIN AMONG U.S. VETERANS OF THE WARS IN IRAQ AND AFGHANISTAN

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SIGNIFICANCE: Although nicotine has analgesic properties, epidemiologic studies among civilians suggest that smoking is a risk factor for the development of chronic pain. Relatively little research has examined the association between pain and smoking among veterans despite evidence that rates of cigarette smoking and pain are higher in military populations. The present study examined the association between cigarette smoking and musculoskeletal pain in U.S. veterans with service in Iraq and Afghanistan. METHODS: The OEF/OIF Veterans Health and Needs Study included a random sample of 5,000 veterans with service in Iraq or Afghanistan. The observed response rate of 29% is comparable with other large mail surveys of this population. The sample for the current study (n=1090) included all respondents with non-missing data on smoking status, gender, and pain. Logistic regression was used to examine the association between cigarette smoking status and current moderate to severe musculoskeletal pain. Models were adjusted for demographic and clinical risk factors including age, race, weight, combat exposure, posttraumatic stress disorder (PTSD), depression, service-connected injury, and use of Veterans Affairs (VA) health care. Missing data were imputed using multiple imputation methods. RESULTS: Thirty percent of the sample reported a lifetime history of smoking. Current smoking was more prevalent among those with PTSD ($p < .01$), depression ($p < .0001$), and among veterans using VA health care ($p < .01$). In the fully adjusted model, current smoking was significantly related to increased pain. The association between smoking and pain, however, was moderated by gender. Women smokers, relative to women nonsmokers, had increased odds of endorsing moderate to severe musculoskeletal pain ($OR = 2.73$; 95% CI : 1.16-6.41), whereas this difference was non-significant for male veterans ($OR = 1.03$; 95% CI : 0.69-1.56). CONCLUSION: Smoking is a risk factor for increased pain in women veterans. More work is needed to understand sex differences in the association between smoking and musculoskeletal pain. Sex differences in smoking-related analgesia, sex hormones, pain perception, and socialization may account for this association. Results from the current study suggest smoking cessation interventions should be offered within the context of behavioral pain management programs.

FUNDING: U.S. DEPARTMENT OF VETERANS AFFAIRS

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POS1-140

THE VALIDITY OF VETERANS AFFAIRS ELECTRONIC MEDICAL RECORD SMOKING DATA AMONG IRAQ AND AFGHANISTAN ERA VETERANS

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SIGNIFICANCE: Accurate assessment of smoking in electronic medical records (EMR) would allow smoking to be included as an important covariate in population-based epidemiological research. The U.S. Department of Veterans Affairs (VA) has one of the most advanced EMR systems in the nation, however, past research using VA EMR data have been limited by the absence of valid smoking information. Smoking prevalence based on ICD-9 codes has been shown to significantly underestimate smoking in VA. The purpose of the current investigation was to examine the validity of smoking data based on "Health Factors" entries included in the VA EMR for veterans with recent military service during the wars in Iraq and Afghanistan. METHODS: Self-reported smoking data from 2,025 participants from the VA Mid-Atlantic Post-Deployment Mental Health (PDMH) study were compared to Health Factors smoking data from the VA EMR. Health factors data are collected at all VA medical facilities using required automated reminders. Smoking Health Factors data consist of text fields representing answers to smoking-focused clinical reminders. Text fields were coded to determine smoking status (i.e., never, former, current smoker). Differences in the performance of the EMR Health Factors data were explored by examining (1) the most frequently recorded EMR Health Factors response, (2) the most recent EMR Health Factors response, and (3) the Health Factors response restricted within 1-year of the PDMH study visit. Sensitivity, specificity, area under the receiver-operating curve, and kappa statistics were used to evaluate agreement between self-reported smoking data and Health Factors smoking status. RESULTS: Agreement was highest between PDMH data and VA EMR Health Factors data when the most frequently observed Health Factor was used to determine smoking status. The kappa statistic was .69 for the comparison of the Health Factors data to PDMH data when examining current, former, and never smoking. Observed agreement was comparable among participants with psychiatric disorders. Smokers had significantly more Health Factors entries ($M = 11.3$, $SD=9.0$) than non-smokers ($M = 2.2$; $SD=3.1$) or former smokers ($M = 4.8$, $SD=5.2$). CONCLUSIONS: Results suggest promise for the utility of VA EMR Health Factors in future studies of Iraq/Afghanistan era veterans. Results indicating that smokers have significantly more Health Factors entries than non-smokers suggest that caution is warranted when using the EMR to select cases for cohort studies as the risk for selection bias appears high.

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POS1-141

INTENTIONS OF MEDICAL STUDENTS TO TREAT TOBACCO DEPENDENCE POST-GRADUATION

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SIGNIFICANCE: Physicians have an important role in delivering tobacco dependence treatment (TDT), but often do not consistently or effectively do so. To improve TDT, it is recommended that training begin in medical school, but it is unknown if medical students' attitudes and knowledge about TDT are barriers to becoming effective interventionists. We assessed the determinants of students' intention to provide cessation advice once they graduate. METHODS: All medical students at Royal College of Surgeons in Ireland were invited to participate in an on-line cross-sectional survey, of which 371 participated (20% response rate) and 338 (91%) had complete data. The dependent variable was intention to treat tobacco dependence throughout one's career. Independent variables were age, gender, whether the student had completed a standardized one-day TDT course, delivered TDT, or currently used cigarettes or other tobacco products. Also assessed were perceived knowledge about TDT, and determinants of behavioral intention from the Theory of Planned Behavior (TPB), including affective attitude (emotional response to providing TDT), cognitive attitude (perceived advantages of providing TDT), worry that patients will not be receptive to TDT, subjective norm (perceived social pressure to provide TDT), and perceived behavioral control. Multivariable correlates of intention were assessed in a multiple linear regression model. RESULTS: Nearly half of students (47%) were male, mean age was 23 yrs, 84% at least slightly agreed that they intended to provide tobacco dependence treat-



ment throughout their career, and 35% strongly agreed. Multivariable correlates of intention to treat explained 40% of the variance and included affective attitude ($b=16.4$, $SE=2.4$, $p<.0001$), cognitive attitude ($b=20.3$, $SE=4.6$, $p<.0001$), worry about providing treatment ($b=-3.8$, $SE=1.5$, $p=.0141$), subjective norm ($b=17.8$, $SE=2.7$, $p<.0001$), and current use of other tobacco products ($b=17.7$, $SE=10.1$, $p=.0813$). CONCLUSIONS: TPB determinants were more highly correlated with intention to provide TDT than knowledge of TDT or didactic or practical exposure to TDT delivery. Results suggest that TDT training efforts should correct misperceptions about the benefits, receptivity of patients, and professional expectations of physicians in delivering TDT.

FUNDING: No Funding

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POS1-142

EXPANDING QUITLINE REACH: EXPERIENCE WITH A NEW SERVICE MODEL IN MINNESOTA AND OKLAHOMA

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SIGNIFICANCE: After declining consumer interest in existing cessation services, ClearWay MinnesotaSM launched a new suite of services in 2014: Individual Services (2 week NRT Starter Kit, email program, text messaging and quit guide), and the Helpline (phone counseling plus NRT, integrated email, integrated text messaging and materials). A "No Judgments. Just Help" mass media campaign was also launched. Oklahoma's Tobacco Settlement Endowment Trust adopted a similar model and media campaign in 2015. This research examines the impact of similar innovations in two states. METHODS: Twelve months of registration and utilization data post launch in both states were analyzed (15,536 for MN, 36,201 for OK). Responder quit rates were calculated from a 7-month follow-up survey for Helpline and Individual Services registrants who received evidence-based services. The survey response rates were over 50% for both states. The outcome study included Helpline responders (276 for MN; 346 for OK) and Starter Kit responders (818 for MN; 321 for OK). RESULTS: Both Minnesota and Oklahoma saw increases in registrations from the year prior to the launch of new services, likely due to a strong interest in Individual Services and the new media campaign (13,539 registrations in MN and 15,789 in OK). In Minnesota, 70.1% of consumers enrolled online and 29.1% by phone. In Oklahoma, with a larger rural population, 14.9% enrolled online and 85.1% by phone. In Minnesota 5.4% selected additional services after initial enrollment; in Oklahoma 13.3% did so. Seven-month point prevalence outcomes were similar in both states for Helpline (31.9% MN; 32.1% OK) and Starter Kit (25.6% MN; 29.9% OK). CONCLUSIONS: Innovations in service delivery combined with statewide mass media campaigns have the potential to expand reach among tobacco users while achieving effective outcomes. Post redesign launch, both states' registrations rebounded to their prior highest levels. Differences in online versus phone enrollment may reflect demographic differences between the two states. These data reinforce the importance of consumer choice to expand quitline reach nationwide.

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POS1-143

INTEGRATING ALCOHOL INTERVENTIONS IN PRIMARY CARE FOR SMOKERS MAKING A QUIT ATTEMPT WITH NRT: A CLUSTER RANDOMIZED TRIAL

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SIGNIFICANCE: Tobacco and alcohol use present multiplicative risk for aerodigestive cancers. Reducing alcohol consumption improves smoking cessation outcomes and reduces cancer risk. Risky alcohol consumption and smoking are often treated separately despite concurrent treatment potentially leading to better

outcomes for each. However, no rapidly scalable program exists for combined interventions in primary care clinics spread across wide geographic areas. This cluster randomized trial aims to report on the differences in intervention rates by primary care practitioners addressing risky alcohol use in a smoking cessation program. METHODS: We used the Interactive Systems Framework (ISF) for Dissemination and Implementation to develop a scalable program in primary care clinics across Ontario, Canada. Practitioners at participating sites were trained via webinar to address risky alcohol use among individuals in a smoking cessation program attempting to quit using nicotine replacement therapy (NRT). Sites were blindly allocated to one of two clinical decision support systems (CDSS) guiding practitioners to provide an intervention for risky alcohol use. Primary analysis will measure the proportion of risky drinkers offered an alcohol intervention in each CDSS arm at baseline. Patients will be contacted by phone or email to track smoking cessation and alcohol consumption rates at 6- and 12-month follow up. RESULTS: Since the study launch in April 2016, 221 primary care clinics have implemented a clinical decision support system. Over 230 practitioners received training to effectively address risky alcohol use in a smoking cessation program. In four months, 3,889 smokers have been screened for risky alcohol use, of which 1,472 (38%) were identified as drinking above recommended guidelines. Of those who drank above guidelines, 749 (49%) were offered an educational resource as a means for intervention. CONCLUSIONS: It is feasible to integrate alcohol interventions in a primary care setting with smokers making quit attempts. This study offers an innovative, cost-effective approach to reducing cancer risk among dual tobacco and risky alcohol users. Upon completion of the trial in March 2017, the effect of different clinical decision support systems on practitioner behavior, and on client tobacco and alcohol use, will be discussed.

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POS1-144

SENSITIVITY OF SUBJECTIVE MEASURES IN DIFFERENTIATING CIGARETTE AND NICOTINE GUM

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SIGNIFICANCE: The Pre-Market Tobacco Product Application Draft Guidance issued by FDA (March, 2012) states that manufacturers provide information on "addictiveness and abuse liability of the product". Many researchers use conventional cigarettes (CC) and nicotine gum (NG) as comparators to make these assessments. In those studies, participants are typically administered multiple subjective measures in order to ascertain the reinforcing effects of the test product(s) relative to the comparators. However, the utility and sensitivity of these subjective measures to differentiate between product categories or products with differing nicotine levels has not been fully examined. METHODS: The sensitivity of multiple subjective measures including questions related to Tobacco/Nicotine Withdrawal and Product Effects were explored in a randomized cross-over study. Twenty-seven adult tobacco consumers smoked CC and used NG (4 mg nicotine) and a test tobacco product. RESULTS: Although the maximum plasma nicotine concentrations differed significantly (geometric least squares mean [CC vs. NG]: 9.68 vs. 4.21 ng/mL), the differences in subjective measures were not proportionate. The peak change from pre-use responses for Tobacco/Nicotine Withdrawal questionnaire items were not statistically significantly different ($p>0.05$) in 11/12 items; whereas the peak responses to Product Effect questionnaire items were statistically significantly higher ($p<0.05$) for CC in 7/10 items as compared to NG. CONCLUSIONS: These findings suggest that the Product Effect but not the Tobacco/Nicotine Withdrawal items differentiate between CC and NG. This work provides insights into the types of measures that could be possibly used in an acute-product-effect study among adult tobacco consumers.

FUNDING: Internally Funded

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**POS1-145****TRAJECTORY OF NICOTINE WITHDRAWAL SYMPTOMS IN WATERPIPE SMOKERS ATTEMPTING TO QUIT SMOKING WITHOUT MEDICATION: RESULTS FROM A PILOT RANDOMIZED CLINICAL TRIAL**

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BACKGROUND: Nicotine withdrawal symptoms (NWS) predict cigarette smoking relapse, but their pattern and intensity has not been evaluated in waterpipe (WP) users attempting to quit. Using data from a pilot cessation trial among WP users in Aleppo, Syria, we examined changes in NWS in relation to abstinence status during the treatment. **METHODS:** Participants (n=41; 93% men; mean age=30.7±9.8) were randomized to receive either brief (1 in person session and 3 phone calls) or intensive (3 in-person sessions and 5 phone calls) behavioral cessation treatment without nicotine replacement treatment (NRT). Using the Hughes & Hatsukami scale, NWS were assessed at baseline and several time points during 3 months of follow-up. The mean of the 10 scale items was calculated to obtain a total NWS score ranging from 1-10 among abstainers (defined as prolonged abstinence at three months post-quit day, assessed by self-report and exhaled carbon monoxide levels of <10 ppm; n=10) and non-abstainers (n=31). **RESULTS:** Across treatment groups, baseline NWS score was higher among non-abstainers vs. abstainers (4.8±1.9 vs. 3.1±1.4; p=.01). In the intensive treatment group, NWS score peaked twice at day 1 post-cessation and day 10 post-cessation among abstainers but did not change among non-abstainers. At the 3-month follow-up, NWS score was higher among non-abstainers versus abstainers (3.4±1.5 vs. 1.8±0.01; p=.004). In the brief treatment group, NWS score peaked among abstainers at day 1 post-cessation (4.2±2.5) while it decreased slightly at day 1 post-cessation and stayed at the same range throughout follow-up among non-abstainers. At the final assessment, NWS mean score was higher among abstainers in the brief treatment compared to abstainers in the intensive treatment (3.1±1.8 vs. 1.8±0.1). **CONCLUSIONS:** The intensive behavioral treatment was more helpful in reducing NWS among abstainers than the brief treatment. More research is needed to determine whether adding NRT to behavioral WP cessation treatment improves NWS relief and cessation.

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POS1-146**IRRREGULARITY OF THE MENSTRUAL CYCLE IN CO-USERS OF MARIJUANA AND TOBACCO**

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INTRODUCTION: Cigarette smoking continues to be the leading cause of preventable death in the United States with 17.8% of tobacco users reporting marijuana use in the past month. Cessation rates are lower in women who use tobacco and may be influenced by ovarian sex hormones. Marijuana has been shown to suppress luteinizing hormone (LH) and shorten the luteal phase, a time with more favorable smoking cessation outcomes compared to the follicular phase. The goal of this study was to describe the menstrual cycle among females who co-use marijuana and tobacco (co-users). **METHODS:** This is a secondary analysis from a parent study examining the effect of progesterone on smoking cessation. All women who reported marijuana use were selected from women aged 18-50 with self-reported regular menstrual cycles. Women used First Response Urine testing kits to determine the date of their LH surge and reported start dates of all subsequent menses for up to 12 weeks. Cycle length was determined and follicular and luteal phases were calculated based on their LH surge. A one-sample t-test was used to compare the luteal phase to the medical conventional average of 14 days. **RESULTS:** Eight women were followed for 23 menstrual cycles. Participants (N=8) were 37.3±10.2 years of age and mostly white (75%). The women had been smoking for 20.6±10.9 years, all were considered low to moderately dependent on cigarettes (FTND score=4.5±2.3), and smoked 14.6±5.4 cigarettes per day. The average menstrual cycle length was 28.0±4.2 days. Three women (38%) did not have a LH surge during their first cycle. The average follicular and luteal phases

were 16.6±3.4 and 10.3±1.7 days, respectively. Compared to the medical conventional average of 14 days, co-users had a significantly shortened luteal phase (14 vs 10.3 days, p=0.001). **CONCLUSIONS:** These data suggest a suppression of luteinizing hormone and shortened luteal phase among co-users with self-reported regular menstrual cycles. Due to more favorable smoking cessation outcomes in the luteal phase, further studies are needed to determine the effect co-use of marijuana and tobacco has on the menstrual cycle and its impact on smoking cessation in women.

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POS1-147**TREATING TOBACCO USE IN CHRONIC PAIN PATIENTS: A PILOT STUDY OF TELEPHONE-DELIVERED ACCEPTANCE AND COMMITMENT THERAPY FOR SMOKING CESSATION**

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BACKGROUND AND SIGNIFICANCE: Smoking and chronic pain represent significant public health concerns in the United States. Patients with chronic pain smoke at higher rates than the general population, and the pain-smoking relationship appears to be influenced by factors such as pain-related anxiety and depression. In spite of the high smoking prevalence among patients with chronic pain, to our knowledge there is only one published randomized controlled trial testing a smoking cessation intervention in this population. The current study examined the effectiveness and feasibility of a 5-session, telephone-delivered Acceptance and Commitment Therapy (ACT) intervention for smoking cessation addressing internal smoking triggers specific to pain patients, such as depression and pain-related anxiety. **METHODS:** Forty-five patients who expressed willingness to quit smoking were recruited from two multidisciplinary pain treatment centers. Participants were randomized to receive the ACT intervention (n=24) or an enhanced treatment-as-usual (TAU) control condition (n=21), which consisted of a fax-referral to the Tobacco Quitline. **RESULTS:** The mean age was 48 (SD = 12.6). Sixty-two percent of participants were female, 89% were White, 7% had a college degree or higher, and 22% percent were employed at least part-time. Every participant in the study reported considering quitting within the next 6 months, and 87% stated planning to quit within the next 30 days. Based on screening measures, rates of probable depression (40%) and probable PTSD (18%) were high at baseline. Participants in the ACT condition had higher verified 7-day point prevalence abstinence from smoking at the end of treatment (15% for ACT versus 5% for TAU); 33% of those who completed the entire ACT treatment reported abstinence at end of treatment. As expected with the small sample size, differences were not statistically significant. At the 3-month follow-up assessment, two participants in the ACT condition (11%) and one participant in the TAU condition (7%) reported not smoking. There were no significant differences in smoking intensity by condition, but we did observe a reduction in smoking in both conditions at the end of treatment, and at the 3-month follow-up assessments. **CONCLUSIONS:** Our findings suggest that chronic pain patients can benefit, at least in the short term, from telephone-delivered smoking cessation. Further studies are needed to determine best smoking cessation practices for this population.

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POS1-148**PROGESTERONE/ESTRADIOL RATIO & SYMPTOMATOLOGY IN FEMALE SMOKERS DURING SHORT-TERM ABSTINENCE**

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Previous research has shown that progesterone and estradiol in females play a role in smoking behavior, however, little is known about how the ratio affects the outcome. High estradiol levels facilitate addictive behaviors while high progesterone levels diminish them. This study examined the ratio of progesterone (P) to



estradiol (E) in the luteal phase of the menstrual cycle and smoking-related symptomatology (SRS) during abstinence. We predicted that a higher P/E ratio would promote less symptomatology in female smokers during their luteal phase. This is a secondary analysis from a large cross-over lab study examining depressive symptoms and short-term smoking abstinence. Subjects smoked ≥ 5 CPD, were in stable physical and mental health and were not taking psychotropic medication. Data collected on Day 4 of smoking abstinence included withdrawal symptoms (MNWS), smoking urges (QSU), positive and negative affect (PANAS), perceived stress (PSS) and premenstrual assessment (PAF). Blood samples were collected for progesterone and estradiol. Linear regression models were used to assess the association between continuous P/E ratio and each continuous SRS measure. Participants (N=100) were on average 30.2 ± 0.7 yo, 58% White and smoked 12.7 ± 0.6 cpd. The P/E ratio on day 4 of abstinence was 93.8 ± 5.0 . There were no significant associations between SRS and P/E ratios. PSS and craving were the only measurements trending towards significance. As the PSS score increased, the P/E ratio increased ($\beta = 2.0 \pm 1.2$; $p = .09$) and as craving increased, the P/E ratio decreased ($\beta = -7.3 \pm 4.5$; $p = .11$). Although no significant associations were found between ratio and SRS, two trends were observed. PSS increased as the P/E ratio increased and craving increased with a decreasing ratio. These relate to the idea that varying levels of progesterone are associated with smoking outcomes. Limitations of the study include self-report of LH (luteinizing hormone) surge. Our large variation of P/E ratios was also difficult to control due to single day abstinence testing. Further research would include collecting hormone levels for a week and using the highest P/E ratio for each individual for analysis.

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POS1-149

USE OF ABSTRACT THINKING AND TOBACCO USAGE

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INTRODUCTION AND AIMS: The frontal lobe is the site of the will, spirituality, character and where abstract thinking takes place. We theorize that those properties could be strengthened if abstract thinking is used often. We explore if there is a relationship between abstract thinking, depression and usage of tobacco products. **DESIGN AND METHODS:** Data from 5997 participants from 5 continents that finished a once a week for 8-week depression educational program was used. All participants took at baseline and end of the 8-weeks the Depression and Anxiety Assessment Test, a 75-item self-report tool that assesses, among other things, depression (using a modified version of PHQ-9 [Patients Health Questionnaire]), demographics, tobacco intake and how many times per week abstract thinking was used. The program taught healthy habits, such as plant-based nutrition, exercise, rest, cessation of addictive habits, etc. Programs are not run for profit.

RESULTS:

At baseline the following relation was found:

*2183 were not using abstract thinking at all per week, from those 234 (10.7%) were tobacco users with a mean depression of 13.4 (moderate) SD 7.4.

*1675 were using abstract thinking 1-2 days a week, from those 114 (6.8%) were tobacco users with a mean depression of 12 (moderate) SD 7.5.

*721 were using abstract thinking 3-4 days per week, from those 50 (6.9%) were tobacco users with a mean depression of 11.4 (low moderate) SD 7.4.

*1419 were using abstract thinking 5 to 7 days, from those 83 (5.8%) were tobacco users with a mean depression of 10.5 (mild).

At the end of the 8-weeks those that started using abstract thinking more than 1 day per week on a regular basis 18.5% of them stopped tobacco and had an end mean depression of 6.9 (none), while those that didn't use abstract thinking per week, only 15.1% stopped tobacco and had an end depression of 8.4 (mild). **DISCUSSION AND CONCLUSIONS:** It seems that practicing abstract thinking various times per week have a beneficial effect on mental health. According to this data regular abstract thinkers tend to use less tobacco products, this seems to be dose

related. Forms of abstract thinking should be encouraged in tobacco prevention and cessation programs.

FUNDING: No Funding

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POS1-150

THE ROLE OF TRAUMA AND RESILIENCE IN DEPRESSIVE SYMPTOMS AND PHYSIOLOGICAL HEALTH RISK INDICATORS IN BLACK EVER VERSUS NEVER SMOKERS

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Blacks are disproportionately affected by tobacco-related illnesses as well as traumatic events that may cause psychiatric conditions associated with smoking. Resilience may account for differential outcomes in people with histories of trauma. We examined 1) childhood and adulthood traumatic experiences (per the Childhood Trauma Questionnaire and Traumatic Events Inventory, respectively), as well as resilience (per the Connor-Davidson Resilience Scale), in relation to depressive symptoms (per the Beck Depression Inventory); 2) these factors on physiological health risk indicators (interleukin-6 [IL-6], C-reactive protein [CRP], and allostatic load); and 3) resilience as a moderator among these risk factors in a sample of 852 Blacks participating in a study investigating risk factors for PTSD and depression. Ever smokers were older, more likely male, and lower socioeconomic status, and experienced more child and adulthood trauma ($p < .001$) and depressive symptoms ($p = .01$). Structural equation modeling indicated that, in ever smokers, childhood trauma was positively associated with depressive symptoms ($p < .001$); resilience was negatively associated with depressive symptoms ($p = .01$). Depressive symptoms were positively associated with IL-6 ($p = .03$), which was positively associated with allostatic load ($p = .01$). Adulthood trauma was positively associated with CRP levels ($p = .03$). In never smokers, child and adulthood trauma were positively associated with depressive symptoms ($p < .001$, $p = .01$). Adulthood trauma was also associated with higher CRP levels ($p < .001$), which was positively associated with allostatic load ($p < .001$). In never smokers, those with higher resilience showed a negative association between childhood trauma and depressive symptoms, whereas those with lower resilience showed a positive association between childhood trauma and depressive symptoms. Resilience was negatively associated with CRP levels ($p < .001$). Trauma and resilience are differentially associated with depression and health risk in never vs. ever smokers, suggesting the importance of promoting resilience in those experiencing trauma to address risk for depression, smoking, and related illnesses.

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POS1-151

THE FEASIBILITY OF IMPLEMENTING NCCN CLINICAL PRACTICE GUIDELINES FOR SMOKING CESSATION

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BACKGROUND: In 2015, the National Comprehensive Cancer Network (NCCN) adopted the Clinical Practice Guidelines in Oncology for Smoking Cessation, which requires all cancer patients to be screened for tobacco, advised to quit and provided evidence based assistance and follow-up to promote abstinence from tobacco during and after cancer treatment. **OBJECTIVE:** To describe the implementation of an automated system to identify and refer current cigarette smokers to a pharmacy led tobacco treatment service in an NCI cancer center designed to be consistent with the NCCN Clinical Practice Guideline. **METHOD:** Data in this abstract are based on 15,868 patient visit records for outpatients seen at the Hollings Cancer Center from November 1, 2015 to July 31, 2016. During this 9-month period, 1,022 current smoking oncology patients were eligible to be enrolled into our tobacco treatment service which attempted to reach them by phone within a week after their last oncology clinic visit to invite them to schedule a future appointment with a tobacco treatment specialist (TTS) for behavioral counseling and pharmacother-



apy consistent with the NCCN guidelines. All patients regardless of whether they received care from the TTS or not, were called back at 1, 3 and 6 months to assess their tobacco use and offer follow-up assistance if needed. **RESULTS:** Forty-nine percent of the 1,022 eligible smokers were reached by phone (n=499) and of those reached 226 (45%) accepted an appointment with the TTS. Patients not reached by phone or who were not ready for assistance were sent information about the tobacco treatment service (n=796). Data available on patients reached at 1-month revealed that 20% were not smoking with quit rates about 2x times higher in those who had seen a TTS. New patient data with more complete follow-up information and an analysis of predictors of accepting/rejecting the appointment with the TTS will be added at the time of presentation. **CONCLUSIONS:** It is feasible to implement the NCCN Clinical Practice Guideline for Smoking Cessation in a large cancer center, although further refinement of these methods are needed to engage more patients in the process of quitting.

FUNDING: No Funding

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POS1-152

NICOTINE DELIVERY FROM E-CIGARETTES: DATA AND LEARNINGS FROM CLINICAL PHARMACOKINETIC STUDIES.

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INTRODUCTION: Nicotine PK studies are important in developing our understanding of nicotine delivery from e-cigarettes. Furthermore, data from such studies may potentially be required as part of a regulatory package, particularly as part of an abuse liability assessment of a novel product. **METHODS:** In two separate studies we examined blood nicotine levels during acute clinical use periods in subjects smoking cigarettes and using e-cigarettes. The first study (ISRCTN74070762; Belfast, U.K.) compared blood nicotine levels in 24 smokers using closed-system modular e-cigarettes according to a defined puffing schedule, with those seen when subjects smoked a cigarette typical of that sold in the study market. The second study (NCT02474849; Los Angeles, USA) examined blood nicotine in 18 vapers who were occasional smokers using the same modular e-cigarettes *ad libitum* and compared these levels to when subjects smoked a single combustible cigarette. Both studies were ethics committee-approved and run according to GCP. Subjects provided written informed consent prior to participation and were deemed healthy by medical examination and clinical laboratory screening. Smoking status was verified by eCO measurements. **RESULTS:** Compliance with abstinence requirements and other inclusion/exclusion criteria was high. 22 subjects completed Study 1 while all subjects completed Study 2. In Study 1, blood nicotine C_{max} was, on average, 5-fold greater for the combustible cigarette compared to the e-cigarette. In contrast, in Study 2 peak blood nicotine levels were similar for the cigarette and the e-cigarette. **CONCLUSIONS:** Our data show a high level of variability when subjects from different populations and with different smoking histories used similar products. Puffing schedule (standardised vs *ad libitum*) may also contribute to this variability. While this may support a need for standardisation of protocols for ecigarette clinical research, to facilitate comparisons between products in different studies, study design needs to take into account study objectives and cohort, real-world usage patterns and which comparisons need to be made between one product and another.

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POS1-153

TREATMENT OF TOBACCO DEPENDENCE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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INTRODUCTION: Patients with type 2 diabetes are at high cardiovascular risk. Treatment of tobacco dependence in these patients is an important part of in-

fluencing all major risk factors for cardiovascular disease. Smoking cessation is often associated with weight gain that may be one of the barriers for tobacco dependence treatment. We retrospectively assessed changes in weight and diabetes compensation after one year of abstinence in patients with type 2 diabetes. **METHODS:** A sample of 304 patients with type 2 diabetes mellitus (T2DM) were intensively treated in the Centre for Tobacco-Dependent in Prague, Czech Republic, between 2007 and 2014 - 59.9% men with the mean age of 57.7 years (SD 10.8), the average Fagerström Test of Cigarette Dependence score 5.9 (SD 2.4; n=256), the average number of cigarettes/day 25.9 (SD 13.5). The biochemically validated success rate, weight change and glycated haemoglobin level change after one year were assessed. **RESULTS:** The success rate after one year was 37.8%. Post-cessation weight gain occurred in 76.6% abstainers (85/115). The mean weight gain after one year was 5.9 kg (SD 5.1; n=85). Values of glycated haemoglobin after one year were available only in 12 abstainers and 23 unsuccessful patients. In abstainers the mean change was -4.92 mmol/mol (SD 14.2), compared to smokers 0.39 mmol/mol (SD 14). **CONCLUSION:** Despite of possible post-cessation weight gain in patients with T2DM, tobacco dependence treatment may improve diabetes compensation and reduce cardiovascular risk.

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POS1-154

NICOTINE DEPENDENCE ASSESSMENT USING FAGERSTROM TEST AND NICOTINE REPLACEMENT THERAPY (NRT) RECOMMENDATION TECHNIQUES FOR SMOKING CESSATION AMONG PANIYA TRIBES

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INTRODUCTION: Tobacco is a highly addictive substance. It is estimated that 1.9 billion people currently smoke worldwide. Tobacco kills one in two users. It is responsible for the death of 1 in 10 adults, with 4.9 million deaths occurring worldwide each year. Tribes are a special population with high prevalence of smoking. Most people who try to stop smoking do so unassisted, and many return to smoking within a few months. There is now substantial evidence that pharmacotherapy, such as nicotine replacement therapy (NRT), can significantly increase an individual's chances of stopping. Indeed, it is widely recommended that pharmacotherapy be incorporated into any quit attempt when not contraindicated. **OBJECTIVES:** To investigate the effectiveness of nicotine replacement therapy (NRT) for smoking cessation among paniya tribes. **DESIGN:** Randomised controlled trial. **PARTICIPANTS AND SETTING:** 200 paniya tribal smokers from South India, aged 18 years and older with a Fagerstrom score of 1 and above were included in the study. **INTERVENTIONS:** The scoring of the tribal patients was done using Fagerstrom test for nicotine dependence. The NRT recommendation chart was used to give the appropriate intervention according to the scoring criteria. **MAIN OUTCOME MEASURES:** Self-reported abstinence assessed by questionnaires at 1, 2, 3 and 6 months and exhaled carbondioxide. **RESULTS:** Of the 200 patients approached, 165 (82.5%) agreed to participate; five of these were later excluded. Among the 160 tried NRT during the study period. At 30-day follow-up, 82 (51.25%) who had used NRT planned to continue using them, it reduced to 74,52 and 30 at the end of 2, 3 and 6 months respectively. Average cigarette consumption decreased from 15.6 per person/d to 7.6 over the study period ($P < .001$). **CONCLUSION:** Pre existing traditions and customs, superadded with illiteracy in paniya tribes have resulted in reduction in the success rate of NRT therapy. However the therapy have paved the way in reduction of daily tobacco use.

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POS1-155

WHITE RACE IS AN INDEPENDENT PREDICTOR OF HEAVY SMOKING AT AN URBAN SAFETY-NET HOSPITAL

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BACKGROUND: Mortality of US non-Hispanic whites has increased sharply; heavier smoking may be a contributing factor. While prior population-based studies have documented heavier smoking among whites relative to blacks, we are unaware of studies examining racial disparities in smoking characteristics among patients receiving primary care at an urban safety-net hospital. **METHODS:** We analyzed baseline data on 352 daily smokers (≥ 10 cigarettes per day) who were in contemplation or preparation stage of readiness to quit smoking and enrolled in a randomized controlled trial of patient navigation and financial incentives to promote smoking cessation. The main independent variable was self-identified race: non-Hispanic white ("white"), non-Hispanic black ("black"), Hispanic (of any race), and other race. The primary outcome was heavy smoking (≥ 20 cigarettes daily). Covariates included validated measures of stress, chaos, and hassles. Multivariable logistic regression analyses assessed the association between race and heavy smoking, controlling for gender and age. We evaluated interaction terms of race with stress, chaos, and hassles, respectively. **RESULTS:** 23% of participants were white, 55% black, 11% Hispanic and 11% other or missing race. Overall, 112 of 352 (32%) participants were heavy smokers; 54% of whites, 26% of blacks, and 33% of Hispanics ($p < 0.0001$). There were no significant differences between heavy and non-heavy smoking in levels of stress, chaos, and hassles. In multivariable analyses, white race was significantly associated with heavy smoking (AOR 3.5; 95% CI 2.0-6.1). Interaction terms of white race with stress, chaos, and hassles, respectively, were not significant. **CONCLUSION:** Whites comprise a disproportionate number of heavy smokers in an urban safety-net primary care population. Heavy smoking is not explained by higher levels of stress, chaos, or hassles in this group. This study was limited by a lack of data on mental health and substance use diagnoses, which may explain higher rates of heavy smoking among whites. Further exploration would help tailor smoking cessation interventions to white smokers seeking care in this environment.

FUNDING: American Cancer Society Research Scholars Grant

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POS1-156

THE RELATIONSHIP BETWEEN RACIAL DISCRIMINATION AND CIGARETTE SMOKING AMONG BLACK AND WHITE SMOKERS WITH MEDIATION AND MODERATION MODELS

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SIGNIFICANCE: Research has shown that pervasive racial discrimination causes psychological distress, leading to chronic mental and physical health symptoms. Cigarette smoking may serve as a potential coping mechanism. Because racial discrimination has been associated with differential smoking rates, it is necessary to identify individual factors that moderate or mediate the association between exposure to discrimination and smoking behaviors and nicotine dependence. The purpose of this study was to examine motor impulsivity as a moderator and perceived stress and depression symptoms as mediators of the relationship between racial discrimination and smoking status. **METHODS:** Fifty Black and White participants were administered the Barratt Impulsiveness Scale (BIS-11), Experiences of Discrimination (EOD) scale and the Perceived Stress Scale-4 (PSS-4), along with other clinical and demographic measures. Participants were asked to report their cigarette usage per day (CPD). Participants smoking fewer than 5 cigarettes per day were excluded to select for chronic smokers. Zero-order correlations were conducted for all predictor variables and mediation and moderation models were tested with multiple regression analyses. **RESULTS:** Models examining perceived stress (PS) and depressive symptomatology (DS) as mediators of the association between racial discrimination and CPD, and motor impulsivity (MI) as a moderator of the association between racial discrimination and nicotine dependence failed to reach significance ($p > .05$). However, DS was significantly positively correlated with frequency of experiences of racial discrimination, $r(50) = .39, p < .05$, while MI was significantly negatively correlated with CPD, $r(50) = -.35, p < .05$. **CONCLUSIONS:** The association between racial discrimination and CPD might not have

been significant despite the conclusions of earlier studies, because CPD does not capture the multifaceted nature of nicotine dependence. In addition, the exclusion of smokers with a low CPD reduced range in responses. However, these data suggest that it is essential to understand the mental health symptoms in response to racial discrimination, such as depression, as well as individual differences that are associated with substance abuse such as impulsivity. Depressive symptomatology and impulsivity thus emerged as interesting targets for research assessing the link between racial discrimination and substance use, as well as for the design and implementation of specialized smoking cessation treatment.

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POS1-157

EFFECTS OF THE NICOTINIC PARTIAL AGONIST VARENICLINE ON SMOKING LAPSE BEHAVIOR IN SMOKERS WITH AND WITHOUT SCHIZOPHRENIA: PRELIMINARY STUDIES

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BACKGROUND: Varenicline, a nicotinic receptor partial agonist, is the most efficacious smoking cessation pharmacotherapy, and has been shown to reduce long-term smoking relapse rates in smokers with schizophrenia (Evins et al., 2014 JAMA). Despite the efficacy of varenicline and other smoking cessation interventions in these patients, high relapse rates persist in the schizophrenia population and the use of human laboratory models may allow the parsing of potential mechanism to improve treatment outcomes in these difficult to treat smokers. The first instance of smoking during a quit attempt ('smoking lapse') is one of the best predictors of relapse. Accordingly, the aim of this study was to investigate the effects of varenicline on smoking lapse behavior in smokers with and without schizophrenia using a validated model (McKee et al., 2013. *Nicotine Tobacco Res.*). **METHODS:** A total of 33 subjects (15 controls, 18 patients) participated in the study. Varenicline was titrated up to 2mg/day over 4 days and continued for a total of 6 days using a randomized, double-blind, cross-over human laboratory study design. **RESULTS:** In an analysis of study completers [smokers with schizophrenia ($n=14$); control smokers ($n=14$)], varenicline increased time to lapse non-significantly in healthy controls ($p=0.12$) and schizophrenia patients ($p=0.10$). These effects were more pronounced in smokers with higher levels of nicotine dependence (e.g. FTND score >5), and there was a trend towards an effect of treatment on time to lapse among the entire sample, with an increased resistance to smoke with varenicline treatment ($p=0.08$). Interestingly, amongst heavily dependent patients, the ability of varenicline to increase time to smoking lapse was more pronounced in non-psychiatric control smokers than in smokers with schizophrenia. **CONCLUSIONS:** While preliminary, our findings support the conduct of larger studies to further delineate the specific mechanisms by which varenicline protects against smoking relapse in schizophrenia, possibly in combination with adjunctive treatments to boost overall outcomes in these difficult to treat tobacco smokers.

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POS1-158

SMOKING TOPOGRAPHY OUTCOMES IN WOMEN DURING PREGNANCY VERSUS WOMEN ON ORAL CONTRACEPTIVES

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INTRODUCTION: Smoking during pregnancy is a common cause of infant morbidity and mortality, yet data on smoking behaviors in pregnant women is lacking. Smoking prevalence at any time during pregnancy is 8.4%, and studies have shown that sex hormones may influence smoking behavior. We hypothesize that smoking behavior may be dampened during periods of high progesterone in preg-



nancy when compared to non-pregnant women. This study examined smoking topography outcomes and symptomatology in pregnant women versus women on oral contraceptives (OC). **METHODS:** This project is part of a parent study examining effects of sex hormones on smoking behavior and symptomatology in pregnant women and women on OC. Participants were ages 18-35, in stable physical and mental health, smoked > 5 cigarettes daily for >1 year. Two groups were included in the study: pregnant women at 16 to 36 weeks gestation (n=65) and a group of women on OC (n=35). Participants attended 5 visits over an 8-day period, including a smoking lab session on day 7 in which topography measures and subjective state scale (SSS) were collected following overnight abstinence. **RESULTS:** Participants averaged 25.7 years of age, mostly identified as white (58.0%), and smoked on average 11.2(±4.4) cigarettes per day. Pearson correlations were used to identify differences between the two groups. Pregnant women had significantly lower puff counts ($p < 0.01$), higher average inter-puff interval ($p < 0.01$), and higher FTND scores at baseline ($p < 0.01$) when compared to women on OC. Additionally, SSS analysis showed that pregnant women had significantly more negative affect and cravings before smoking ($p = 0.02$ and $p = 0.02$, respectively), and fewer physical symptoms both before and after smoking ($p = 0.03$ and $p = 0.03$, respectively). **DISCUSSION:** These results demonstrate a significant difference between smoking topography outcomes and subjective state scale reports in pregnant women versus women on OC. Hormonal changes in pregnancy may play a role in smoking behaviors as well as subjective symptomatology before and after smoking. These findings warrant further exploration.

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POS1-159

MENTAL HEALTH CORRELATES OF CIGARETTE USE IN LGBT INDIVIDUALS IN THE SOUTHEASTERN UNITED STATES

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SIGNIFICANCE: Smoking prevalence for lesbian, gay, bisexual, and transgender (LGBT) individuals is significantly higher than for heterosexual, cisgender individuals. Elevated smoking rates also are linked to psychiatric comorbidities, substance use, poverty, low education levels, and chronic stress—extant factors in this region. This study examined mental health (MH) correlates of cigarette use in LGBT individuals residing in Augusta, Georgia and the surrounding area. **METHOD:** Participants were 190 individuals from a larger Augusta area LGBT health needs assessment (mean age 34.5; SD=12.94; 61% gay/lesbian; 71% Caucasian; 81% cisgender). Demographics (sexual orientation, age, gender identity, ethnicity, and education), MH variables (current/past psychiatric diagnoses, number of poor MH days in the last 30, the Patient Health Questionnaire (PHQ)-2 depression screener, and a 3-item loneliness scale), and frequency of cigarette use were included. Analyses performed included bivariate correlations, ANOVAs, and hierarchical regression. **RESULTS:** Higher frequency of cigarette use was correlated with current/past history of ADHD, Anxiety, Bipolar Disorder, Depression, and Drug Abuse, more days of poor MH in the last 30, and higher PHQ-2 and loneliness scale scores (all $p < .05$). Of demographics, only education was significant ($r = -.32$, $p < .01$). To examine the unique contribution of these factors on cigarette use, we performed a hierarchical linear regression. Education was entered into Step 1, current/past history of aforementioned MH diagnoses at Step 2, poor MH days in the last 30 at Step 3, and PHQ-2 and loneliness at Step 4. Our total model accounted for 17.6% of the variance in frequency of cigarette use. Only education, Bipolar Disorder, and the number of poor MH days were significant contributors to our model at Step 4, $F(9, 180) = 4.28$, $p < .001$. **CONCLUSIONS:** Less education, Bipolar Disorder, and recurrent poor MH increase LGBT vulnerability to frequent cigarette use. Access to LGBT-competent MH providers in this low resource area, especially those who can address culturally specific factors in tobacco use and cessation, is crucial to reducing this health disparity.

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POS1-160

PSYCHOPATHOLOGY AND TOBACCO DEMAND

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SIGNIFICANCE: Behavioral economic measures of the relative value of tobacco can be used to examine individual differences in motivation for tobacco under certain contexts. Indices of smoking reinforcement from a cigarette purchase task (CPT) have been shown to be associated with level of tobacco dependence and to play a significant role in the maintenance of smoking. Smokers with psychopathology, relative to those without, may demonstrate stronger levels of motivation or desire for tobacco following a period of smoking deprivation, which could account for disparate rates of smoking and cessation among this subgroup. **METHODS:** Participants (n = 111) were community-recruited adult daily smokers who completed the 22-item version of the CPT after a deprivation period of approximately 60 minutes. Presence of psychopathology was assessed via clinical interview; 40.5% (n = 45) of the sample met criteria for past-year (12-month) psychopathology. Specifically, 31.5% (n = 35) had an emotional disorder (anxiety/mood), 17.1% (n = 19) had a substance use disorder, and 19.1% of the sample had more than one disorder. The presence or absence of psychopathology was examined in terms of CPT performance. **RESULTS:** Smokers with any psychopathology showed significantly higher intensity (demand at unrestricted cost; \$0) and O_{max} (peak expenditure for a drug) relative to smokers with no psychopathology. Intensity was also significantly higher among smokers with an emotional disorder compared to those without. Smokers with a substance use disorder showed significantly higher intensity and O_{max} , and lower elasticity, reflecting greater insensitivity to price increases. Having ≥ 2 psychological disorders also was associated with higher intensity relative to having 1 or no disorders. These effects were significant after adjusting for demographic characteristics and level of tobacco dependence. **CONCLUSIONS:** The current findings suggest that presence of psychopathology may be associated with greater and more persistent motivation to smoke. Additionally, demand for tobacco increases with number of psychological disorders, indicating that smokers with multiple psychological disorders will likely exhibit reduced price sensitivity and elevated abuse liability. Future work is needed to explore the mechanism linking psychopathology to tobacco demand.

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POS1-161

EFFECTIVENESS AND RETENTION IN SMOKING CESSATION TREATMENT FOR MENTAL HEALTH AND ADDICTION PATIENTS USING SUPPORTIVE COUNSELING AND COMBINED PHARMACOTHERAPY

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SIGNIFICANCE: To investigate treatment effectiveness and retention in a population with and without mental health/addiction (MHA) disorders that received nicotine patch alone or in combination with other medications (i.e., gum, bupropion, or nortriptyline) for smoking cessation treatment in a Brazilian CAPS unit, taking into account sociodemographics and smoking profile covariates. **METHODS:** Comparison of treatment success (7-day point abstinence at the end of the treatment) and retention (presence of the individual in all of the 4 medical consultations and 6 group sessions) in two subsamples of MHA (n = 267) and non-MHA (n = 397) patients who were included in a 6-week treatment provided by an Brazilian Psychosocial Care Center (CAPS) from 2007 to 2013. Treatment protocol was composed by group therapy (based on cognitive-behavioural concepts) and pharmacotherapy (nicotine patches, nicotine gums, bupropion and nortriptyline available, prescribed by psychiatrists). **RESULTS:** Within MHA patients, nicotine patch plus bupropion (aOR = 2.00, 95%CI = 1.14-3.50, $p = 0.015$), and nicotine patch plus gum (aOR = 2.10, 95%CI = 1.04-4.23, $p = 0.036$) were associated

with treatment success. Within non-MHA patients, female gender (aOR = 0.60, 95%CI = 0.37-0.95, $p = 0.031$), and lower HSI (aOR = 0.80, 95%CI = 0.65-0.99, $p = 0.048$) were associated with treatment success. No variable was associated neither with dropout or retention, within MHA and non-MHA patients. **CONCLUSION:** Our findings support the use of nicotine patch plus bupropion, and nicotine patch in samples with high rates of medical, psychiatric and addiction disorders. These findings support those of previous studies in the general population. Pharmacological treatment associated with group therapy based on cognitive-behavioural concepts and combined with ongoing MHA treatment seems to be the best option for smoking cessation treatment among MHA patients. Units that deal with MHA patients, such as CAPS in Brazil, should be encouraged to treat smoking addiction in this population. Future studies should investigate retention rates in other MHA patient samples.

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POS1-162

REDUCING NICOTINE LEVELS INCREASES OBTAINMENT OF NICOTINE REPLACEMENT THERAPY: A SECONDARY ANALYSIS

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SIGNIFICANCE: Reducing the nicotine levels of cigarettes has been proposed as a future regulatory policy. Currently, the most common method to reduce nicotine levels is reducing number of usual brand cigarettes per day (CPD). Reducing nicotine levels from cigarettes may prompt smokers to seek non-cigarette forms of nicotine. The present secondary analysis examines whether reducing nicotine levels by reducing usual brand CPD prospectively predicts obtaining non-combustible nicotine replacement therapy (NRT). **METHOD:** A national sample of 560 adults who smoked ≥ 10 CPD and were not ready to quit in the next month were randomized to receive one of three brief telephone based interventions to prompt quit attempts delivered over 1 month and then followed for 6 months. No medication was provided. Self-reported CPD was measured at baseline and at the conclusion of the 1 month harm reduction period. Whether participants obtained NRT or made a quit attempt was assessed at 6 monthly follow-ups. **RESULTS:** After controlling for condition, baseline CPD, and past use of NRT, a greater reduction in CPD from baseline to the end of month 1 predicted an increased odds that participants would obtain NRT by the 6-month follow-up (OR=1.12, 95% CI=1.07 to 1.18). Among those who did not reduce CPD ($n=278$), 8% obtained NRT during the follow-up period. In contrast, 18% of those who reduced 1-24% CPD ($n=126$), 25% of those who reduced 25-49% CPD ($n=114$), and 38% of those who reduced $>50\%$ CPD ($n=42$) obtained NRT during the follow-up period. We did not determine how much NRT use was for quitting vs continued reduction or temporary abstinence. However, among those who obtained NRT, 72% made a quit attempt that lasted ≥ 24 hours. **CONCLUSIONS:** Reducing nicotine levels of cigarettes may increase the use of NRT.

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POS1-163

EFFECTIVENESS OF TRAINING GENERAL PRACTITIONERS IN DELIVERING THE "5A" OR "ABC" APPROACH FOR BRIEF STOP-SMOKING ADVICE DURING ROUTINE CONSULTATIONS: STUDY PROTOCOL OF A PRAGMATIC, CLUSTER RANDOMISED CONTROLLED TRIAL

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SIGNIFICANCE: According to clinical guidelines, general practitioners (GP) should routinely provide their smoking patients brief advice and offer help to quit tobacco. The delivery of such advice is traditionally based on the "5A" approach.

The alternative "ABC" approach has several potential advantages, but there is no evidence that it is more effective than usual care or at least as good as 5A in triggering quit attempts and increasing abstinence rates. The primary aim of the current study is to compare rates of quit attempts in smoking patients after routine consultation with GPs who have been trained in 5A or ABC or are delivering usual care. **METHODS:** A pragmatic 3-arm cluster randomised controlled trial is conducted in ~30 GP practices in the German Federal State of North Rhine-Westphalia in 2016/2017. GPs will be randomised to receive training in 5A, ABC or no training (usual care). Baseline data are collected in all consecutive smoking patients consulting their GP within 4 weeks following the training. The primary aim of the current study is to assess and compare rates of quit attempts in smoking patients at one month after a regular consultation with GPs who have been trained in either delivering 5A or ABC or who have received no training (usual care). Secondary aims are to assess and compare: (1) patient-reported rates of delivery of advice to quit during the consultation; (2) quality of the delivered advice; (3) satisfaction with the delivered advice; (4-6) patient-reported point prevalence abstinence rates at one, six and 12 months after consultation; (7) cost-effectiveness and cost-utility. **CONCLUSIONS:** If training GPs to deliver the ABC approach leads to an increase in quit attempts compared with usual care it would represent a promising alternative to 5A.

Ethics: The trial has been approved by the ethics committee of the Medical Faculty of the Heinrich-Heine-University Düsseldorf.

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POS1-164

THE INDIRECT EFFECT OF EMOTION REGULATION IN THE RELATION BETWEEN PSYCHOPATHOLOGY AND SMOKING COGNITIONS

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SIGNIFICANCE: Smoking prevalence is disproportionately high among individuals with mental illness, which may in part be motivated by an over-reliance on smoking to manage negative affect in a manner that becomes automatic, thereby contributing to greater nicotine dependence. In turn, smokers with mental illness may experience elevations in negative affect reduction, habitual, and addictive smoking motives and also expect that smoking will effectively alleviate distress. One underlying mechanism that may explain this phenomenon is difficulty in emotion regulation (ER), a transdiagnostic vulnerability characterized by maladaptive coping strategies. Specifically, elevations in aforementioned smoking cognitions may in part be explained by a more general deficit in emotion regulation skills. However, no studies to date have directly explored this possibility. The aim of the current cross-sectional study is to examine indirect effect of difficulty in ER in the relation between psychiatric status and smoking motives and outcome expectancies among daily cigarette smokers. **METHODS:** Participants were 347 daily smokers (51.3% male, $M_{age}=39.0$, $SD=13.3$) recruited to participate in a randomized controlled trial of a smoking treatment and anxiety management program. On average they reported smoking 17.8 cigarettes/day ($SD=9.1$) in the past week, for 20.7 years ($SD=13.2$), and evidenced moderate nicotine dependence ($M=5.5$, $SD=2.1$). Approximately 40.9% ($n=142$) met DSM-IV criteria for current Axis I. **RESULTS:** After covarying for sex, age, and heaviness of smoking, results showed a significant indirect effect of difficulty in ER in the relation between psychiatric status and habitual ($R_2=.17$, $df=5$, 337 , $F=14.09$, $p<.001$), addictive ($R_2=.14$, $df=5$, 337 , $F=11.17$, $p<.001$) and negative affect reduction ($R_2=.21$, $df=5$, 337 , $F=17.57$, $p<.001$) smoking motives as well as negative reinforcement expectations of smoking ($R_2=.18$, $df=5$, 334 , $F=14.82$, $p<.001$). **CONCLUSION:** These findings suggest that psychiatric status is related to specific smoking cognitions through its relation to poor ER. Despite limitations of cross-sectional study, these findings suggest that improving ER may reduce smoking cognitions in smokers with psychiatric condition that may underlie persistent smoking behavior.



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POS1-165

IMPLEMENTING A COMPREHENSIVE TOBACCO CESSATION PROGRAM AT AN ACADEMIC MEDICAL CENTER: CHALLENGES AND SUCCESSES

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SIGNIFICANCE: Tobacco use remains the number one preventable cause of morbidity and mortality and use remains especially high among psychiatric and cancer patients. We describe here the creation and expansion of a comprehensive tobacco cessation program in an addiction medicine clinic at an academic medical center, identifying barriers and facilitators to care. **METHODS:** The program intake process includes motivational interviewing and carbon monoxide breath testing. Those who enroll in the program receive 8 weekly smoking-cessation groups, consisting of mindfulness skills and pharmacotherapy education for smoking cessation. Key challenges have been a low clinician referral base and restrictive insurance/billing. Facilitators include an intramural innovations grant from our institution's Cancer Center, development of an electronic referral system, and student intern engagement for outreach and education to referring providers. **RESULTS:** The program, created in December 2014, received a steady average of about 2 referrals per month during 2015, increased to 7 per month for Jan-Feb 2016, and then to over 8 per month, with a record 17 referrals in June 2016. The increase in referrals has been driven predominately by Cancer Center patients; however, this has resulted in only a slight increase in the number of initial intake and group visits due mainly to barriers of insurance benefit coverage and distance from clinic. Desire to quit is moderate-to-high (7.2 out of 10), while confidence (6.6/10) to quit is lower. Once patients enter a cessation treatment group (N=37), retention has been high: 92% return for at least a second group, and over half attend at least 6 groups. At intake, patients report smoking an average of 13.1 cigarettes per day (SD=7.9) for 32 years (SD=16.9), with moderate nicotine dependence (FTND M=4.6, SD=2.3); 47% reported having a psychiatric history. Though 42% tried e-cigarettes in the past, all but one discontinued; many cited faulty devices as the reason for returning to tobacco cigarettes. **CONCLUSIONS:** Data from this implementation project assists others in translating existing evidence-based tobacco cessation practices into a real-world academic medical center setting. We identify methods of increasing future enrollment, from increasing remote contact through telephone and telehealth and addressing financial barriers to care.

FUNDING: Stanford Cancer Center: Clinical Innovation Fund

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POS1-166

ELECTRONIC NICOTINE DELIVERY DEVICE (ENDD) USE AMONG PEOPLE WITH ANXIETY DISORDER IN KUALA LUMPUR

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SIGNIFICANCE: Smoking among people with mental illness is much higher compared to the general population, however, there is little information about the use of electronic nicotine delivery devices (ENDD) in this same population. In Malaysia, smokeless tobacco use which included ENDD rose from 1.4% in 2011 to 10.4% in 2015 in the general population. There is little information however on the use of ENDD among people with mental illness despite being more dependent to nicotine and at higher risk for health harms. This study therefore attempts to investigate the awareness and use of ENDD in people with anxiety disorders in Kuala Lumpur. **METHOD:** This study was a subset of a bigger cross-sectional study investigating the prevalence of smoking in people with anxiety disorders and its associating factors conducted in the largest public hospital in Kuala Lumpur. Socio-demographic,

anxiety and smoking variables were collected at the outpatient psychiatric clinic. Those able to converse in Malay and English, diagnosed to have anxiety disorder based on the MINI interview rated questionnaire were included, whereas those unwilling to consent and unwell were excluded. Analysis was conducted using SPSS and ethics was obtained from the National Medical Research Register. **RESULTS:** 150 people were recruited into the study. 52.7% were males, single (69.3%), employed (59.7%) and earned < RM2000 (54%). 56.7% of the participants were < 50 years of age. The most common diagnosis was panic disorder without agoraphobia (55.1%). 66% with anxiety disorders were aware of ENDD. 10.7% reported ever using an ENDD and 2.7% reported using it within the last 30 days. Amongst those who smoked, 62.5% had used an ENDD compared to those who were non-smokers. **DISCUSSION:** The awareness of ENDD in people an anxiety disorder was high. An explanation was the "successful advertisement" of ENDDs in local forums, social media and print news. The disproportionate number of ENDD users in smokers with anxiety compared to non-smokers might be attributed to dual use, however, this information was missed during data collection as the main study was not aimed to investigate ENDD use at length. The greater use of ENDD might provide an opportunity to reduce harm should ENDD be safe for use and strictly regulated. The prevalence of 10.7% ENDD use in those with anxiety is similar with the general population. This lower than expected rate is similar with other studies in Malaysia comparing between general and mental health populations smoking rates compared to international data and warrants further investigation.

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POS1-167

EXAMINING PREGNANT SMOKERS' INTEREST IN USING ELECTRONIC NICOTINE DELIVERY SYSTEMS, SMOKING CESSATION MEDICATIONS, AND NICOTINE REPLACEMENT DURING AND AFTER PREGNANCY TO REDUCE OR QUIT SMOKING.

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SIGNIFICANCE: Research suggests that pregnant smokers believe electronic nicotine delivery systems (ENDS) may be successfully used for smoking reduction or cessation, but that they are unsure about potential harm to their baby, so it is unclear if they are using or interested in using ENDS for smoking cessation or reduction during pregnancy. The purpose of the present study was to assess pregnant smokers' use and attitudes regarding ENDS, smoking cessation medications, and nicotine replacement therapy (NRT) during and after pregnancy. **METHODS:** A convenience sample of 86 pregnant smokers (65.9% White; mean age = 28) were recruited from a high risk pregnancy clinic. Each participant completed an anonymous survey and an exhaled CO measurement. The survey assessed their attitudes and beliefs toward medication, NRT, and ENDS as methods for smoking cessation or reduction during and after pregnancy. Data was examined using Pearson chi squares. **RESULTS:** Participants had significantly reduced their cigarettes per day from 17.5 to 8.6 since becoming pregnant ($p < .05$), with 40% reporting trying to quit smoking. Despite few participants (5.8%) reporting current ENDS use, the majority of the sample expressed an interest in vaping both during (50.6%) and after pregnancy (53.5%) in order to quit or reduce smoking. Compared to those who had never vaped, those who had ever vaped (62.4%) were significantly more interested in vaping both during (60.4% vs 35.5%) and after pregnancy (64.2% vs 37.5%; $p < .05$). Participants who had ever used any form of NRT (56.9%) were significantly more interested in using NRT both during (61.2% vs 16.7%) and after pregnancy (57.1% vs 25%; $p < .01$). Few participants had ever used a smoking cessation medication (10.6%) and few were interested in using them during (11.8%) or after pregnancy (20.9%). **CONCLUSIONS:** Pregnant women are interested in using ENDS and NRT for smoking cessation. In general, they are more interested in product use after pregnancy than during pregnancy, and are more interested in using products they have used previously.

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POS1-168

DEPENDENCE BEHAVIORS AND NICOTINE EXPOSURE IN LARGE AND SMALL CIGAR SMOKERS

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BACKGROUND: Cigars are capable of variable nicotine delivery, and therefore cigar smoking may lead to nicotine dependence and withdrawal symptoms, and increase nicotine exposure; however, few clinical laboratory studies have examined these aspects of cigar smoking. **METHODS:** We conducted a clinical study to determine how cigar type, former cigarette smoking, and self-reported smoke inhalation affect dependence and nicotine exposure following ad libitum use of own brand cigars. Participants (n=77) were recruited to provide equal representation in three groups: large vs. small cigars, primary vs. secondary cigar smokers, and self-reported inhalation vs. no inhalation. Participants provided two cigars: one was analyzed for nicotine content and weight, and the other was smoked ad libitum up to one hour in a laboratory setting. Dependence and associated behaviors were measured with existing and modified behavioral scales. Furthermore, we investigated smoking topography and biomarkers of exposure, including plasma nicotine and exhaled carbon monoxide, during cigar exposure. **RESULTS:** Cigar smokers showed symptoms of nicotine dependence, and cigar smoking alleviated withdrawal symptoms and significantly increased plasma nicotine levels. In multiple regression analyses, dependence, craving/withdrawal symptoms (and their reduction), and expired CO were associated with self-reported inhalation behaviors. In contrast, cigar type was related to topography measures (i.e., estimated nicotine intake, smoking duration). We found significant differences for plasma nicotine boost such that small cigar smokers and self-reported inhalers had greater increases in plasma nicotine concentrations than large cigar smokers and non-inhalers, respectively. **CONCLUSIONS:** Our findings offer additional evidence about the risks of cigar smoking, and underscore the importance and necessity of FDA's regulation over cigar products in order to mitigate their effects on the public health.

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POS1-169

THE ROLE OF VIRTUAL REALITY ON SMOKERS' MOTIVATION: A PILOT STUDY

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BACKGROUND: The number of smokers and tobacco-related diseases are increasing all over the world. Deaths related to smoking were 83,000 only in Italy in 2015. Stop smoking is not easy and require motivation and effort. The aim of our study is to compare the efficacy of different motivational stimuli to quit smoking. **METHODS:** We recruited a number of 12 smokers not motivated to quit, 6 males and 6 females, aged between 20 and 30 years, with a mean of 11,3 cigarettes smoked per day and a mean of 9 years of smoking. We used a VAS scale to quantify the motivation to stop smoking at baseline and after three different kind of stimuli: show the typical package of cigarettes with cruel images of tobacco-related diseases; a video with cruel images of tobacco-related diseases; a virtual reality session inspired to development of tobacco-related diseases. Stimuli administration was randomized. We compared the motivation to quit smoking between the three categories of stimuli and between the stimuli and baseline. Statistical analysis was performed using GraphPad Prism 6.0. One-way analysis of variance (Anova) was used to compare the means between the categories and determines whether any of those means were significantly different from each other. **RESULTS:** Compared to baseline, all the three categories were highly significant in increasing the motivation to stop smoking ($p < 0.0001$). There was not a statistically significant difference between the package and the video. The difference between the package and the virtual reality was highly significant ($p < 0.001$). The difference between the video and the virtual reality was statistically significant ($p < 0.05$). **CONCLUSION:** The use of a virtual motivational stimulus would appear to greatly increase the motivation to quit smoking in this group of smokers unwilling to quit. In this group of smokers not motivated to quit, our specific virtual reality session

seems to be the most effective method to improve motivation to quit, compared to antismoking images or videos.

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POS1-170

NICOTINE REPLACEMENT THERAPY (NRT) IN RESIDENTIAL SUBSTANCE ABUSE TREATMENT: A CROSS SECTIONAL SURVEY EXAMINING ATTITUDES AND PREDICTORS OF FUTURE INTENTIONS TO USE NRT

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SIGNIFICANCE: Smoking rates continue to be extremely high amongst people accessing residential substance abuse treatment. Nicotine Replacement Therapy (NRT) is recommended for this population group as a frontline smoking cessation tool. However, previous research suggests that NRT is under utilized in substance abuse treatment settings. To improve the use of NRT amongst people attending substance abuse treatment it is important that the factors influencing smokers' decisions to use NRT are understood. The study aimed to (1) examine the smoking cessation strategies used by participants in previous quit attempts, (2) examine the participants attitudes towards NRT (i.e. safety concerns and perceived efficacy), and (3) examine the predictors of participants intentions to use NRT to support future quit attempts. **METHODS:** Participants completed a cross sectional survey that examined their smoking behaviours, previous experiences using smoking cessation strategies, attitudes and beliefs regarding NRT, and intentions to use NRT as part of future quit attempts (N = 218). All participants were attending residential substance treatment provided by We Help Ourselves, a large provider of specialist alcohol and other drug treatment in Australia. **RESULTS:** The majority of participants (98%) reported that they had smoked regularly in their lifetime, and 89% were current smokers. Forty-five percent of the current smokers reported that they had previously used NRT to support a quit attempt, with 54% reporting that they intended to use NRT to support a future quit attempt. Participants' perceptions of the safety of NRT or perceived drawbacks of NRT were not related to future NRT use. However, participants were more likely to report that they would use NRT to support their future quit attempts if they had previously used NRT and perceived NRT to be effective ($R^2 = 35\%$, $\chi^2(5) = 35.59$, $p = .00$). **CONCLUSIONS:** Improving the use of evidence based smoking cessation strategies within substance abuse treatment continues to be a priority. To enhance the use of NRT, future research should consider strategies that help to improve participants' positive perceptions regarding the efficacy of NRT.

FUNDING: Cancer Institute NSW Early Career Research Fellowship.

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POS1-171

USING AN E-CIGARETTE IS LIKE EATING TOFU WHEN YOU WANT MEAT

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SIGNIFICANCE: With the exception of menthol, in 2009 the use of flavors in cigarettes was banned. However, use of flavors in e-cigarettes continues to be permitted and is widespread. While there has been research on attitudes toward and the behavioral effects of flavored tobacco products in youth, further research is needed across all age groups. **METHODS:** The purpose of this qualitative study was to explore the attitudes, beliefs and use of e-cigarettes and to understand the role of flavors and their impact on tobacco smoking cessation efforts among adult e-cigarette users. Twenty in-depth, semi-structured phone interviews were conducted with eleven women and nine men living in California, their ages ranged from 25-60 with a mean age of 38 years. **RESULTS:** The participants reported the primary reasons for using e-cigarettes were for convenience, cigarette smoking cessation, decreased social isolation, and as a way to circumvent no-smoking policies: "You could sneak one [e-cigarette] on an airplane or bus but you can't sneak a cigarette anywhere." However, e-cigarette use was experienced as a "gateway



to relapse... I hadn't been smoking cigarettes for months, and I was having this really strong urge, and I just walked into this 7/11, and bought one of those things [e-cigarettes], and smoked them. But the next day, I bought a pack of cigarettes." All participants used e-cigarettes with nicotine but found them less "satisfying" than cigarettes: "When I'm stressed, I'm going to smoke a cigarette... it's as if the cigarettes... make you feel more fulfilled." One man stated: "An e-cigarette is like eating tofu when you really want meat." The preferred e-cigarette flavors were tobacco and fruit flavors, and the most common reasons for using flavors were to satisfy cigarette and food cravings. Because of the belief that e-cigarettes "could be used anywhere", the most common pattern of use was described as "constant" or "nonstop vaping." As the participants became more nicotine dependent, they graduated to more powerful vaporizers, thus increasing their nicotine intake per hit. Reducing percent of nicotine in e-liquid only led to more intense vaping: "It's more addicting [than cigarettes]." **CONCLUSION:** A consistent narrative thread was initial optimism about smoking cessation, leading to relapse of cigarette smoking with feelings of betrayal, shame, and regret. E-cigarettes initially addressed smoker's problems of guilt about smoking cigarettes and social isolation but over time, they experienced a "deeper nicotine addiction" and a "greater sense of failure."

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POS1-172

TRAINING FOR SUSTAINING: BUILDING SUSTAINABILITY INTO PRACTICE-BASED TOBACCO CONTROL INTERVENTIONS

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BACKGROUND: Sustainability is a hot-button issue in developing, implementing, and studying practice-based health interventions. CEASE (Clinical Effort Against Secondhand Smoke) uses evidence-based tools and techniques to promote sustainability, such as building CEASE into the office flow, adapting CEASE to the practice, securing funding for tobacco control efforts, and increasing staff capacity related to tobacco control. Practices are trained, at a distance, to routinely address family tobacco use in a sustainable manner. Training consists of structured phone calls, phone and email support based on performance metrics, an online AAP Maintenance of Certification module, and a reference manual. **OBJECTIVE:** To identify the issues and solutions related to sustaining a tobacco control intervention from the perspective of pediatricians and pediatric office staff. **METHODS:** As part of a cluster randomized clinical trial in ten pediatric practices within five US states, we collected data by recording the training sessions with pediatric office staff and pediatricians. The data was coded and analyzed qualitatively. **MAIN RESULTS:** During these calls, pediatricians and staff were encouraged to reflect on implementing and sustaining CEASE. Trainees presented practice-specific ideas for improving staff capacity, adapting the CEASE intervention, building CEASE into the office flow, and changing the EMR to document family tobacco use and exposure. **CONCLUSION:** By building the sustainability concept into the first CEASE training calls, pediatric offices thought of CEASE as a way of providing care, not a short-term program. This laid the groundwork for addressing how to sustain CEASE throughout the study. **POLICY RECOMMENDATIONS:** Family tobacco control interventions should address sustainability before changes are made to practice flow and care. By addressing sustainability early, practices can improve the chances of sustaining family-centered tobacco control in pediatric settings.

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POS1-173

"THANK YOU! WITH YOU, QUITTING IS EASIER": TEXT-MESSAGING INTERACTION BETWEEN LATINO SMOKERS AND THEIR CESSATION COUNSELOR

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BACKGROUND: The potential of text-message smoking cessation interventions to increase intra-treatment support, a determinant of cessation, is still to be exploited. This study looks at the unique text-based interactions between smokers and their counselors and the association of these interactions with their quit-rates. **METHODS:** Community health-workers recruited 50 smokers to participate in Latino Kick Buts, a 28-week smoking cessation text-message program, structured in 5 progressive stages that allowed bi-directional exchange of text-messages including keyword-driven messages and text-message interaction with a smoking cessation counselor. Self-efficacy, intra-treatment support and smoking cessation were assessed at Week 12 using the Working Alliance Inventory, Confidence Inventory and self-reported 7-day point abstinence. We conducted a content analysis of messages sent by participants to their counselor and categorized them into 9 categories (reasons to quit, NRT support, self-efficacy, strategies to quit, education, smoking status, well-being, triggers and gratitude). **RESULTS:** Participants sent 1,730 messages to their counselor; 4% sent no messages, 30% less than 10 (low interaction), 54% between 10 and 100 (medium) and 12% more than 100 (high). Participants with higher levels of interaction with their counselor reported stronger intra-treatment support and self-efficacy ranging from 0% for those who did not interact at all, up to 100% and 75% respectively among high interaction participants. Moreover, participants with higher intra-treatment support and self-efficacy reported higher quit-rates. Cessation rate at Week 12 was 0% for those who did not interact with the counselor, 20% for those with a low interaction, 33.3% for those with medium and 50% for those with a high interaction. The most common themes were Gratitude (31.1%) and self-efficacy (19.4%) e.g. "you have made me strong enough to say NO to cigarettes". **CONCLUSION:** Our findings suggest a positive association between high levels of text-based interaction with a counselor and smoking cessation. Self-efficacy and intra-treatment support promoted by the counselor might mediate this association.

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POS1-174

TREATMENT ATTRITION: ASSOCIATIONS WITH NEGATIVE AFFECT SMOKING MOTIVES AND BARRIERS TO QUITTING AMONG TREATMENT-SEEKING SMOKERS

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Pre-treatment attrition and perceived barriers for quitting are clinically important processes involved in early phases of quitting smoking (Ahluwalia et al., 2002; Macnee & Talsma, 1995). However, little is known about constructs that may contribute to these processes such as negative affect reduction smoking motives. Negative affect reduction smoking motives may be particularly important to examine in relation to these processes given extensive research indicating that such smoking motives contribute to and maintain maladaptive smoking behavior, including greater nicotine dependence (Smith et al., 2010), fewer quit attempts (Bacio et al., 2014), and more severe withdrawal-related problems during a quit attempt (Farris et al., 2015). To address this gap, the current study evaluated the association between negative affect reduction smoking motives and pre-treatment attrition as well as perceived barriers for quitting among a sample of 425 treatment-seeking smokers (48.5% female; $M_{age} = 37.69$; $SD = 13.61$) enrolled in a smoking cessation study examining the efficacy of a novel smoking cessation treatment relative to a standard smoking cessation treatment. Results indicated that greater negative affect reduction smoking motives was associated with an increased likelihood of treatment initiation ($OR = 1.77$, $CI = 1.06, 2.95$). Additionally, negative affect reduction smoking motives was associated with greater perceived barriers for cessation among pre-treatment drop-outs ($b = 5.02$, $SE = 1.96$, $p < .05$) and treatment initiators ($b = 1.90$, $SE = 0.91$, $p < .05$). The current findings identify smokers with greater motivation to smoke to manage their negative affect as a particularly vulnerable subset of smokers. Indeed, while these smokers may be more likely to

initiate treatment, without specialized care to address their personal needs, their likelihood of quit success may be significantly diminished. Clinically, this initial investigation provides evidence for the possible utility in addressing negative affect reduction smoking motives during early stages of quitting and has the potential to inform the development of personalized, early stages of quitting interventions for smoking cessation.

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POS1-175

METHODOLOGICAL CONSIDERATIONS FOR IDENTIFYING LIKELY USERS OF E-VAPOR PRODUCTS FOR AMBULATORY CLINICAL STUDIES

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The purpose of this study was to assess the utility of pre-study product trial and a purchase interest questionnaire in identifying likely users of various e-vapor products [EVP]. We also investigated adherence to study protocol instructions to use a minimum number of e-vapor cartridges per day [eCPD]. Subjects (healthy adult smokers, > 10 cigarettes per day [CPD]) participated in a 4-day product trial period on 4 EVPs (Menthol and Classic flavors at 1.5% [P15] and 2.5% [P25] nicotine by weight, 3.7 volt battery). Subjects (n=226) that indicated "probably" or "definitely" would buy the test products after product trial were randomized into a 5-group study: Control Group (CG, n=25. Continued smoking), Test Group1 (TG1 n= 51, P15 ad lib use), TG2 (n=52, instructed to use P15 > 1 eCPD or > 2 if CPD >18), TG3 (n=49, P25 ad lib use) and TG4 (n=49, instructed to use P25 > 1 eCPD). Subjects in the TGs were allowed to smoke cigarettes *ad libitum*. Biomarkers of exposure (BOEs: blood COHb, urine NNAL) were collected at baseline and end of study (21 days). On average, by the end of the study, subjects used 0.8 [TG1], 1.3 [TG2], 0.7 [TG3] and 1.1 [TG4] eCPD and their CPD change from baseline [TG1: -36.1%, TG2: -35.8%, TG3: -28.9%, TG4: -32.2%] was significantly different compared to the CG [+0.8%]. Many subjects reported < 1 eCPD [TG1: 71%, TG2: 28%, TG3: 85%, TG4: 43%] and <20 puffs per day [TG1: 38%, TG2: 22%, TG3: 34%, TG4: 36%]. Changes in BOEs were not statistically significant between TGs and CG. Overall, providing instructions to use a minimum number of cartridges appears to have only a modest impact on number of eCPD (ad libitum vs. instructed to use eCPD: 0.8 vs 1.3 for P15 and 0.7 vs. 1.1 for P25). Although subjects reported they "probably" or "definitely" would buy the EVPs, usage was relatively low under these study conditions. Our results suggest that it might be difficult to identify likely users of a test EVP based on limited product use. Additional methods may be needed to find adult smokers that will use EVPs on a consistent basis.

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POS1-176

COMPARING SMOKING TOPOGRAPHY OF USUAL BRAND CIGARETTES IN PREGNANT AND NON-PREGNANT SMOKERS

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SIGNIFICANCE: Most female smokers are unable to quit when they find out they are pregnant. Instead, most report reducing their cigarettes per day (CPD) by ~50% and making this reduction all at once shortly after learning of pregnancy. In the general population, similarly abrupt reductions in CPD are associated with compensatory smoking (i.e., changes in smoking intensity to maintain a desired blood-nicotine level). If pregnant women engage in compensatory smoking, they may expose themselves and their offspring to the same level of toxicants despite reporting reductions in CPD. To our knowledge, no studies have examined whether pregnant smokers engage in compensatory smoking. In the present study, smoking topography data were collected from pregnant smokers and compared to

topography data from non-pregnant female smokers who previously participated in a parallel study in our lab. **METHOD:** All participants completed a screening session, including questions about their tobacco use. Pregnant smokers reported reducing their smoking by 43% (22.4 to 12.9 CPD) after learning of pregnancy. All participants presented to the experimental session with a >50% reduction in screening carbon monoxide (CO) levels and then smoked one of their usual brand cigarettes ad lib through a Borgwaldt © CReSS Desktop Smoking Topography device. This device assessed number of puffs, puff duration, inter-puff interval, puff volume and maximum flow rate. CO was also measured every 15 min for 60 min after smoking to calculate CO boost. **RESULTS:** The two groups did not differ on any demographic or smoking characteristics at screening. Preliminary analyses suggest that none of the smoking topography parameters differ between pregnant smokers (n = 17) and non-pregnant smokers (n = 91). However, pregnant smokers have a significantly smaller CO boost after smoking one cigarette compared to non-pregnant female smokers. **CONCLUSIONS:** Pregnant smokers appear to smoke cigarettes similarly to non-pregnant smokers. It does not seem that pregnant smokers are smoking cigarettes in a way that may cause more toxicant exposure per cigarette compared to non-pregnant female smokers.

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POS1-177

DEVELOPMENT OF A SELF-HELP SMOKING CESSATION INTERVENTION FOR HISPANIC/LATINO SMOKERS

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Hispanics/Latinos make up 17% of the US population, and in some sub-ethnic groups smoking prevalence rates are over 30%, exceeding rates of non-Hispanic Whites. However, there is a dearth of evidence-based smoking-cessation interventions for Hispanic/Latino smokers. Thus, we "transcreated" (translated with cultural adaptation) our existing validated, English-language "Stop Smoking for Good" self-help smoking cessation intervention for Spanish-speaking smokers. Focus groups were conducted to assess reactions to the existing English-language materials (10 booklets and 9 pamphlets). Specifically, we aimed to identify culturally relevant smoking cessation barriers as well as elements that would increase acceptability. Focus group participants (N=23) were bilingual Hispanic/Latino smokers from diverse sub-ethnic groups. Familism, defined by the sense of attachment, loyalty and collective well-being among the nuclear and extended family, emerged as a key theme. Thus, we developed an additional booklet to provide family and friends with tools necessary to support their loved one's quit attempt. Other findings included: religion/spirituality as coping mechanisms; coffee as a key trigger for smoking; and challenges faced by immigrants that serve as stressors and cues to smoke. Format change suggestions included preferences for color images and a bright color palette, and interactive activities. Focus group findings informed the development of a Spanish-language version of the booklets entitled, "Libre del cigarrillo, por mi familia y por mí." Subsequently, learner verification interviews (N=20) with Spanish-speaking Hispanic/Latino smokers assessed the appeal and acceptability of the revised content and visual modifications. Findings included the need to: expand the sections on cessation aids, include additional culturally salient daily stressors; further emphasize financial and social benefits of quitting smoking; and describe ways in which family and friends can support the quit attempt. Visual elements of the materials were well received. The final version of the Spanish-language materials will be tested in a randomized controlled trial.

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POS1-178

RELATIONSHIP BETWEEN ALCOHOL USE SEVERITY IN SMOKERS MAKING A QUIT ATTEMPT AND INTERVENTION BY PRACTITIONERS IN PRIMARY CARE SETTINGS

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SIGNIFICANCE: Tobacco and alcohol use present multiplicative risk for aerodigestive cancers. There is strong evidence that reducing alcohol consumption improves smoking cessation outcomes and decreases cancer risk. Screening, Brief Intervention, and Referral to Treatment (SBIRT) is a proven approach for reducing risky alcohol use. In a smoking cessation program, the proportion of practitioners intervening with patients who engage in risky alcohol consumption is unknown. **METHODS:** We implemented a clinical decision support system (CDSS) in 221 primary care sites across Ontario, Canada. The CDSS prompts health care practitioners to deliver SBIRT to participants of a smoking cessation program who report risky alcohol use. Risky alcohol use is defined as drinking above the Canadian Cancer Society's low-risk drinking guidelines or the Alcohol Use Disorders Identification Test cut-off. We measured rates of SBIRT delivery by tracking the number of practitioners offering an educational resource as a means for intervention to smokers drinking at risky levels. **RESULTS:** In four months, 3,889 patients have been screened for risky alcohol use; 1,472 patients (38%) reported engaging in risky alcohol use, of which approximately 93% were daily smokers. However, only 49% of individuals drinking at risky levels were offered an educational resource by their health care practitioner. Participants who scored above the AUDIT cut-off (indicating high risk of alcohol dependence) were significantly more likely to be offered an educational resource than participants engaging in lower risk drinking (67% vs. 48%, $p = 0.004$). There was no significant association between practitioners offering educational resources and baseline smoking status or self-reported lifetime history of cancer diagnosis. **CONCLUSIONS:** The use of SBIRT in primary care settings offering a smoking cessation program provides a critical opportunity for health care practitioners to implement a low-burden, cost-effective intervention to reduce cancer risk associated with alcohol and tobacco use. Further education of practitioners is needed to intervene with smokers drinking at any level above recommended guidelines.

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POS1-179

THE CIGARETTE PURCHASE TASK: EXAMINING DIFFERENCES IN THE REINFORCING VALUE OF CIGARETTES IN PREGNANT SMOKERS WITH VS. WITHOUT DEPRESSIVE SYMPTOMS

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SIGNIFICANCE: Research has documented strong relationships between depressive symptoms and peripartum smoking. Heavier smoking predicts greater likelihood of depressive symptoms and depressive symptoms predict greater likelihood of smoking during pregnancy. The Cigarette Purchase Task (CPT) is a behavioral economic task that assesses the relative reinforcing value of cigarettes, which, of course, influences likelihood of quitting. The present study represents an initial assessment of whether the CPT provides insight into how demand for cigarette smoking varies in relation to depressive symptoms during pregnancy. **METHODS:** 86 pregnant cigarette smokers enrolled in an ongoing smoking-cessation trial completed the BDI-1A and the CPT at study intake. Relationships between levels of depressive symptoms (established BDI categories: minimal, mild, moderate, severe) and the five CPT indices (Intensity, Omax, Pmax, Breakpoint, Elasticity) were examined using Pearson correlations. **RESULTS:** Intensity (consumption levels when cigarettes are free) was the only CPT index that was significantly correlated with BDI scores ($r = .26$, $p < .05$). Examining that relation by BDI severity categories revealed that it was severe depressive symptoms (BDI score ≥ 30) that contributed the most to this relationship with Intensity ($r = .34$, $p < .01$). **CONCLUSIONS:** The one discernible difference in the reinforcing value of cigarettes between pregnant smokers with varying levels of depressive symptoms was Intensity. These results are in agreement with previous findings from a study using the CPT to compare the relative reinforcing effects of cigarettes among smokers with schizophrenia versus smokers without mental illness where Intensity again was the one CPT

index that differed between them. These results suggest that the reinforcing value of cigarettes in those with and without mental illness may differ mostly in Intensity of demand, a measure of unconstrained consumption and not in how these populations respond to constraints on smoking (e.g., taxes). Further research comparing smokers with versus without other psychiatric conditions will be important to assess the generality of this observation.

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POS1-180

WHAT ARE THE TOP HEALTH PRIORITIES AMONG SMOKERS HOSPITALIZED WITH AN ACUTE CARDIAC CONDITION?

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SIGNIFICANCE: Most smokers want to quit, but smoking cessation rates after an acute cardiac condition have not improved over the past decade. We sought to better understand ways in which clinicians can aid smokers to quit permanently after a cardiac event or procedure. **METHODS:** We administered a 29-item questionnaire to current smokers hospitalized with a myocardial infarction (MI), percutaneous coronary intervention (PCI), coronary artery bypass graft and/or valve procedure, between October 2015 and May 2016. The questionnaire assessed patients' top priorities for health behavior change following discharge and their perceptions of what would best help them quit smoking. **RESULTS:** Of the 105 patients approached, 81 (77%) patients completed the survey (68% male, 57 ± 10 years, 64% with a high school degree or less, 78% with MI and/or PCI). Overall, 80% of patients reported interest in quitting smoking and 93% ranked smoking cessation as their greatest health change priority. This far surpassed all other suggested behavior changes, including: consistently taking prescribed medications, attending cardiac rehabilitation (CR), following a healthy diet, losing weight, and attending all doctor appointments. In general, patients felt that smoking cessation medications (43%), attending CR (41%), and starting an exercise program (35%) would increase their likelihood for a successful cessation attempt although 16% of patients felt as though nothing would help them quit and strongly disagreed that their smoking behavior was related to their cardiac condition. Even though 81% of patients reported interest in various smoking cessation aids, only 38% were prescribed some form of smoking cessation medicine at discharge by their physician. **CONCLUSIONS:** The vast majority of hospitalized smokers with cardiac disease want to quit smoking, desire help in doing so, and rate cessation overwhelmingly as their highest health behavior priority. The period following an acute cardiac event appears to be a time of great receptivity to smoking cessation intervention but disappointingly low rates of prescriptions for smoking cessation medications on discharge following a cardiac event.

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POS1-181

PRIMARY AND SECONDARY OUTCOMES FROM A STEPPED WEDGE RANDOMISED CONTROLLED TRIAL OF A SMOKING INTERVENTION WITHIN RESIDENTIAL SUBSTANCE ABUSE TREATMENT.

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SIGNIFICANCE: Cardiovascular disease and cancer are leading causes of mortality for people with a history of alcohol or other substance use disorders. Smoking

and other unhealthy lifestyle behaviours are the primary behavioural risk factors that contribute to the development of these diseases. In addition to addressing problematic alcohol use, there is the potential for substance abuse treatment services to also address smoking. Healthy Recovery is an 8-session group-based intervention that primarily targets smoking, but also addresses diet and physical inactivity as part of a healthy lifestyle approach. The presentation will report the primary smoking outcomes from the study. It will also report secondary analysis examining perceived self-efficacy and behavioural importance as potential psychological mechanisms underlying the Healthy Recovery group intervention. METHODS: The project was conducted as a stepped wedge randomised controlled trial (N = 172; 89% follow-up at 8 months). Participants were attending residential alcohol and other substance abuse treatment provided by The Australian Salvation Army. RESULTS: Participants completing Healthy Recovery had a significantly lower rate of cigarettes smoked per day at 2 months follow-up than people in the control group (average of 5 cigarettes/day lower; $p=0.001$). At 8 months there was still a statistically significant difference between the two groups ($p=0.05$). When compared to treatment as usual, people completing Healthy Recovery demonstrated higher quit rates post intervention (18% v 2%). At post-intervention, participants in the treatment condition (Healthy Recovery) rated themselves as higher on measures of behavioural importance and self-efficacy to quit smoking. Perceived self-efficacy was found to mediate the relationship between condition and number of cigarettes consumed at follow-up. CONCLUSIONS: People attending substance abuse treatment are willing to engage in healthy lifestyle interventions. Interventions focusing on increasing individual's self-efficacy to quit smoking during substance abuse treatment may lead to reductions in smoking. Future research should examine the implementation of Healthy Recovery within tobacco-free residential treatment.

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POS1-182

EVALUATING THE UTILITY OF SUBJECTIVE EFFECTS FOR PREDICTING ENROLLMENT IN AND COMPLETION OF A CLINICAL TRIAL OF A SMOKELESS TOBACCO PRODUCT

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SIGNIFICANCE: Subjective effects of drugs, representing pharmacological and non-pharmacological effects, have been shown to be associated with future use and abuse. Measuring subjective effects, such as liking, satisfaction, and aversion, is crucial to gaining an understanding of consumer perception of tobacco products. This study examined the predictive validity of subjective drug and product effects with respect to product adoption. METHODS: A total of 151 individuals were enrolled in Minneapolis, Columbus, and Buffalo. Participants were shown two snus products (Camel Snus Winterchill and Camel Snus Robust), asked to try each of the products for 5 minutes and rate using the Product Evaluation Scale (PES) and Drug Effects Questionnaire (DEQ), and select the preferred product. After a one-week use period, those who used at least 2 units of Camel Snus per day (or at least 14 pouches total) were eligible to enroll in the Clinical Trial Phase. Key outcomes for this study were flavor selection, extent of product use, and Clinical Trial completion. RESULTS: We noted no relationships between participant characteristics such as sex, age, prior smokeless use, or baseline CPD and PES or DEQ scores with any of these outcome variables. Winterchill was far more popular, and participants who selected Winterchill (N=110) tended to have higher scores on that product in initial ratings relative to Robust. For the smaller number who preferred Robust (N=41), initial ratings for Robust tended to be higher than those for Winterchill. There was no significant difference between Winterchill and Robust preference in amount of snus used per day (3.3 vs 2.8 units per day, $p=.720$) and subjective effects were weak predictors of product use. No differences in trial completion were observed between those who selected Winterchill or Robust (22% vs. 28%, $p=.530$). Regardless of product, it appears that PES and DEQ ratings were uniformly poor predictors of trial completion. CONCLUSIONS: Findings indicate that while subjective effects predict product preference in the short-term, they did not predict extent of use or completion of the trial, suggesting that these initial measures have limited implications for long-term behavior.

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POS1-183

THE EFFECTS OF ACUTE TOBACCO ABSTINENCE ON GAMBLING BEHAVIOR AMONG GAMBLERS WHO SMOKE

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SIGNIFICANCE: Disordered gambling (DG) afflicts approximately 3% of Canadians and often co-occurs with smoking. Rates of tobacco dependence among DGs as high as 60% have been found in recent studies. One possible influence of smoking in DG could be nicotine's reinforcement enhancing effects on other rewards. For instance, nicotine has been found to increase responding on a computer task to earn sensory rewards. Also, acute tobacco abstinence can result in reduced performance on tasks which are reinforced by money. Furthermore, smokers assigned to an 'abstinence' condition have been found to provide lower 'happiness' ratings for positive film clips than 'satiated' smokers. It's possible that similar processes may influence other reinforced behaviour such as gambling. The goal of this study was to examine if tobacco abstinence influences gambling-related reinforcement. METHODS: Regular video lottery terminal (VLT) gamblers who smoke were recruited for a two session within-subjects experiment where they were assigned to 'abstinent' and smoke-as-usual 'satiated' conditions. Participants were then asked to play a VLT which was pre-loaded with credits. Subjective craving was examined across conditions at multiple timepoints throughout the test session. In addition, VLT gambling variables such as average size of bets and amount of time spent gambling were recorded. RESULTS: To date, 13 male participants (mean age = 40.2 years; DGs = 10; mean FTND score = 9) have completed both abstinence and satiated conditions. Preliminary results for subjective craving suggest a trend toward significance ($p = .09$) for the interaction of condition X timepoint for the visual analog scale item 'crave gambling', with the satiated group experiencing higher craving following gambling but not the abstinence group. A significant difference was found for 'average amount bet' with higher wagers in the abstinent than in the satiated condition. No differences were found for total time or money spent gambling. CONCLUSIONS: Preliminary results suggest that tobacco abstinence may alter gambling-related craving and betting behavior. Implications of these findings for the treatment of comorbid addiction will be discussed.

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POS1-184

ARE DEPRESSIVE AND ANXIETY SYMPTOMS ASSOCIATED WITH HEAVY SMOKING OR HIGHER NICOTINE DEPENDENCE AMONG HIV-INFECTED SMOKERS IN RUSSIA?

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BACKGROUND: In the US, mental disorders are strongly correlated with heavy smoking. In Russia, few studies have explored this association in a general population or in an HIV-infected population, specifically. We examined the relationship between depressive symptoms and heavy smoking among smokers from two HIV-infected Russian cohorts. METHODS: We analyzed data from the Russia ARCH (Alcohol Research Collaboration on HIV/AIDS) and the LINC (Linking Infectious and Narcology Care) studies. We defined smokers as those who smoked > 7 cigarettes weekly. The main independent variable was depressive symptoms (CES-D score > 24); a secondary independent variable was high anxiety (STAI score > the median score, measured only in LINC). The primary outcome was heavy smoking, >20 cigarettes daily. A secondary outcome was moderate-high dependence on the Fagerstrom. Separate multivariable logistic regression analyses assessed associations between mental illness and each outcome, controlling for gender, age, education, income, alcohol dependence, study cohort and injection drug use. RESULTS: 449 of 609 (74%) potentially eligible participants were smokers and comprised the study sample. Overall, 35% reported depressive symptoms and 26% reported heavy smoking. In unadjusted analyses, a higher proportion of those with depressive symptoms (vs. those without) reported heavy smoking (33% vs. 22%, $p=0.015$) and moderate-high dependence (63% vs. 50%, $p = 0.005$). In multivariable analyses, depressive symptoms were not significantly associated



with either heavy smoking (AOR 1.2; 95% CI 0.7-2.0; $p=0.48$) or moderate-high nicotine dependence (AOR 1.5; 95% CI 0.9-2.4; $p=0.11$). Similarly, among the 148 subjects from LINC, anxiety was not significantly associated with heavy smoking or moderate-high nicotine dependence. **CONCLUSION:** Among Russian HIV infected smokers, depressive and anxiety symptoms were not significantly associated with either heavy smoking or higher levels of nicotine dependence. Future studies investigating the relationship between other mental disorders and smoking characteristics are warranted.

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POS1-185

RANDOMISED CONTROLLED TRIAL COMPARING NICOTINE REPLACEMENT THERAPY (NRT) PLUS BRIEF COUNSELLING AND BRIEF COUNSELLING ALONE ON SMOKING CESSATION IN PATIENTS PRONE TO LUNG CANCER USING BED FONT MICRO-SMOKERLYZER

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BACKGROUND: Tobacco use in any modality is the greatest preventable morbidity and mortality in developing world. Cessation interventions require an equal balance of pharmacotherapy and behavioural supportive care. The peer influence may drive people towards smoking, and interventions to re-channelize their addition through pharmacologic and non pharmacological approaches may pave the way in de addiction. Intensive behavioural support has been shown to be effective in inpatients with college students but is logistically difficult to deliver as a routine service to all smoking candidates. Less intensive counselling would be more suitable for widespread application. Studies of nicotine replacement therapy (NRT) in patients to date have been relatively small, and although suggestive of a beneficial effect, have not shown significant differences relative to placebo, results supported by a systematic review of the subject. We have therefore conducted a pragmatic open randomised controlled trial to determine whether a brief cessation counselling intervention suitable for widespread use, or the same counselling intervention given with NRT, is more effective than usual care in promoting smoking cessation. **METHODS:** Patients who were prone to lung cancer were randomised to receive either usual care (no additional advice at admission), counselling alone (20 minute intervention with written materials), or NRT plus counselling (counselling intervention with a 6 week course of NRT). Inclusion Criteria-Previous lung disease, a family history of lung cancer, Past cancer treatment, Lowered immunity, Previous smoking related cancers, Exposure to certain chemicals and radon gas. Continuous and point prevalence abstinence from smoking (validated by exhaled carbon monoxide <10 ppm) was measured at 3 and 12 months, and self-reported reduction in cigarette consumption in smokers was assessed at 3 and 12 months. **RESULTS:** 300 smokers were enrolled. Abstinence was higher in the NRT plus counselling group ($n=100$) than in the counselling alone ($n=100$) or usual care ($n=100$) groups. The difference between the groups was significant for validated point prevalence abstinence at 3 months (65%, 33%, 27% respectively, $p=0.045$) and at 12 months (27%, 16%, 14%, $p=0.03$). There was no significant difference between counselling alone and usual care, or in reduction in cigarette consumption between the treatment groups. **CONCLUSIONS:** NRT given with brief counselling to patients prone to lung cancer is an effective routine smoking cessation intervention.

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POS1-187

THE EFFECT OF CHILDHOOD ABUSE ON CIGARETTE SMOKING BEHAVIOR

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SIGNIFICANCE: Approximately 7.7 million Americans are affected by posttraumatic stress disorder yearly (National Institute of Mental Health, 2010), and research

has identified a positive relationship between smoking and trauma exposure (McCauley, Bloisnich, & Dichter, 2015). Furthermore, there is substantial evidence linking childhood abuse and daily smoking (Topitzes et al., (2010)). Therefore, understanding the relationship between trauma exposure, and particularly childhood abuse, and smoking behaviors, is a necessary step in order to create effective interventions to treat both of these important public health problems. **METHODS:** African-American and Caucasian cigarette smokers matched on age, gender and education, were recruited for an EEG study examining attentional bias and cue reactivity. Participants were phone screened for eligibility and completed baseline and experimental sessions with EEG recordings. Participants' cigarette use was assessed using self-report and physiological measures (CO levels), and trauma exposure was assessed using the Childhood Trauma Questionnaire. **RESULTS:** Results showed that emotional and sexual abuse were significant predictors of cigarette use ($R^2=0.61$), but physical abuse and neglect were not. Specifically, individuals who reported greater emotional and physical abuse also reported greater number of cigarettes smoked. Also, participants who experienced or witnessed a traumatic event smoked more cigarettes than those who heard about it. **CONCLUSIONS:** The results of the current study highlight a relationship between type of childhood abuse, degree of exposure to the traumatic event, and cigarette use, and have implications for interventions aimed at both trauma exposure and tobacco dependence.

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POS1-188

USING E-CIGARETTES WITHIN A HOSPITAL SETTING - AN ACCEPTABILITY TRIAL FOR ALCOHOLICS

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INTRODUCTION: An acceptability trial was undertaken at Kenepuru Hospital, Porirua, New Zealand, to ascertain whether electronic cigarettes (e-cigarettes) were a useful option for alcoholic patients to use to help them stop or reduce their smoking while they were in the ward for detoxification. **METHODS:** We studied two groups of patients. The first group was surveyed on the usefulness of standard nicotine replacement therapy. The second group were offered an e-cigarette as a nicotine replacement option. All were asked to record their use of cigarettes, e-cigarettes and of nicotine replacement during their stay on the ward, and were given opportunities to comment. Self-reported use of nicotine replacement therapy and of tobacco was monitored. Informal impressions of the nursing staff were also collected, where offered. For the e-cigarette group, a blood sample were taken on day 3 or 4 of their stay in hospital for nicotine/cotinine analysis, to confirm nicotine intake status. **RESULTS:** E-cigarettes were well accepted as a form of nicotine replacement, though they were not effective for all. The average reduction in smoking was very similar between the control and the e-cigarette groups. No adverse effects were noticed. Several of the e-cigarette group expressed an interest in continuing to use e-cigarettes for smoking reduction or replacement after leaving hospital. Importantly, though nursing staff were initially dubious, they found the e-cigarettes a useful adjunct to patient management. **CONCLUSIONS:** For heavily tobacco dependent smokers, e-cigarettes were a useful aid to patient management within a hospital setting. **IMPLICATIONS:** Further exploration of the use of e-cigarettes as a smoking replacement and cessation tool within institutional settings is warranted. Furthermore, the possibility of using e-cigarettes to help alcoholics and other smokers with complex psychological and medical needs to stop smoking should be explored.

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POS1-189

RECRUITMENT CHANNELS AND ENROLLMENT OF COMMUNITY COLLEGE STUDENTS INTO A WEB ASSISTED TOBACCO INTERVENTION (WATI) TRIAL

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BACKGROUND: United States college students, particularly those attending community colleges, have a higher prevalence of smoking than that of general population. Recruitment of such understudied smokers into research studies has not been studied in depth, despite a moderate amount of information on study recruitment success with smokers from traditional four-year colleges. Recruitment channels and success are evolving as technology evolves, so it is important to understand how to best target, implement, and evaluate recruitment strategies. **OBJECTIVE:** The aim of this analysis is to both qualitatively and quantitatively explore recruitment channels and their success with enrollment into a randomized Web Assisted Tobacco Intervention (WATI) trial in this priority population of underserved and understudied smokers. **METHODS:** Qualitative research methods included key informant interviews (n=18) and four focus groups (n=37). Quantitative research methods included observed online responsiveness to any channel (n=10,914), responses from those completing online screening and study consent (n=2,696), and responses to a baseline questionnaire from the fully enrolled study participants (n=1,452). **RESULTS:** Qualitative results prior to recruitment provided insight regarding the selection of a variety of recruitment channels proposed to be successful, and provided context for the unique attributes of the study sample. Quantitative analysis of self-reported channels used to engage with and to enroll into the study revealed the relative utilization of channels at several recruitment points. The use of "mass emails" to the student body was reported by the final sample as the "most influential" channel, accounting for 62.2% of the total enrolled sample. **CONCLUSIONS:** Community college students remain an understudied population in tobacco use intervention trials. Relative channel efficiency for recruitment into a WATI trial was analyzed across a wide variety of channels. One primary channel (mass emails) and a small number of secondary channels (including college websites and learning management systems) accounted for most of the recruitment success.

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POS1-190

INTEGRATION OF BEHAVIORAL ACTIVATION WITH CONTINGENCY MANAGEMENT FOR SMOKING CESSATION AMONG LOW INCOME COMMUNITY SMOKERS: A PILOT STUDY

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INTRODUCTION: Basic science and clinical research have provided a framework for what leads to and maintains addictive behaviors as well as informs treatments. With this in mind, we have developed a novel treatment which integrates contingency management (CM) via the use of smart phones with brief behavioral activation (BA; Lejuez et al., 2011). In this novel approach, the target of CM is adherence to activity scheduling and monitoring, which is theorized as the active ingredient of BA. BA, developed as a treatment to improve depressed mood through engagement with activities that provide positive reinforcement, has shown success when applied as a treatment to smokers with elevated depressive symptoms (MacPherson et al., 2010; 2016). A challenge, however, has been successfully incentivizing completion of therapeutic homework in BA and engagement in alternative behaviors. Thus, there is potential value in adding CM to BA for smoking, particularly at the early period post-treatment, when risk for relapse is highest. We report on the results of a pilot study integrating BA and CM (BACM) for the treatment of cigarette smoking. **METHOD:** Participants included 56 treatment-seeking adult smokers (62% male, 64% African-American, Age $M(SD)$ = 49(8.9), Median Income = \$0 - \$9,999, Cigarettes per Smoking Day $M(SD)$ = 10(6.3)) who received

BACM paired with nicotine replacement therapy. BACM involved 5 sessions of group-based treatment. Quit date was assigned to occur at session 3. Participants completed a baseline assessment as well as measures of smoking cessation outcomes (Timeline Followback), environmental reward (Reward Probability Index), and behavioral activation (Behavioral Activation for Depression Scale) at sessions 1, 3, and 5 as well as at 2, 4, 6, and 12 week follow-up. **RESULTS:** The study is currently conducting follow-up assessments that will be completed by the end of 2016. In this presentation, we will provide preliminary data on feasibility, acceptability, and treatment outcomes for BACM. **CONCLUSION:** We discuss whether BACM is a promising intervention that may promote smoking cessation using a novel approach among low-income community smokers.

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POS1-191

CORRELATES OF COGNITIVE FUNCTION AMONG TOBACCO SMOKERS WITH HIV AND COMPARISON TO TOBACCO SMOKERS WITHOUT HIV

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SIGNIFICANCE: Advances in the treatment of HIV/AIDS have improved the life expectancy of HIV-infected individuals. Unfortunately, HIV-infected individuals are more likely to use tobacco than those in the general population, but little is known about the mechanisms that underlie these high smoking rates. Since cognitive deficits are common among those with HIV and are associated with smoking persistence, these deficits may be a barrier to smoking cessation among HIV-infected smokers. We compared cognitive function between HIV-infected and HIV-uninfected smokers and evaluated correlates of cognition among HIV-infected smokers to help guide the development of population-specific smoking cessation interventions. **METHODS:** Participants were HIV-infected (n=103) and HIV-uninfected smokers (n=73) enrolled in separate smoking cessation trials. Prior to receiving treatment (baseline assessment), participants completed cognitive tasks measuring working memory, attention, and processing speed (N-back and Continuous Performance Task [CPT]). For HIV-infected smokers, we assessed the association among cognition, demographics, smoking history, and disease specific information (e.g., viral load, CD4 count). **RESULTS:** For the N-back task, HIV-infected smokers (vs. HIV-uninfected smokers) were less accurate (p=0.008), particularly as task difficulty increased (group by n-back level interaction, p=0.01). HIV-infected smokers also showed slower response times on the N-back (p=0.001) and the CPT (p=0.002). Among all smokers, higher education and younger age were associated with better cognitive function. Among HIV-infected smokers, male gender, higher income, and higher carbon monoxide levels were associated with better cognitive function. Among HIV-uninfected smokers, lower levels of nicotine dependence and fewer cigarettes per day were associated with better cognitive function. **CONCLUSIONS:** These data suggest that HIV-infected smokers may have lower levels of working memory and processing speed compared to HIV-uninfected smokers. Smoking cessation interventions that consider cognitive neurorehabilitation for HIV-infected smokers may reduce relapse rates and tobacco-related morbidity.

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POS1-192

THE USE OF SELF-DIRECTED RELAPSE PREVENTION BOOKLETS TO ASSIST IN MAINTAINING ABSTINENCE AFTER A 6-WEEK GROUP SMOKING CESSATION TREATMENT PROGRAM: A RANDOMIZED CONTROLLED TRIAL.

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SIGNIFICANCE: The majority of smokers who attempt to quit relapse to smoking within the first year. This makes identifying effective relapse prevention interventions a vital step in helping smokers maintain long term abstinence. A previous review of the effectiveness of smoking relapse prevention interventions for abstinent smokers concluded that self-directed relapse prevention materials such as *Forever Free* (FF) booklets, appear to reduce relapse in smokers who achieved abstinence without professional assistance. However, little is known about whether FF booklets are useful for smokers who did receive professional assistance. **AIMS:** The purpose of this study is to determine if FF booklets are effective at preventing relapse when added to group cessation treatment plus transdermal nicotine patches. **METHODS:** 225 participants were randomized to receive FF relapse prevention booklets or a control booklet (Surgeon General's report on the health effects of smoking, SG) at the end of a six week group treatment program. Participants were considered quit, and were included in the primary analysis if they had a CO <10ppm (n=115). They were then contacted 4 weeks later by phone to assess whether they had read the materials. They were also followed up in person 6 months after their target quit date. At this point, smoking status was biochemically validated using exhaled carbon monoxide (CO). **RESULTS:** There was no differences in the demographic or smoking characteristics between the groups at baseline. At the phone contact, the FF group had read a significantly smaller proportion of the materials versus the control booklet (20.0% read most or all of FF v. 72.0% of SG, $p < 0.001$). The only significant predictor of quitting was male gender ($p=0.01$) and increasing days since last tobacco use at 4 weeks ($p=0.04$). There was no difference between the groups in the 6 month quit rate at the end of the trial (40.7% quit FF v. 44.6% quit SG, $p=0.67$). **CONCLUSION:** *Forever Free* self-directed relapse prevention booklets did not reduce relapse or enhance cessation over general tobacco and health information when added to intensive group smoking cessation treatment.

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POS1-193

CHARACTERIZING SMOKERS WHO USE AMERICAN INDIAN RESERVATION CIGARETTES

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SIGNIFICANCE: In an effort to reduce cigarette smoking, many states have increased cigarette taxes. As a result, some smokers travel to American Indian (AI) reservations to purchase untaxed cigarettes. In high tax areas for example, as many as 67% of smokers obtain their cigarettes from AI reservations. Despite this, there is a paucity of research on these smokers. In this project, we seek to learn more about the demographic and smoking characteristics of this smoker subgroup. **METHODS:** Participants were adult smokers participating in a laboratory study investigating reduced-nicotine cigarettes. Participants presented to the laboratory under conditions of acute abstinence and completed a demographic and smoking questionnaire, the Minnesota Nicotine Withdrawal Scale, and Fagerstrom Test for Nicotine Dependence immediately after smoking a usual brand cigarette. They also completed the Cigarette Purchase Task (CPT), a measure of cigarette reinforcing effects using sensitivity of demand across varying cigarette prices. **RESULTS:** Smokers who purchase their cigarettes from an AI reservation ($n=12$) smoked significantly more cigarettes per day than non-AI smokers ($n=157$) (21.3±7.2 vs 15.3±5.9, respectively; $p<0.01$). They presented with higher levels of nicotine dependence (6.2±2.0 vs 4.5±2.1, respectively; $p<0.01$) and withdrawal

(2.8±0.9 vs 2.3±0.9, respectively; $p=0.04$). A larger percentage of AI reservation cigarette smokers also were unemployed vs. non-AI smokers ($p<0.01$). Finally, after controlling for baseline smoking rates, AI reservation cigarette smokers demonstrated a maximum expenditure on the CPT that was \$5.64 lower than non-AI smokers ($p<0.05$). **CONCLUSIONS:** Our preliminary data suggest that, relative to smokers who purchase their cigarettes from retail stores, those who obtain their cigarettes from AI reservations appear to smoke more cigarettes per day, have greater levels of nicotine dependence and withdrawal, and are more likely to be unemployed. AI reservation cigarette smokers may also exhibit purchasing behaviors unique from other smokers, including a lower maximum expenditure on cigarettes.

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POS1-194

LONGITUDINAL TRENDS IN ELECTRONIC CIGARETTE/ VAPE FORUM CHARACTERISTICS

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INTRODUCTION: Electronic cigarette (ECIG)/vape Internet forums are websites that allow members from around the world to have discussions and share information about various ECIG topics. Most forums are open to the public, allowing them to be great platforms for the spread of information, networking, and vaping advocacy. This longitudinal study reports the characteristics of vape forum participation and changes in vape forum membership, discussion boards, and messages over a period of eight months. **METHODS:** Research staff used five popular search engines, Google, Yahoo, Bing, Ask, and AOL, to search for ECIG/vape forums by using the keywords "vape forum", "vape chat room", "vaping", "vape discussions", and "vape discussion board". After excluding forums that did not relate to ECIGs/vaping, 75 forums were included in the study. Baseline data on forum activity including membership, discussion boards, and messages were collected from December, 2015 to January, 2016. Forum activity was tracked monthly for eight months. **RESULTS:** Of the 75 forums, 47 (62.7%) displayed activity data, were active at all eight monthly time points, and had a total of 1,011,714 members at baseline (January, 2016). In August, 2016, there were a total of 1,095,522 members representing an increase of 83,808 members. Nineteen of the forums had over 5,000 members in January, 2016 which increased to 21 forums in August, 2016. Total discussion board topics increased from 1,699,684 in January, 2016 to 1,936,570 in August, 2016. An average of 274,387 messages were posted each month during forum tracking. Forty-one percent of forums had one or more social media link. **CONCLUSIONS:** Increases in ECIG/vape forum membership, discussion posts, and high numbers of monthly message posts indicate ECIG/vape forums are popular mediums for ECIG information exchange. The social media and accessibility features of ECIG/vape forums allow information to be shared quickly and thousands of individuals participate in discussions regularly. These forums could be a useful tool to inform FDA about new ECIG trends and could also serve as a platform to communicate accurate information to the vaping community.

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POS1-195

COGNITIVE, EMOTIONAL AND SOCIO-DEMOGRAPHIC PROFILE OF SMOKERS AND NON-SMOKERS WITH MULTIPLE CHRONIC CONDITIONS

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In addition to being a chronic disease, smoking is considered an independent risk factor for the onset of numerous diseases by altering their expression, course and prognosis. It is believed that smoking can also interfere with cognitive impairment due to decreased oxygen supply to the brain and changes in neurotransmitter metabolism. Tobacco association with multiple chronic conditions (MCC) leads to the hypothesis of broader cognitive deficits and worsening of the pathological picture. OBJECTIVES: To characterize the cognitive profile of smokers (G1) and non-smokers (G2) with MCC. METHOD: 72 subjects, 39 smokers and 33 non-smokers responded to an interview to collect sociodemographic, clinical and cognitive data. RESULTS: G1 had mean age of 56.32 (SD = 7.57) years, with 69.4% of adults in middle age; 66.1% women, married (53.2%) and low education (79% with less than 8 years of formal education). Comorbidities: systemic arterial hypertension (SAH) (88.7%), type 2 diabetes (DM) (53.2%). G2 average age was 63.36 (SD = 4.72) years, 63.6% of young elderly users; 72.7% women, married (51.7%) and 69.7% with lower education. Comorbidities: SAH (87.9%), DM (60.6%). Depressive symptoms were found in 41% of smokers and 39.4% of non-smokers. Cognitive analysis of G1 indicated that 84.6% of smokers had mild cognitive impairment, while non-smokers totalled 81.8%. Stratifying by cognitive domains, there were higher averages in semantic memory, attention, language and spatial and temporal orientation in non-smokers, although not statistically significant. CONCLUSION: Current smokers were significantly younger ($p < 0.001$) and already multiple comorbidities. Although not statistically significant, cognitive decline among smokers was higher despite them being younger than non-smokers. Cognitive evaluation in larger samples of patients with MCC is necessary in order to confirm the presence of smoking as a sign of worse clinical profile and greater cognitive impairment. This measure may add to the cognitive-behavioural and pharmacological interventions provided for smoking cessation the stimulation/ cognitive rehabilitation in this population.

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POS1-196

THE EFFECT OF PRENATAL CIGARETTE SMOKING AND PARENTAL WARMTH ON MALADAPTIVE BEHAVIORS IN CHILDREN

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Cigarette smoking is known to be harmful to adults and their parenting practices, but it can also be harmful to the children of adults who smoke. In past research, prenatal cigarette smoking has been linked to adverse behaviors such as child aggression and externalizing behaviors, which can lead to maladaptive behaviors in adolescence. It is important to investigate the link between smoking during pregnancy and relationships between parents who smoke and their children, as well as the child's behaviors to better understand what influences child problem behaviors. In the current study, we examined how parents coped with their children's negative emotions, child maladaptive behavior, and inquired about parents' prenatal smoking. We tested two groups of parents and their children matched by maternal age and education. The sample consisted of 88 mother-infant dyads recruited prenatally and assessed during pregnancy and at 24 months and Kindergarten. The sample was characterized by mothers who were of lower SES, lower education level, and younger. Our hypotheses were that 1) Expressive encouragement and emotion focused reactions (parental warmth) would be negatively correlated with dysregulation and externalization (child maladaptive behavior) 2) Prenatal cigarette smoking would not be correlated with parental warmth. In support of our first hypothesis, we found that expressive encouragement was negatively correlated with both dysregulation ($r = -.20, p = .07$) and externalizing behaviors ($r = -.30, p = .01$). We also found that emotion focused reactions were negatively correlated with dysregulation ($r = -.22, p = .04$) and externalizing behaviors ($r = -.25, p = .02$). Contrary to our hypotheses and previous research, our study did not support an association between prenatal cigarette smoking and parental warmth. A possible

reason for this finding is that the effect is bimodal because of an undetermined moderator effect. Further research should hope to identify this moderator and find a stronger answer to our research question. Our findings do support that more parental warmth can be protective through development and help a child develop less maladaptive behavior.

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POS1-197

COGNITIVE CHANGES IN PREGNANT AND NON-PREGNANT SMOKERS DURING CESSATION AND AD LIBITUM SMOKING

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SIGNIFICANCE: Negative changes in cognitive function have been observed during tobacco cessation. Previous studies found changes in cognitive function during pregnancy and also that hormones may affect cognitive function. How cognitive functioning may be affected by cessation attempts during pregnancy is unknown. The objective of this study is to compare trends in cognitive function during short term cessation in pregnant and non-pregnant smokers. METHODS: This secondary analysis is part of a parent study examining effects of sex hormones on smoking behavior and symptomatology in pregnant women and women on oral contraceptives. Participants were ages 18-35, in stable health, smoked > 5 cigarettes daily for >1 year. There were 3 groups: Oral Contraceptives (OC) N=49; 2nd trimester (T2) wks 13-22 N=41 and 3rd Trimester (T3) wks 32-37 N= 45. All participants completed an 8 day testing period, including a nicotine lab session after overnight abstinence. Each session included: Immediate Memory Test (IMT) and Finger Tapping task (FT) to evaluate attention, impulsivity and motor speed and Delayed Memory Test (DMT) and Word Recall task (WR) to evaluate delayed and episodic memory. A log transformation of scores was used, as the data did not have a normal distribution. RESULTS: Participants were 25.5 (SD ± 4.3) yrs of age, 37% identified as non- white and 38% reported completing \leq high school. OC performed significantly lower than both T2 ($P = 0.0398$) and T3 ($P = 0.0252$) on IMT and lower than T2 ($P = 0.0221$) on DMT. OC performed significantly better on WR than both T2 ($P = 0.0305$) and T3 ($P = 0.0027$). T3 performed significantly lower on FT than OC ($P < .0001$) and T2 ($P = 0.0032$). CONCLUSION: T2 and T3 scored better than OC on immediate memory. T2 scored better than OC on delayed memory. T2 and T3 scored worse than OC on episodic memory. T3 scored lower than both OC and T2 on motor speed. These results suggest that conditions with high sex hormones, i.e. pregnancy, compared to naturally cycling levels of sex hormones may impact cognitive function. Further study is needed. Limitations include lack of pre-pregnancy or postpartum data for longitudinal comparison, and no data from non-smokers.

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POS1-198

BIOMARKER OF EXPOSURE REDUCTIONS UPON SWITCHING FROM CIGARETTES TO A CARBON HEATED TOBACCO PRODUCT

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Tobacco harm reduction, increasingly embraced by the public health community, becomes feasible as new nicotine containing products are becoming available. The FDA has issued a modified risk tobacco product (MRTP) guideline for products with the potential to reduce harm or the risk of tobacco-related diseases compared to commercially marketed tobacco products. Heating instead of burning tobacco clearly falls into this category. The Carbon Heated Tobacco Product (CHTP) is based on the principle of heating tobacco and is currently being assessed for its potential to reduce individual harm compared to smoking cigarettes. This randomized study over 5 days in confinement aims at demonstrating reduced exposure by measuring 15 different harmful and potentially harmful constituents (HPHCs) selected among those usually presents in cigarette smoke, furthermore the load



of mutagens in urine, and CYP1A2 activity were assessed. *Ad libitum* CHTP use ($n=41$) was compared to continued cigarette (CC) smoking ($n=39$). In subjects who switched to CHTP, biomarkers of exposure levels were reduced by a minimum of 50% (Total 1-OHP) to a maximum of 95% (1-NA) on day 5 compared to baseline. Compared to CC use, day 5 levels were reduced by 55% (Total 1-OHP) to 97% (1-NA) with CHTP. CHTP Ames reversion rates and CYP1A2 activity were reduced by 70% and 22%, from baseline respectively. CHTP nicotine uptake was close to that from CC. The results indicate that CHTP, broadly reduces exposure to the measured HPHCs.

FUNDING: Philip Morris Products S.A., Neuchâtel, Switzerland

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POS1-199 TOBACCO AND MENTAL HEALTH

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BACKGROUND: We analyzed data from a depression program to see if tobacco use is associated with depression and anxiety. Some participants prefer non-pharmacological methods to help them overcome tobacco usage. **METHODS:** The 8-week Depression and Anxiety Recovery Program was started by the Nedley Clinic from Weimar, California. The program is not medical program. Participants met once a week for 8 weeks for a 2 hour program that includes viewing a DVD and discussion in small groups. The Depression and Anxiety Assessment Test (registration TX 7-398-022) was used to measure depression and anxiety based on the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders Volume 5) and among other things gathered information on demographics and tobacco usage. Depression was classified into 4 categories: none (0-6), mild (7-10), moderate (11-19), and severe (20 or more). The test was applied at baseline and at the end of the 8-weeks. The educational program encourage participants to follow healthy habits, including overcoming addictive behaviors. **RESULTS:** From the 5998 participants that finished the 8-week program, 481 (8%) reported usage of tobacco products. At baseline tobacco users had on mean depression of 15.7 (moderate) SD 7, mode 20 and median 17 and mean anxiety level of 10 (moderate) SD 5, mode 12 and median 11. Those not using tobacco products at baseline had a mean depression of 11.8 (moderate) SD 7.5, mode 4, median 11 and mean anxiety of 7.5 (mild) SD 5.8, mode 0 and median 7. At the end of the 8 weeks, 24% ($n=116$) had stopped using tobacco. Those that stopped using tobacco had a mean depression of 7.6 (mild) SD 5.6 and mean anxiety of 4.5 (none) SD 3.9, those that continued to use tobacco at the end of the 8-weeks had a mean depression of 8.6 (mild) SD 6.2 and anxiety of 5.2 (mild) SD 3.8. **CONCLUSION:** Tobacco usage seems to be related to higher levels of depression. The eight week community-based depression program was effective in helping some quit tobacco and improving mental health, it seems those that quit tobacco have better outcomes.

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POS1-200 TRAINING HEALTH PROFESSIONAL STUDENTS TO TREAT TOBACCO DEPENDENCE AMONG PERSONS WITH MENTAL ILLNESS AND CO-OCCURRING SUBSTANCE USE DISORDERS: A MIXED-METHODS STUDY

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SIGNIFICANCE: The prevalence of tobacco use among people with mental health diagnoses and co-occurring substance use disorders greatly exceeds the prevalence in the general population. The purpose of this pilot study was to estimate the impact of an interprofessional approach to teaching graduate nursing, social work, and pharmacy students to treat tobacco dependence among individuals with mental illness and co-occurring substance use disorders. **METHODS:** Inves-

tigators applied a 1-group, pre/post-test design, with qualitative and quantitative descriptive analyses. Study measures, administered via web-based surveys, included factors known or hypothesized to be associated with tobacco cessation counseling behavior. Nursing ($n=13$), pharmacy ($n=9$) and social work ($n=14$) students participated in a 2-hr web-based training, a 3-hr live training, a simulation with a standardized patient, and a group, audio-recorded debriefing session with interprofessional faculty. **RESULTS:** Emergent themes from qualitative analyses were: valuing simulations, demystifying disciplines, reflecting on and building skills, critiquing practice, and lessons learned. Participants' self-rated counseling ability ($p<0.001$), perceived self-efficacy ($p<0.001$), intention to ask about tobacco use ($p=0.003$), and intention to provide counseling for tobacco cessation ($p<0.001$) increased significantly. All students believed that participating in the training would increase the number of patients with mental illness or co-occurring substance use disorders whom they will counsel for cessation (50%, definitely yes; 50%, probably yes), and all students believed that the quality of their counseling would increase (68% definitely yes, 32% probably yes). Almost all (98%) students believed that incorporating tobacco cessation into required curricula in health professional schools would increase the number of patients with mental illness or co-occurring substance use disorders who quit smoking. **CONCLUSIONS:** Teaching students via an interprofessional team approach appears to be effective in enhancing counseling abilities and self-efficacy. Larger studies are needed to validate the results of this pilot study.

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POS1-201 DISTRESS TOLERANCE DIMENSIONS AND SMOKING BEHAVIOR AMONG MEXICAN DAILY SMOKERS

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Distress intolerance has been implicated in various aspects of smoking maintenance and quit behavior, although past work has been conducted almost exclusively among European American samples. The present study sought to extend past work by exploring distinct subdimensions of distress intolerance (Tolerance, Appraisal, Regulation, and Absorption) among a sample of 113 (53.13% female; $M_{age} = 22.81$, $SD = 2.13$) adult daily smokers from Mexico City, Mexico in regard to multiple indices of problematic smoking. Results indicated that the Appraisal dimension of distress intolerance was associated with smoking more cigarettes per day, a greater number of (lifetime) failed quit attempts, and an increased likelihood of early smoking relapse. These findings remained significant after controlling for negative affectivity, gender, alcohol usage as well as the variance accounted for by other distress tolerance dimensions. Such results provide novel empirical evidence that lesser perceived ability to tolerate distress because it is appraised as 'unacceptable' may be a particularly important element of the construct in terms of better understanding multiple public health relevant indicators of smoking for Mexican smokers. Overall, the present findings uniquely contribute to a growing body of research related to distress intolerance and its implications for explicating the nature of the maintenance of smoking behavior among a highly understudied segment of the smoking population (Mexican smokers).

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POS1-202

EPISODIC FUTURE THINKING SPECIFIC TO SMOKING-RELATED ILLNESS: EFFECTS ON DELAY DISCOUNTING, CIGARETTE DEMAND, AND CIGARETTE CRAVING

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Delay discounting refers to the tendency for people to devalue delayed reinforcement. Compared to non-smokers, cigarette smokers show excessive delay discounting, which may contribute to tobacco dependence. Episodic future thinking (EFT), or mental simulation of future events, has been shown to reduce both delay discounting and laboratory smoking behavior. Traditionally EFT involves vividly imagining positive future events. In the present study, we examined the effects of EFT featuring negative content, notably smoking-related illness (SRI) in cigarette smokers. The primary objective of this study was to compare the effects of negative EFT with those of traditional EFT on delay discounting, economic demand for cigarettes, and cigarette craving. Smokers were recruited from Amazon.com's Mechanical Turk website. Accepted participants were randomly assigned to one of two EFT groups: EFT or EFT+SRI; and one of two episodic "recent" thinking (ERT) control groups: ERT or ERT+SRI. The EFT groups imagined positive future events, while the ERT groups imagined real events that occurred in the recent past. Both EFT+SRI and ERT+SRI groups imagined these events while also experiencing SRI symptoms. Participants were asked to complete monetary delay-discounting, cigarette demand, and cigarette craving tasks, while thinking about the episodic cues they created earlier. EFT decreased discounting ($p < 0.01$), regardless of SRI condition. The addition of SRI symptoms increased discounting ($p < 0.05$), regardless of episodic condition. EFT had no effect on cigarette demand intensity (consumption unconstrained by price) or elasticity (sensitivity of consumption to price), regardless of SRI condition. However, the addition of SRI symptoms decreased intensity and elasticity (in both cases, $p < 0.001$), regardless of episodic condition. Finally, EFT decreased cigarette craving ($p < 0.05$), regardless of SRI condition; and the addition of SRI symptoms decreased craving ($p < 0.01$), regardless of EFT condition. In the future, the generality of these effects may be examined in other populations, such as alcoholics. These methods may also be adapted for use in clinical treatment to encourage smoking cessation.

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POS1-203

INTEGRATING CLINICAL TOBACCO TREATMENT INTO THE PERINATAL PROGRAM AT CHILDREN'S HOSPITAL: A SUCCESSFUL COLLABORATION BETWEEN THE OKLAHOMA HOSPITAL ASSOCIATION AND OU MEDICAL CENTER

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SIGNIFICANCE: Women in Oklahoma who smoke before pregnancy and continue to smoke into the final three months of pregnancy do so at a rate significantly higher than the national average. Infant exposure to secondhand smoke from parents or guardians in Oklahoma also occurs at a rate higher than the national average. Tobacco use during pregnancy and infant exposure to secondhand smoke is a well-established predictor of poor health outcomes including pre-term birth, low birth weight, infant mortality, chronic lung disease and others. Reducing rates of tobacco use during pregnancy and infant exposure to secondhand smoke is a top public health priority in Oklahoma. **METHODS:** This case study will describe: (1) the development and implementation of tobacco treatment best practices within the Neonatal Intensive Care Unit (NICU) at Children's Hospital; (2) proposals to expand tobacco treatment to other care centers within Children's Hospital; (3) provisions for educating medical residents; and (4) outcomes data pertaining to this initiative. **RESULTS:** This presentation will highlight the successful partnership between the Oklahoma Hospital Association (OHA) and the University of Oklahoma (OU) Children's Hospital, Department of Pediatrics, Section of Neonatology, to integrate sustainable evidence-based tobacco treatment services. This includes electronic referral to the Oklahoma Tobacco Helpline for parents and guardians of babies admitted to OU Children's Hospital. **CONCLUSIONS:** Embedding sustainable tobacco treatment into a large university based pediatric teaching hospital can be a challenging endeavor, but offers a tremendous opportunity to enhance quit attempts and sustained quit rates for parents and guardians of newborns. Reviewing the challenges, strategies, and lessons learned in this case study will

provide valuable information to help public health champions focused on this priority population.

FUNDING: Oklahoma Tobacco Settlement Endowment Trust

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POS1-204

MAXIMAL HANDGRIP STRENGTH IS INVERSELY ASSOCIATED WITH NICOTINE DEPENDENCE IN A SAMPLE OF US ADULT CIGARETTE SMOKERS

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SIGNIFICANCE: Handgrip strength is inversely and independently associated with cardiovascular disease, cancer, and death from all causes, even after adjusting for age and other confounding factors, such as gender, height, and body weight. While the negative effects of cigarette smoking on health and physical fitness have been tested, no study has examined the relationship between handgrip strength and key factors associated with smoking, such as nicotine dependence. Thus, the purpose of this study was to assess the cross-sectional relationship between maximal handgrip strength and nicotine dependence in a United States sample of adult cigarette smokers. **METHODS:** Data for this study were gathered from 55 smokers who wanted to participate in a large-scale smoking cessation trial, but were never enrolled (i.e., dropped out prior to randomization). Across two on-site visits, demographics, smoking measures, and physical assessments were collected. Nicotine dependence was assessed with the Nicotine Dependence Syndrome Scale (NDSS). Maximal handgrip strength was measured with a Jamar hand dynamometer. Participants held the device in their dominant hand and were instructed to squeeze with maximal force. The average of three trials was used in the analysis. **RESULTS:** Participants were 41 males and 14 females ages 19-70 (47.1 ± 9.9). The vast majority (74.5%) identified as Black or African American. The mean number of cigarettes smoked/day was 19.1 ($SD=10.6$). The mean handgrip strength was 35.4 kg ($SD=9.6$ kg); range 21.2-56.1 kg. The mean NDSS score was -0.16 ($SD=2.26$); range -5.29-4.54. After controlling for confounding factors (age, gender, height, body weight), handgrip strength was inversely correlated with nicotine dependence ($r=-.28$, $p=.04$). Further analysis revealed that the partial correlation coefficients were significantly different for men ($r=-.33$, $p=.04$) and women ($r=.05$, $p>.05$), $p=.04$. **CONCLUSION:** Maximal handgrip strength appears to be inversely associated with nicotine dependence in men, but not women. Future studies will be needed to confirm this gender difference, and further investigate the potential mechanisms responsible for this relationship.

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POS1-206

PERFORMANCE OF ABANDONMENT SMOKING OF CLINIC, WITH 1.187 PATIENTS IN THE PERIOD OF 1999 AT 2013

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The goal is to evaluate the performance of the Abandonment smoking of Clinic about the success. To analyze the profile of patients and relate smoking history and nicotine dependence presenting the outcome during follow-up. This is a retrospective study that included information from all patients enrolled in the specific database to smoking cessation clinic at the Hospital São Lucas. Since its inception, the clinic has a database that is updated with data and peculiarities of patients registered. From this, we drew a profile of patients and relate the achieved success rate, characterized by a year of follow up without relapse. We analyzed 1,187 patients undergoing care at the smoking cessation clinic at the Hospital are PUCRS. They had an average age of 48.5 years, and a female predominance. They achieved an average weight gain during follow 1,48Kg. As for education, 83.8 % had less than 11 years of schooling and 54.7 % were married. The average



time consumption of cigarettes was 30 years, and nearly half (47.8%) showed a level index Fagerstrom 6 (six) which significant moderate dependence on nicotine. The success of the clinic obtained a level of 44.5% as average, and in the last three years showed a discrepant increase compared to previous years. This study shows no association between drug therapies and success. The success was associated with older individuals with lower level of dependence according to Fagerstrom index. In this study, we analyzed various database variables to smoking cessation clinic. We noted a predominance of females in the search for smoking cessation, and an average age in the range of 48 years. The annual success rate of the clinic is consistent with that observed in the literature, except for the last three years had great success. Still on the success, no relationship to drug treatment, as the cognitive behavior therapy was as efficacious drugs when analyzed, whether oral or topic. However, we emphasize the importance of the approach to change habits in order to succeed in stopping smoking.

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POS1-207

INTEGRATING CLINICAL TOBACCO TREATMENT INTO HOSPITALS AND AFFILIATED CLINICS WITH INTER-OPERABLE ELECTRONIC HEALTH RECORDS: PARTNERING WITH HEALTH SYSTEMS FOR SUSTAINABILITY AND IMPACT

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SIGNIFICANCE: Clinical tobacco treatment including fax referrals by health providers to quitlines is a proven method of increasing quit attempts and rates. As Electronic Health Record (EHR) implementation proliferates, programs rooted in paper-based processes face sustainability challenges. Integrating electronic referrals (eReferrals) to state quitlines into EHRs, holds promise to create greater consistency, sustainability and impact. As hospitals acquire ambulatory care centers and integrate their EHRs and care standards into those clinics, the opportunity to make sweeping tobacco treatment system changes is more feasible than ever. **METHODS:** Tobacco treatment quitline referral data and lessons learned from 3 healthcare systems participating in the HHPQ initiative are utilized to explore: (1) potential long term consequences of paper driven tobacco treatment on sustainability, (2) potential long term consequences of EHR driven tobacco treatment on sustainability and (3) eReferral data from a private health system and Native American health system to demonstrate the importance of targeting systems integration of EHR's and care standards to maximize efficiency and outcomes. **RESULTS:** This presentation contributes to the growing knowledge-base about integrating clinical, evidence-based tobacco treatment into EHR's. System change experience and observations from the Oklahoma Hospital Association's *Hospitals Helping Patients Quit (HHPQ)* initiative indicates that partnerships between public health officials and health systems, to fully integrate EHR's and standards of care in hospitals and clinics, results in effective tobacco treatment systems change. **CONCLUSIONS:** Embedding tobacco treatment into EHR's of systems with integrated hospitals and clinics conforms to modern practice standards, creating more opportunity for enhanced sustainability and impact.

FUNDING: The Oklahoma Tobacco Settlement Endowment Trust

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POS1-208

DOES HAVING A HISTORY OF SEXUAL ABUSE INCREASE RISK OF TOBACCO USAGE?

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RATIONALE: A history of sexual abuse could trigger addictive behaviors. We hypothesize that a history of sexual abuse could lead increased risk of tobacco usage. **MATERIAL AND METHOD(S):** Between 2007 and 2016, 5997 participants, from 5 continents, finished the 8-week depression recovery program offered by previously trained facilitators that were certified by the Nedley Clinic based in Weimar, California. Each participant answered at baseline and at the end of the 8-weeks the Depression and Anxiety Assessment Test. This questionnaire evaluated levels of

depression and anxiety and it included demographics and questions about sexual abuse history and current tobacco usage. Participants met once a week for 8 weeks for a two-hour program. Each educational program was independently run and did not established a doctor-patient relationship. None of the programs was done for profit. The program taught healthy behaviors including importance of overcoming addictions. **RESULTS:** From the 5997 participants, 1832 reported having suffered sexual abuse. From this group, 10% (n=184) declared using tobacco products and had an average age of 51.6 (St dev 14), 243 were males (13.2%) and 1589 were females (86.7%). Among those without a history of sexual abuse 4.9% (297) reported using tobacco products. At the end of the 8-weeks, 13.5% (n=25) of those that suffered from sexual abuse were able to quit tobacco products. **CONCLUSION(S):** Having a history of sexual abuse seems to be related to higher tobacco usage, according to this data it was twice as likely. From this data, females were more likely to suffer from sexual abuse. The program was effective in decreasing tobacco usage. Those that used tobacco and have a history of sexual abuse seem to benefit from the program. People with a history of sexual abuse should be offered a tobacco prevention programs. Long term follow-up is planned.

FUNDING: No Funding

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POSTER SESSION 2

POS2-1

NEUROCHEMICAL SUBSTRATE FOR MENTHOL ENHANCEMENT OF NICOTINE REWARD IN RATS: EVIDENCE FROM AN INTRACRANIAL MICRODIALYSIS STUDY

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Epidemiological observations suggest that menthol may promote tobacco smoking and nicotine dependence. Our previous animal work showed an enhancing effect of menthol on nicotine reward (Biswas et al, 2016). This study employed both behavioral test and intracranial microdialysis technique to examine the facilitating effect of menthol on nicotine self-administration and the dopamine levels in the nucleus accumbens of rats in response to menthol and/or nicotine administration. Male Sprague-Dawley rats were trained in daily 1-h sessions to press a lever for self-administration of intravenous nicotine at 0.015 mg/kg/infusion, a dose on the ascending limb of the inverted "U" shaped nicotine dose-response curve. Menthol (5 mg/kg) or its vehicle was given intraperitoneally 5 min prior to the test sessions. In separate sets of rats, dopamine levels in the right nucleus accumbens in response to administration of nicotine, menthol, and both were measured using microdialysis coupled with HPLC assay. In the behavioral tests, menthol increased self-administration of nicotine in a dose-dependent manner. In the neurochemical assay, menthol, albeit did not produce an effect on its own, enhanced dopamine release induced by nicotine administration. These data demonstrate a facilitative effect of menthol on nicotine reward and an interaction of menthol with nicotine to enhance dopamine release in the nucleus accumbens. These findings may shed a light on our understanding of the influence of menthol on smoking and its underlying neurobiological mechanisms.

FUNDING: NIH/FDA grant R01DA027377

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POS2-2

QUANTIFYING ELECTRONIC CIGARETTE FLAVOR PREFERENCE WITH BEHAVIORAL ECONOMIC DEMAND

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SIGNIFICANCE: A large variety of electronic cigarette liquid (e-liquid) flavors are currently available for purchase in the United States. The US Food and Drug Administration has the ability to and has considered regulating the availability of these flavors. However, little is known about how regulations restricting e-liquid flavors will affect purchasing decisions and consumption by users. METHODS: Current smokers attended eight laboratory sessions after 12 hours of abstinence from nicotine products. In each session, participants were allowed to smoke 10 puffs over a five-minute period of either an e-cigarette containing a double-blinded e-liquid flavor (menthol or tobacco) and nicotine concentration (0, 8, or 36 mg/mL) or one of two flavors of conventional cigarettes (menthol or tobacco). Cigarette evaluations and withdrawal ratings were collected at five time points throughout the one-hour sessions, and behavioral economic demand for the cigarette just consumed was collected shortly after the projected peak nicotine blood concentration. RESULTS: When plotted as a function of preferred versus non-preferred flavor, a large and statistically significant increase in demand emerged for the preferred e-cigarette flavor and preferred conventional cigarette flavor. This flavor preference effect was evident across nicotine concentrations and cigarette type for demand intensity (consumption unrestricted by price; $p < .05$), while demand elasticity (sensitivity to price) was unaffected by flavor preference. Depending on reference price, switching from a preferred to a non-preferred flavor was associated with a reduction in consumption equal to a 10-fold or greater increase in price. CONCLUSIONS: Flavor of electronic cigarette liquid has a large effect on behavioral economic demand intensity, identifying this as a key variable impacting purchasing decisions and consumption of e-liquid.

FUNDING: Virginia Commonwealth University Center for the Study of Tobacco Products pilot research program

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POS2-3

DIACETYL IN E-CIGARETTES: SOURCES, STABILITY AND AEROSOL TRANSFER

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SIGNIFICANCE: Diacetyl and acetyl propionyl has been reported to be present in many e-liquid flavours. Inhalation of diacetyl in occupational settings has been shown to lead to the onset of a decline in respiratory function and a condition known as bronchiolitis obliterans; acetyl propionyl appears to have similar inhalation toxicology. Acetoin has been used as an alternative to these compounds in e-cigarette liquids, but while the toxicological data on it shows little of concern, its chemical similarity to diacetyl means that its conversion to diacetyl could occur. This study was conducted to understand whether acetoin is a precursor to diacetyl, the stability of these materials in e-liquids and the extent to which they transfer from e-liquids to e-cigarette aerosols. METHODS: Laboratory testing was conducted in which e-liquids were spiked with diacetyl and acetoin and analysed by GC-MS at various times after spiking. A range of formulations were assessed covering various acetoin levels, VG/PG ratios, water contents and pH/nicotine levels. Liquid and aerosol measurements were conducted. All measurements were conducted by Enthalpy Analytical Inc. RESULTS: Acetoin was found to be a precursor of diacetyl in e-liquids, particularly under alkaline conditions such as those found when nicotine is present in the e-liquid. Higher water content e-liquids accelerated the conversion to diacetyl. Acetyl propionyl and diacetyl were also found to be unstable in e-liquids, with their concentrations declining over time. Aerosol concentrations of diacetyl and acetyl propionyl produced by e-cigarettes were proportional to the e-liquid contents. CONCLUSIONS: This work has shown that acetoin is a precursor to diacetyl in nicotine containing e-liquids. Action should be taken by e-liquid manufacturers and flavouring suppliers to eliminate the use of diacetyl, acetyl propionyl and acetoin as flavour ingredients.

FUNDING: The study was funded by British American Tobacco.

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POS2-4

EFFECTS OF CIGARETTE NICOTINE CONTENT ON ABSTINENCE SYMPTOMS AND SMOKING BEHAVIORS IN ADOLESCENT SMOKERS

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The FDA has the authority to reduce the nicotine content of commercially available cigarettes to very low levels, with the goal of making them less addictive and reducing the public health burden of tobacco smoking. Very low nicotine content (VLNC) cigarettes have not yet been studied thoroughly in adolescents, however, making the potential effect of such a policy on young smokers unclear. The aim of the current study was to determine the acute effects of 4 doses of nicotine in cigarettes (15.8, 5.2, 1.3 and 0.4 mg/g of tobacco) in adolescent daily smokers (ages 15-19, $n=50$). Following overnight abstinence, participants reported on their craving, withdrawal and positive and negative affect pre- and post- ad lib smoking of one cigarette. Participants' smoking topography was recorded to determine if lower doses of nicotine would lead to compensatory smoking as measured by number of puffs, inter-puff interval, total puff duration, and total puff volume. Paired t-tests comparing change in subjective measures from pre- to post- smoking across doses were conducted, and results indicated that all four nicotine doses significantly reduced abstinence-induced craving, withdrawal and negative affect (all p 's $< .001$). Mixed models were conducted to evaluate the effect of nicotine yield on residualized change scores calculated from pre- to post- smoking, with baseline dependence and age included as predictors of both individual level of effect of dose (intercepts) and change across dose (slopes) for all outcomes. Results revealed a nonsignificant effect of nicotine yield for all abstinence and topography outcomes (all p 's $> .05$). Overall, this study showed that all four doses of research cigarettes significantly reduced abstinence-induced withdrawal, craving, and negative affect in adolescents, but reductions did not differ significantly across dose; and no evidence was found that VLNC cigarettes led to compensatory smoking. These promising results highlight the importance of continued research on how regulatory policy may affect adolescent smokers.



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POS2-5

BRAIN REACTIVITY ON A DELAYED REWARD DISCOUNTING TASK PREDICTS SMOKING CESSATION TREATMENT RESPONSE

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SIGNIFICANCE: Smoking treatment may be improved by clarifying the determinants of treatment success. It has been demonstrated behaviorally that higher levels of delayed reward discounting (DRD; i.e., proportionate preference for smaller immediate rewards over larger delayed rewards) are associated with relapse. Neural activity during functional magnetic resonance imaging (fMRI) paradigms represents promising translational biomarkers for predicting clinical outcomes. The primary goal of this study was to identify the underlying neural indices of impulsive decision making that predict smoking cessation treatment response. **METHODS:** We measured behavioral and brain response during an fMRI DRD paradigm in smokers prior to an eight-week best-practices smoking cessation intervention. The analyses were conducted on 42 subjects (M cigarettes daily = 22.3; FTND = 4.9). Subjects were divided into relapse (N = 24) and no relapse (N = 18) groups. Smoking cessation relapse was operationalized as smoking at least one cigarette per day for seven days, treatment dropout, or an exhaled carbon monoxide > 10 parts per million. For each delay interval, choices that were +/- two in each direction of the indifference point were classified as hard choices, and all other choices were classified as easy choices (control choices were included as a baseline). Following preprocessing of fMRI data, omnibus one-way three-level (easy, hard, and control) within-subject analyses of variance were conducted at the whole-group level, with significant effects followed-up with pairwise t-tests to identify specific patterns. Then between-group differences were explored for regions that were selectively most active during hard and easy choices. **RESULTS:** At the behavioral level, the no-relapse group exhibited a significantly higher area under the curve, reflecting less impulsivity ($p = .02$). The dorsolateral prefrontal cortex (DLPFC) exhibited significantly more activation for hard choices and was significantly more active for the no-relapse group during hard and easy trials. Regions more active during easy trials (and more active in the no-relapse group in general) included precuneus, middle temporal gyrus/superior temporal gyrus, superior temporal gyrus, middle temporal gyrus, and uvula/tuber. **CONCLUSIONS:** The most notable finding is that the DLPFC is recruited for difficult decision making and is more active in successful quitters. This indicates that the DLPFC is related to adaptive decision making and positive outcomes in smoking cessation treatment.

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POS2-6

ASSOCIATIONS BETWEEN DYNAMICS OF CRAVING DURING ATTEMPTS TO RESIST SMOKING AND EXPERIMENTAL SMOKING LAPSE BEHAVIOR

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SIGNIFICANCE: Smoking lapse is a strong predictor of relapse during cessation attempts. Laboratory models of smoking lapse behavior have demonstrated that baseline craving predicts smoking lapse, yet none have examined the dynamics of craving during attempts to resist smoking. Several theories of tobacco dependence posit that fluctuations in craving and mood may strongly predict smoking lapse. **METHODS:** We used an extension of the smoking lapse paradigm, in which 128 adult, daily smokers (M age = 35.9; CPD = 21.0) delayed smoking for 5 min increments (maximum of 50 min total) in exchange for decreasing amounts of money. Immediately prior to each choice, participants rated their current craving

level and negative mood. Over the duration of the lapse paradigm, 98 participants (76.6%) chose to smoke. Discrete-time hazards models were used to examine predictors of time to smoking lapse. **RESULTS:** Nicotine dependence level, CO level, time since last cigarette, gender, and income did not predict time to lapse, $ps > .13$. Craving immediately prior to the first choice predicted greater risk of smoking lapse over time, $p < .001$. When dichotomized at the median, smokers with high vs. low craving prior to the first choice had a four-fold higher risk of smoking lapse ($HR = 4.2$). However, this risk decreased over time, such that higher craving levels prior to the first choice predicted lapse risk only at early, but not late, time points. **CONCLUSIONS:** Results suggested that, when provided opportunities to smoke, early craving levels predicted risk of lapse in the short-term (<30 min), but not long-term. Further examination of moment-to-moment changes in craving and negative mood and their associations with smoking lapse behavior will be reported using time-varying covariate and regression models. Findings may elucidate important dynamics of craving that occur during smoking cessation attempts that expand our understanding of smoking motivation and inform intervention research.

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POS2-7

NICOTINE PROFOUNDLY IMPACTS SYNAPTIC PLASTICITY IN THE ORBITOFRONTAL CORTEX DURING LATE ADOLESCENCE, BUT NOT ADULTHOOD

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More than 90% of adult smokers report their first use of tobacco before the age of 18. Evidence shows that smoking during adolescence increases the vulnerability to addiction and decreases the rate of successful quitting. Additionally, the rapid increase in electronic cigarette usage in adolescents raises serious concerns about the effects of nicotine exposure on the brain during this critical period of development. One brain region that continues to develop during adolescence and early adulthood is the orbitofrontal cortex (OFC), which is highly involved with impulse control. Therefore, we assessed the impact of nicotine on long-term synaptic plasticity in the OFC in late adolescent and adult mice. We found that in adolescent mice, a high-frequency tetanic stimulation protocol could successfully induce long-term potentiation (LTP) in the OFC. In contrast, bath application of nicotine during tetanic stimulation induced sustained long-term depression (LTD). However, adult mice displayed neither the LTP nor the nicotine-induced LTD responses following our stimulation protocol. In order to determine a possible mechanism for the age-dependent effects, we used pharmacological and genetic approaches in conjunction with our LTP paradigm. These studies showed that the nicotine-induced reversal to LTD observed during late adolescence is mediated through neuregulin 3 (NRG3)-ErbB4 signaling. Furthermore, qPCR analysis indicated significantly higher expression of NRG3 and ErbB4 in the OFC, specifically during this period of late adolescence; this may represent the molecular driver behind nicotine's effect on OFC plasticity in adolescent and its loss of function in adult. The select vulnerability of OFC plasticity during late adolescence to nicotine exposure may underlie both higher rates of dependence and lower rates of quitting success in individuals exposed to nicotine during adolescence. Current studies are examining the long-term effects of chronic nicotine and withdrawal during adolescence on OFC neuroplasticity and concomitant behavioral consequences.

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POS2-8

NICOTINE DEPRIVATION INCREASES PAIN SENSITIVITY, NEUROGENIC INFLAMMATION, AND SECONDARY HYPERALGESIA AMONG DAILY TOBACCO SMOKERS

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SIGNIFICANCE: A recently proposed reciprocal model posits that pain and smoking interact in the manner of a positive feedback loop, resulting in greater pain and the maintenance of tobacco dependence. There is also reason to believe that abstaining from smoking may increase pain, which in turn could precipitate relapse. The goal of this study was to develop a human laboratory model of pain and smoking, and to assess multiple indices of experimental pain reactivity following a nicotine deprivation manipulation. **METHOD:** Daily tobacco smokers (43% female; M CPD = 22) were randomized to either extended deprivation ($n = 74$; 12-24 hours smoking abstinence) or continued smoking ($n = 63$) conditions prior to undergoing experimental pain assessment using a capsaicin model that approximates key features of clinical pain. **RESULTS:** Manipulation checks confirmed that deprived smokers (vs. continued smokers) endorsed more severe nicotine withdrawal ($F = 5.512, p < .05$), and evinced a greater reduction in exhaled CO ($F = 74.35, p < .001$). Results indicated that deprived smokers (vs. continued smokers) reported greater pain intensity ($p = .005, \eta_p^2 = .07$), and evinced larger areas of neurogenic inflammation ($p = .018, \eta_p^2 = .06$) and secondary hyperalgesia ($p = .014, \eta_p^2 = .06$). The effects of nicotine deprivation on pain intensity ratings were further shown to be mediated by severity of nicotine withdrawal ($b = 9.618, 95\% \text{ CI } 0.988, 25.345$). **CONCLUSIONS:** These results implicate both peripheral and central mechanisms of action in the effects of nicotine deprivation on experimental pain reactivity. We also observed a positive association between withdrawal scores and deprivation-induced sensitivity to pain. One implication of these findings is that smokers with co-occurring pain may experience a variety of negative pain-related sequelae during the early stages of a quit attempt. Indeed, increased pain as a function of smoking abstinence could undermine the goals of both pain and tobacco cessation interventions. Smokers in pain may benefit from tailored cessation interventions that account for the antithetical influence of smoking abstinence-induced amplification of pain.

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POS2-9

EFFECTS OF THE 5-HT_{2C} AGONIST, LORCASERIN, ON NICOTINE SELF-ADMINISTRATION IN NON-HUMAN PRIMATES

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The results of previous studies suggest that the 5-HT₂ family of receptors may be a promising target for novel medications to modulate the abuse-related effects of psychoactive drugs, including nicotine. The recent approval of the 5-HT_{2C} agonist lorcaserin (LOR) for chronic weight management by the FDA further suggests that, if effective in selectively decreasing nicotine self-administration in preclinical studies, LOR could rapidly move into clinical trials for the management of nicotine addiction. To this end, the present self-administration studies were conducted to evaluate the effects of acute and chronic treatment with LOR on nicotine - and/or food-maintained responding in non-human primates. In these experiments, adult rhesus monkeys ($N=3-4$) with >2 years of nicotine self-administration experience responded under a 5-response fixed-ratio (FR): time-out 10-sec schedule of food and IV nicotine (0.01 mg/kg/inj) reinforcement during daily 100-min sessions. In acute tests, LOR (0.1-1.0 mg/kg, IM) was administered 15-min prior to the beginning of behavioral sessions whereas, in a chronic regimen, LOR (0.1 mg/kg/hr, SC) was administered for 3-5 consecutive days via osmotic mini-pump. Results show that acute and chronic LOR dose-dependently decreased nicotine self-administration; intake decreased to <50% of baseline values at the highest dosage in both studies. Food-maintained responding was only modestly decreased by LOR administration in acute studies and unaffected in chronic studies. These results indicate that LOR reduces the reinforcing effects of nicotine and support further evaluation of LOR as a candidate pharmacotherapy for nicotine dependence.

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POS2-10

RESTING STATE FUNCTIONAL CONNECTIVITY IN TOBACCO SMOKERS AND ELECTRONIC CIGARETTE USERS: CORRELATIONS WITH GUT BACTERIAL DIVERSITY

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Electronic cigarettes (ecigs) are nicotine-delivering devices that are increasingly popular, especially among the young. A major open question is the extent to which tobacco cigarettes and ecigs affect brain functioning and if differences occur between these exposures. In addition, preliminary data in humans and rodents showed that the bacterial microbiome may be differentially altered by ecig use vs. cigarette smoking. We used brain functional MRI to study resting state functional connectivity (RSFC) in current cigarette smokers ($N=6$), ecig users ($N=8$), and non-smoking controls ($N=7$). We also collected stool and oral samples for microbiome analyses. Bacterial profiles were generated to assess total and viable bacterial populations by V4 16S sequencing of extracted DNA and cDNA, respectively. Alpha- and Beta-diversity metrics were used to compare bacterial diversity and composition between cigarette smokers or ecig users, and matched controls. For RSFC we used a series of regions hypothesized to be important for tobacco use disorder (accumbens, striatum; prefrontal cortices; precuneus; cingulate cortices) as seeds in ROI-to-ROI analysis. For microbiome studies, we collected stool samples and used operational taxonomic units (OTUs) as a measure of bacterial diversity in a preliminary analysis. Increased microbial richness is usually associated with good health measures. We found differences in RSFC between cigarette smokers and ecig users in several regions including: accumbens/med cingulate (higher in cigarette smokers), med prefrontal/precuneus, medial prefrontal/cerebellum crus 2, frontal medial orbital/temporal inferior cortex, and precuneus/thalamus (higher in ecig users). In most cases non-smoking controls had intermediate values between cigarette smokers and ecig users. Next, we performed correlations between RSFC and OTUs. We found that in all cases except nucleus accumbens/med cingulate, RSFC negatively correlated with OTUs. We are currently collecting additional data to complete these studies. In conclusion, our data suggests that ecig use has effects in certain brain regions different to that in cigarette smokers. In addition, RSFC between the regions that showed differences between cigarette smokers and ecig users negatively correlated with OTUs. If these preliminary data are confirmed in a larger cohort, the microbiome may be implicated in the effects that cigarette smoking and ecig use have on brain functioning, providing a novel therapeutic target.

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POS2-11

INTOLERANCE FOR SMOKING ABSTINENCE AMONG NICOTINE DEPRIVED, TREATMENT-SEEKING SMOKERS

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SIGNIFICANCE: The Intolerance for Smoking Abstinence Discomfort Questionnaire (IDQ-S) assesses distress tolerance specific to the experience of nicotine withdrawal. The IDQ-S has not been validated among nicotine deprived, treatment-seeking smokers. The present study sought to extend previous research by examining the relationship between the IDQ-S and various smoking and demographic variables, as well as with cue-elicited craving among abstinent, treatment-seeking smokers. **METHODS:** Abstinent, treatment-seeking smokers completed the IDQ-S, measures of nicotine dependence and reinforcement, and provided a smoking history before undergoing a smoking cue-reactivity procedure. Craving and negative affect were assessed pre- and post-cue presentation. **RESULTS:** IDQ-S Withdrawal Intolerance and Lack of Cognitive Coping were significantly and negatively correlated ($r = -0.35, p = .001$). IDQ-S Withdrawal Intolerance was significantly associated with nicotine dependence ($r = 0.59, p < .0001$), nicotine reinforcement ($r = 0.56, p < .0001$), and age ($r = -0.27, p = .01$) and significantly predicted cue-elicited craving ($F(1,83) = 6.58, p = .01, B = 0.27, \eta_p^2 = 0.07$). Lack of Cognitive Coping was higher among those never having made a quit attempt ($t(85) = -2.46, p = .02$, Hedge's $g = 0.72$) and who had higher levels of

smoking ($r = 0.22$, $p = .04$), lower nicotine dependence ($r = -0.26$, $p = .02$) and re-inforcement levels ($r = -0.25$, $p = .02$), and who were less educated ($t(85) = 2.56$, $p = .01$, Hedge's $g = 0.56$). **CONCLUSIONS:** The combination of nicotine deprivation and current motivation to quit smoking may differentially affect abstinence-related cognitive coping relative to tolerating withdrawal. Though withdrawal intolerance and lack of cognitive coping were associated with several smoking-related variables, only withdrawal intolerance was associated with heightened cue-elicited craving. These findings suggested that among abstinent, motivated-to-quit smokers, withdrawal intolerance may increase vulnerability to experience cue-elicited craving, which could, in turn, be associated with greater risk of relapse.

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POS2-12

CADMIUM AND LEAD BLOOD CONCENTRATIONS IN CIGARETTE SMOKERS, E-CIGARETTE USERS, DUAL SMOKERS AND NONSMOKERS

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SIGNIFICANCE: Among heavy metals, which are present in tobacco smoke, lead and cadmium are of particular importance. Both metals affect smokers' health. Cadmium is included into I group according to IARC classification based on sufficient evidence of the carcinogenicity in humans, while exposure to lead is linked to elevated blood pressure and increase risk of hypertension. The aim of the study was the assessment of blood level of lead and cadmium in individuals declaring to be nonsmokers, cigarette smokers, dual smokers and e-cigarette users. **METHODS:** The study involved 163 volunteers (F/M, 77/86) non occupationally exposed to lead and cadmium, who were divided into four groups: never smoking ($n=51$; $37.1 \pm 5.3y$), smoking for at least 2 years ($n=35$; $31.3 \pm 5.7y$), dual smokers smoking conventional cigarettes for at least two years and using e-cigarettes for at least 6 month ($n=29$; $26.8 \pm 5.8y$), e-cigarette users for at least 6 month previously smoking conventional cigarettes for at least two years ($n=48$; $30.1 \pm 5.8y$). Lead and cadmium in blood were determined by atomic absorption spectrometry. **RESULTS:** The mean blood concentration of lead and cadmium (micrograms/L (95% CI)) adjusted to age, sex and BMI were 12.6 ($10.9-14.3$); 15.3 ($13.6-17.0$); 14.9 ($12.8-17.1$); 18.4 ($15.3-21.5$) for blood lead and 0.371 ($0.101-0.641$); 0.495 ($0.225-0.766$); 1.796 ($1.447-2.143$); 1.817 ($1.325-2.308$) for blood cadmium in the nonsmokers, e-cigarette users, dual smokers and smokers group, respectively. Highly significant difference ($p < 0.0001$) was found between blood level of cadmium in nonsmokers or users of e-cigarette and smokers or dual smokers. **CONCLUSIONS:** The study suggests that smokers who completely switch to e-cigarettes and stop smoking conventional cigarettes may significantly reduce their exposure to cancer-causing cadmium. Whereas only slightly decreasing of blood concentration of lead in e-cigarette users and dual smokers in relation to blood concentration of lead in smokers may be a result of slow releasing of lead to the circulation from bone, where lead was accumulated during release of smoking the conventional cigarettes.

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POS2-13

COMBUSTIBLE CIGARETTES HAVE MET THEIR MATCH: THE NICOTINE DELIVERY PROFILE OF SECOND- AND THIRD-GENERATION ELECTRONIC CIGARETTES

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SIGNIFICANCE: While likely less harmful, e-cigarettes' efficacy as a viable public health strategy to end the use of combustible cigarettes will likely be determined by their ability to deliver cigarette-like levels of nicotine (~15ng/mL in 10-12 puffs). The present study examined the nicotine delivery profile of third (G3) versus second generation (G2) e-cigarette devices under naturalistic use conditions. **METHODS:** Twenty exclusive G2 and G3 users, vaping their own device, e-liquid flavor, and nicotine concentration, completed one laboratory session following a 12-hour nicotine abstinence. Participants completed a standardized 10-puff bout and then puffed *ad libitum* for 115 minutes. Venous blood samples were collected for plasma nicotine concentration. Subjective effects, device characteristics, e-liquid consumption, and nicotine concentration were assessed. **RESULTS:** G3 users, while vaping significantly lower nicotine concentrations (G3: 4.1 (2.9) mg/mL vs. G2: 22.3 (7.5) mg/mL, $p < 0.00001$) but using devices delivering significantly higher power to the atomizer [G3: 71.6 (50.0) watts vs. G2: 8.6 (1.9) watts, $p = 0.004$], achieved significantly higher plasma nicotine concentrations ($p < 0.05$) following the first 10 puffs [G3: 17.5 (12.9) ng/mL vs. G2: 7.3 (2.8) ng/mL], and following 25 [G2: 8.6 (4.4) vs. G3: 18.5 (13.0)] and 40 minutes [G2: 9.0 (5.4) vs. G3: 19.7 (13.0)] of *ad libitum* use. No significant differences in plasma nicotine concentrations were observed between 60 to 120 minutes. G3 users consumed significantly greater amounts of e-liquid than G2 users [G3: 4.7 (2.3) mg vs. G2: 0.5 (0.3) mg, $p = 0.0003$], suggesting compensation due to lower nicotine concentration. Vaping urges and withdrawal were significantly reduced following 10-puffs, with no significant differences between device groups. **CONCLUSION:** G3s are more efficient nicotine delivery devices than G2s, with a nicotine delivery profile and craving reduction capability matching combustible cigarettes. G3 users compensated for their low e-liquid nicotine concentration by vaping more e-liquid during the session, which may have negative implications for their exposure to harmful constituents. These findings have important implications for understanding the addiction potential of these devices and their viability/suitability as aids to smoking cessation.

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POS2-14

TOWARD REAL-TIME MONITORING OF BRAIN NICOTINE LEVELS IN ANIMAL MODELS.

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Four microbial enzymes that are naturally involved in metabolizing nicotine were examined for their potential use on amperometric biosensors that are designed to measure changes in nicotine levels in real time in brain tissue of animal models (rodents). The most promising enzyme identified was the flavoenzyme, 6-hydroxy nicotine oxidase, from the microorganism *Shinella sp* strain HZN7. A recombinant form of the enzyme was produced using a bacterial over-expression system and the enzyme was purified and its catalytic properties examined. The enzyme was also crystallized and its structure solved to a resolution of 1.4 Angstroms. Molecular docking studies were used to identify the binding conformation for nicotine within the active site of the enzyme and to predict mutations that would likely increase the binding affinity of nicotine within the catalytic pocket. Here we describe the structure of the six-hydroxy nicotine flavoenzyme and the effects of several mutations within the active site. Although showing only 26% sequence identity, the overall fold of the *Shinella* 6-hydroxynicotine oxidase was similar to the published structure of 6-hydroxynicotine oxidase from *Arthrobacter nicotinovorans*. The catalytic rate constant for nicotine was 5-fold greater than that of the nicotinovorans



enzyme whereas the Michaelis constant for nicotine binding was more than 12-fold lower. These differences were apparently due to a marked difference in the mechanism of binding of the nicotine within the active site in close proximity to the bound Flavin (FAD). Preliminary studies in which the engineered enzyme was bound to a microelectrode, validated it as a viable molecular scaffold for development of a nicotine biosensor.

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POS2-15

EFFECTS OF FILTER VENTILATION ON BEHAVIORAL ECONOMIC DEMAND FOR CIGARETTES: A PRELIMINARY INVESTIGATION

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Since the 1970s, the majority of cigarettes sold in the United States and abroad have featured ventilation holes cut into the filter designed to dilute mainstream smoke. Although initially introduced to produce a lighter-tasting and potentially safer cigarette, data have since suggested that filter ventilation instead increases total harm from smoking through a compensatory smoking mechanism. In the present study, we compared behavioral economic demand (i.e., consumption as a function of price) for ventilated and unventilated cigarettes as a measure of abuse liability. Following an initial cigarette sampling period, regular smokers ($N = 8$; additional data to be collected) of highly ventilated "light" or "ultra-light" cigarettes were provided with an experimental income and allowed to use this income to purchase unventilated and/or ventilated cigarettes of their usual brand across a range of prices. Unventilated cigarettes were prepared with tamper-evident tape around the filter to block ventilation holes; ventilated cigarettes were also prepared with tamper-evident tape to control for possible effects of tactile sensation and visual appearance, but this tape was located away from ventilation holes. At the end of each purchase session, participants received all cigarettes they purchased at one randomly selected price. In sessions in which only one cigarette type was available, demand measures were undifferentiated between ventilated and unventilated cigarettes. However, in sessions in which both cigarettes were available at equivalent unit prices, clear preference for ventilated cigarettes emerged ($p < .05$); that is, few participants purchased unventilated cigarettes at any price. Thus, the relative abuse liability of unventilated cigarettes depend on the availability of smokers' preferred, ventilated cigarettes. These data, combined with future investigations of variables that moderate this effect, may be used to inform regulatory policy regarding cigarette filter ventilation.

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POS2-16

RESTING-STATE NEURAL CIRCUIT CORRELATES OF NEGATIVE URGENCY: A COMPARISON BETWEEN TOBACCO USERS AND NON-TOBACCO USING CONTROLS

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SIGNIFICANCE: Negative urgency (i.e., a tendency to act rashly under extreme negative emotions) is related to tobacco use. However, its neural correlates are not well understood. Employing tobacco use as a candidate condition, this study examined neural correlates of negative urgency by measuring resting-state connectivity of hypothesized negative urgency-related brain regions. **METHODS:** Twenty-two tobacco users (mean age = 37.50, $SD = 13.32$; 36.4% males) and 21 age- and gender-matched non-tobacco using controls (mean age = 36.57, $SD = 13.78$; 38.1% males) were included from the Nathan Kline Institute's Rockland Project dataset. Participants completed the negative urgency subscale from UP-PS-P Impulsive Behavior Scale. A 5-minute resting-state scan and an MPRAGE anatomical scan were analyzed in FreeSurfer and AFNI. *A priori* seed regions included bilateral amygdala and temporal pole. After standard preprocessing steps, seed-based connectivity analyses created individual connectivity maps with each seed. Main effects of group and negative urgency were examined. **RESULTS:** Tobacco users and non-tobacco using controls did not differ in negative urgency

($t(41) = 0.63$, $p = .53$). Compared to non-tobacco using controls, tobacco users had stronger connectivity between the right amygdala and left medial orbitofrontal cortex (OFC; $p < .005$, $k = 100$). Across the entire sample, negative urgency was positively correlated with connectivity between both left and right temporal poles and left supramarginal gyrus. **CONCLUSIONS:** Using negative urgency-related brain regions, the seed-based connectivity analyses identified circuits associated with tobacco use or negative urgency. Amygdala and OFC are key regions in negative urgency, and the group difference in right amygdala – left medial OFC connectivity suggests that tobacco use is related to heightened connectivity strength in this circuit. Temporal pole is anatomically interconnected with amygdala and OFC, and is linked to visceral emotional responses to perceptual stimuli. Past research has found that supramarginal gyrus is associated with cigarette cue craving. Bilateral temporal pole – left supramarginal gyrus circuits found in this study suggest that craving may occur as an emotional response via negative urgency.

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POS2-17

N-ACETYL CYSTEINE ATTENUATES ROS PRODUCTION AND ASSOCIATED EAAT2 DOWNREGULATION DURING NICOTINE WITHDRAWAL IN THE NUCLEUS ACCUMBENS OF MICE

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SIGNIFICANCE: There is an immediate need to develop more effective smoking cessation aids due to the high relapse rate associated with the current ones. N-Acetylcysteine (NAC), the precursor to an endogenous antioxidant known as glutathione, has shown therapeutic potential in many neurological disorders. However, the scope of NAC's application in nicotine dependence and withdrawal are as yet unknown. **METHOD:** To evaluate NAC's efficacy and benefits during nicotine withdrawal, 24h prior to withdrawal, chronic saline- or nicotine-treated animals were administered either saline or NAC. Following 24h WD from either saline or nicotine, the animals were tested in the Open Field (OF) test and then evaluated for reactive oxygen species (ROS) generation via brain imaging. To investigate certain gene expressions, qPCR analysis was done on nucleus accumbens samples from the mice. **RESULTS:** We found that animals pretreated with NAC displayed anxiolytic effects in the OF and had significantly lower levels of ROS. QPCR analysis of nucleus accumbens samples from the mice implicates specific NADPH oxidases as the key producer of ROS during nicotine withdrawal. We find that nicotine withdrawal significantly increases expression of these molecules, which can be blocked through NAC treatment. Previous studies have shown that ROS generation can both regulate glutamate release as well as potentially negatively regulate the glial excitatory amino acid transporter, EAAT2. We find that while EAAT2 expression is reduced during nicotine withdrawal, this effect is absent in withdrawal animals pretreated with NAC. **CONCLUSION:** Altogether, our emerging evidence suggests that NAC pretreatment precludes ROS production and associated EAAT2 downregulation during nicotine withdrawal in the nucleus accumbens of mice. These data suggest that ROS generation may play a significant role in nicotine withdrawal; therefore, antioxidants targeting ROS production may be promising compounds for smoking cessation therapeutics.

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POS2-18

NICOTINE CONCENTRATION AND IDENTIFICATION OF CHEMICAL COMPOUNDS PRESENT IN VYPE E-LIQUID SOLUTIONS

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BACKGROUND: E-liquid solutions typically contain propylene glycol, vegetable glycerine, nicotine and flavourings. Previous studies have reported inaccurate labelling of nicotine concentration and concerns over the presence of undesirable substances such as diketones (e.g. diacetyl, acetyl propionyl and acetoin). This study aims to investigate both nicotine concentration and identification of chemical compounds present within the e-liquid solutions of a common product range avail-



able in the United Kingdom. **METHODS:** The e-liquid solutions were purchased from Vype (Vype, UK) at a nicotine concentration of 12mg/ml. The full flavour range was purchased: Blended Tobacco, Crisp Mint, Dark Cherry, VPure (Unflavoured), Golden Tobacco, Fresh Apple, Infused Vanilla, Rich Aniseed and Oriental Spice. Nicotine concentration was determined using a gas chromatograph (GC). Chemicals compounds present within the e-liquid solutions were identified using a gas chromatography/mass spectrometry (GC/MS) method. All experiments were performed at least in triplicate. **RESULTS:** GC analysis determined the nicotine concentration of the nine e-liquids to vary from 12.5mg/ml to 13.7mg/ml. The discrepancy from the labelled nicotine concentration (12mg/ml) was an average of +10.7%, ranging from +3.9% to +13.9%. GC/MS analysis of the nine e-liquids identified a total of 64 different compounds. All of the samples contained nicotine, propylene glycol and glycerine. Five flavours contained menthol and four contained 2-Butanone. With regards to diketones, no diacetyl or acetyl propionyl were detected in any of the samples. One sample (infused vanilla) contained acetoin. **CONCLUSIONS:** The e-liquid solutions analysed in this study demonstrated reasonable consistency and accuracy of nicotine concentration. It was demonstrated that a wide range of compounds were present in the e-liquid solutions, 64 in total. No diacetyl or acetyl propionyl were detected but one sample contained acetoin.

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POS2-19

VASCULAR ENDOTHELIAL OXIDATIVE STRESS LEADING TO HYPERTENSION: DEVELOPMENT OF AN AOP USING IN VITRO ASSAYS

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SIGNIFICANCE: Cigarette smoking is associated with a number of diseases including cardiovascular disease. Key events from exposure to cigarette smoke to the development of disease related endpoints can be mapped out in the form of an adverse outcome pathway (AOP). An AOP is a framework that can document a chain of biological effects induced by exposure to a chemical (cigarette smoke) that describe molecular and biological responses at the cellular, tissue, organ, whole body and population level. AOPs offers promise for researchers, regulators and risk assessors, forming toxicological and biological knowledge frameworks to aid risk assessment based on mechanistic reasoning and supporting biomarker discovery and validation. We have recent mapped out an AOP focussing on key events associated with the development of hypertension initiated by cigarette smoke-induced vascular endothelial oxidative stress. Oxidative stress contributes to endothelial dysfunction and can lead to impairment of endothelium-dependent vasodilation and hypertension as it has an inhibitory effect on endothelial nitric oxide (NO) production, which is critical for the maintenance of healthy vascular tone. **METHODS AND RESULTS:** Using bovine aortic endothelial cells (BAECs) and cigarette smoke aqueous extracts (AqE) from a 3R4F reference cigarette, we were able to model and further assess these endpoints *in vitro*. Exposure of BAECs to AqE resulted in significant changes to key events including a decrease in NO production with a concomitant increase in superoxide, and generation and accumulation of 4-HNE protein adducts. AqE exposure led to depletion of tetrahydrobiopterin (BH4) and total biopterin levels. Importantly, exposure of BAECs to AqE indicated a central role of the ubiquitin proteasome system (UPS) in AqE-induced eNOS dysfunction. **CONCLUSION:** our results provide strong *in vitro* evidence to support an AOP of vascular endothelial oxidative stress leading to hypertension. These endpoints combined with clinical data can serve as potential biomarkers of cigarette smoke-induced vascular endothelial dysfunction and help to provide foundation comparative data to support the assessment of novel tobacco and nicotine products.

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POS2-20

EFFECTS OF NICOTINE DEPRIVATION ON CURRENT PAIN INTENSITY AMONG DAILY TOBACCO SMOKERS

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Animal research has consistently demonstrated greater pain sensitivity during nicotine deprivation, and there is cross-sectional evidence that tobacco smokers may experience increased pain following periods of smoking abstinence. The goal of this study was to examine changes in self-reported current pain intensity as a function of nicotine deprivation among a sample of daily tobacco smokers ($N = 137$; 43.8% female; M CPD = 22.3) who were recruited to participate in a larger study of the effects of smoking abstinence on experimental pain reactivity. Participants were randomized to either deprivation (12-24 hrs smoking abstinence; $M = 17.5$ hrs since last cigarette) or continued smoking conditions. Current pain intensity (0-10 NRS) was assessed at baseline (study visit 1) and following the deprivation manipulation (beginning of study visit 2, prior to experimental pain induction). Manipulation checks indicated that deprived smokers scored higher on a measure of nicotine withdrawal ($p < .05$), and evinced a greater reduction in exhaled CO ($p < .001$) relative to continued smokers. ANCOVA (controlling for baseline pain, gender, age, and race/ethnicity) revealed a main effect of the deprivation manipulation, such that deprived smokers endorsed greater current pain intensity than continued smokers, $F(1, 129) = 7.65, p < .01$. Logistic regression further revealed that, among participants who reported zero pain at baseline ($n = 70$, 51% of the total sample), those who abstained from smoking were nearly 4 times more likely to endorse pain following the deprivation manipulation ($AOR = 3.70, p < .05$). These results suggest that daily tobacco smokers may experience increased pain during the early stages of smoking abstinence. Nicotine deprivation-induced amplification of pain could interfere with smoking cessation and may warrant tailored intervention. Future research would benefit from assessing the source of pain onset/exacerbation in the context of smoking abstinence. Future work should also examine the effects of nicotine deprivation among smokers with pre-existing and/or chronic pain.

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POS2-21

DIFFERENTIAL GENE EXPRESSION IN MUCILAIR™ AFTER EXPOSURE TO CIGARETTE SMOKE AND E-CIGARETTE AEROSOL

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SIGNIFICANCE: The use of e-cigarettes over recent years has increased significantly and potentially offers a safer alternative to combustible tobacco. Such widespread use holds great potential for reducing the harms associated with tobacco use and recently, for example, Public Health England stated that e-cigarettes are around 95% less harmful than conventional cigarettes. This reduction in harm however still needs to be fully scientifically proven. Advances in molecular biology and computational sciences offers new opportunities to apply innovative approaches to assess adverse biological responses for product risk assessment by combining omics screens with knowledge-based biological pathways. **METHODS:** This study investigated the use of RNA-sequencing and protein profiling of inflammatory cytokines in MucilAir™ lung epithelial tissues after exposure to aerosol from a commercially available closed system e-cigarette (Vype ePen) or smoke from a 3R4F reference cigarette. Functional endpoints, such as cytotoxicity, barrier function (TEERs), ciliary beat frequency and transcriptomic perturbations were compared after short repeated exposures to products, matched for puff profile and mass deposition. **RESULTS:** Results indicated reduced responses with e-cigarette aerosol exposure when compared to 3R4F cigarette smoke. Over 100 genes were differentially expressed at $FC > 1.5$ and $pFDR < 0.1$ following smoke exposure, compared to 0 genes with an e-cigarette aerosol, with these statistical filters. Looser statistical filters identified a few responsive genes for e-cigarette aerosol of which only two could be confirmed by qPCR. Gene enrichment analysis was conducted and predicted a response to 3R4F smoke exposure in biological processes involving inflammation and oxidative stress pathways. Out of a panel of 33 cytokines screened 8 were up-regulated ($FC > 1.5$ p -value < 0.05) following 3R4F

smoke exposure. CONCLUSION: E-cigarette aerosol caused limited perturbations in gene and inflammatory cytokine expression compared to conventional cigarette smoke as assessed using next generation sequencing-based systems biology approaches in 3D commercially-available reconstituted lung epithelial tissues.

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POS2-22

SMOKING BEHAVIOR OF WOMEN WHO DELIVERED PRETERM

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SIGNIFICANCE: Preterm birth (PTB) rate (8.9%) did not show decrease in the past two decades in Hungary, therefore it is a significant public health issue. Beside medical conditions, one of the most important reasons of preterm birth is maternal smoking before and during pregnancy. Aims to explore differences in the smoking behavior of women who delivered preterm and to assess the relationship between maternal factors and body weight of preterm babies. METHODS: We conducted a retrospective cohort study among mothers delivered with live born babies from 2009 to 2013 (N=16,150) in Hungary's 5 underdeveloped counties. Measures included birth outcomes, cigarette smoking patterns, nicotine dependence levels (Fagerstrom Test for Nicotine Dependence) during pregnancy, birth weight of newborns, and maternal residence, body mass index (BMI) and parity. Descriptive statistics and linear regression analyses were conducted to explore factors associated with newborn body weight. RESULTS: Eight percent (n=1284) of the total sample delivered preterm (<37th gestation week). Smoking prevalence prior to pregnancy/during pregnancy by gestation weeks were 57.8%/47.7% among those who delivered <28 gestation week; 46.4%/42.0% among those who delivered 28–31 gestation week (+6 days); 44.3%/38.9% among those who delivered 32–36 gestation week (+6 days); and 33.3%/24.6% among those who delivered ≥37 gestation week. PTB rate by nicotine dependence level was 6.6% among nonsmoker; 9.8% among very low dependents; 11.7% among low dependents; 13.8% among moderate dependents; and 17.8% among high dependents. Maternal smoking, rural residence, low maternal BMI and multiparity decreased preterm newborns' body weight (190 gram). CONCLUSIONS: Women who delivered preterm had high smoking prevalence prior to/during pregnancy and it also showed a significant effect on newborn body weight. Maternal nicotine dependence resulted notable PTB rate. Improving knowledge and practical skills of health providers is necessary in order to prevent smoking uptake in the young female population and promote cessation among pregnant smokers.

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POS2-23

GENETIC INFLUENCES ON TOBACCO USE AMONG AN ETHNICALLY DIVERSE COLLEGE STUDENT SAMPLE

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SIGNIFICANCE: Prior studies demonstrate that genetic factors influence tobacco use behaviors. However, heritability estimates vary across the lifespan and across stages of tobacco use behavior. A limited number of genetic variants associated with nicotine dependence and heavy smoking have been identified, primarily in adult Caucasian populations. An examination of the effects of individual variants and aggregate genetic variation can help to clarify mechanisms of underlying risk in younger and ethnically diverse populations. METHODS: Phenotypic data on smoking and DNA was collected in a sample of young adults (N=9892) as part of the Spit for Science project, which was conducted in an urban and ethnically

diverse university setting. For genetic analyses, participants were empirically assigned to the following 1000 Genomes Project based ancestry super-populations: African (AFR; N=1339), American (AMR; N=582), East Asian (EAS; N=557), European (EUR; N=3018), and South Asian (SAS; N=455). Genome-wide association studies were conducted separately by ancestral group and then meta-analyzed to potentially identify novel genetic variants influencing tobacco use behaviors, including: lifetime use of tobacco, age of onset, regular tobacco use, and the Fagerstrom Test for Nicotine Dependence (FTND), as well as two FTND items, cigarettes per day and time to first tobacco use after waking. SNPTest v2.5.2 was used to conduct these analyses, under an additive model only including markers with a minimum minor allele frequency of 0.005 and INFO score of 0.5. Heritability based on common genetic variants was also assessed using Genome-wide Complex Trait Analysis to estimate the proportion of phenotypic variance attributable to observed (non-imputed) genetic variants. RESULTS: No genome-wide significant genetic variants were identified for lifetime use of tobacco. Genome-wide significant genetic variants were identified for the other tobacco use variables, but none replicated findings from the Tobacco and Genetics Consortium. Heritability, estimated from genotypic data, for tobacco use behaviors varies from 0.21 to 0.44 in Caucasian college students (p-value <0.05). CONCLUSIONS: Genetic factors influence the liability to tobacco use behaviors in college-aged students, at both the individual variant and aggregate levels. College populations are a potential source of diverse samples for gene identification.

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POS2-24

DIFFERENCES ACROSS PRODUCTS MARKETING AS "SNUS" IN SWEDEN, U.S., AND INDIA

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Swedish snus is a moist finely ground product made with pasteurized tobacco. Manufacturing of snus is subject to a strict production standard that outlines specific requirements for tobacco type and processing, and specifies the allowable ranges of certain toxicants and carcinogens in the final product. Epidemiologic evidence indicates that exclusive use of Swedish snus is associated with the relatively low overall cancer risks, which can be attributed, at least in part, to its low levels of tobacco-specific N-nitrosamines (TSNA) – a major group of potent carcinogens in smokeless tobacco. Relatively recently, several new tobacco products marketed as "snus" started appearing in other parts of the world, including the U.S. and India. We analyzed a range of chemical constituents, including TSNA, nicotine and other tobacco alkaloids, nitrate, nitrite, and metals, in four brands of products marketed as snus: General (Sweden), Marlboro and Camel (U.S.) and Chai Khaini (India). The effect of storage conditions on the levels of several constituents was compared. We also incubated each product with saliva and sodium nitrite to investigate the potential formation of additional amounts of TSNA in oral cavity. Comparisons across various products marketed as snus revealed drastic differences in the levels of individual constituents, distinct TSNA and alkaloid profiles, and different capacity for TSNA formation in simulated saliva. For instance, the sum of three carcinogenic TSNA in General, Marlboro, Camel, and Chai Khaini was 0.27 µg/g, 0.77 µg/g, 1.25 µg/g, and 23.0 µg/g, respectively. Levels of individual TSNA varied from 50-fold to over 300-fold across products, and minor tobacco alkaloids nor nicotine and anatabine varied more than 5-fold. Levels of biologically available unprotonated nicotine were lowest in Marlboro snus and highest in Chai Khaini: 0.04 mg/g and 7.8 mg/g tobacco, respectively. Incubation with saliva led to a significant increase in the levels of some TSNA in Marlboro snus, and a slight increase in Chai Khaini, while General and Camel snus were not affected. Overall, these results suggest that toxic and carcinogenic potential varies drastically across the tested products. Deliberate labeling of some smokeless tobacco products as "snus", and the potential association of some of these products with the relative safety of Swedish snus, may be highly misleading.

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**POS2-25****ELECTROPHYSIOLOGICAL CORRELATES OF THE COGNITIVE EFFECTS ASSOCIATED WITH E-CIGARETTE WITHDRAWAL**

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SIGNIFICANCE: Nicotine withdrawal has been linked to deficits in a variety of cognitive domains; such as sustained attention, working memory and cognitive control. Cognitive control deficits are of special importance, since deficits in response inhibition can predict relapse in individuals quitting smoking. However, a characterization of the neural correlates of the nicotine-related inhibitory control deficits remains to be determined. In the present study we aimed to provide a temporal, spectral, and spatial dissociation of the neural correlates of those deficits. **METHODS:** Participants (N=17) were asked to refrain from using nicotine and caffeine for 4 hours prior to the testing session. Upon arrival a go/no-go task was administered. Participants were asked to hit a response button for a letter that was different than the letter presented immediately before, and to inhibit the response when it was the same. Following the first part of the session, participants vaped to satiation, using their own e-cigarettes. The go/no-go task was then presented again. EEG was recorded during the performance of the task. Time-frequency (TF) EEG/ERP analyses were conducted to isolate activity in delta (0-3 Hz) and theta (4-7 Hz) frequency bands. Inhibitory processes have been related differentially to activity in the delta and theta frequency bands. **RESULTS:** Our results showed that the effect of nicotine withdrawal was observed in the delta band (pre-post vaping difference, $t(16) = 2.96$, $p = 0.01$, while theta was unmodulated. Importantly, these effects were present only on the GO trials; indicating that the effects of withdrawal were strongest during motor execution (i.e., button press) rather than inhibition (i.e., withholding a response). **CONCLUSIONS:** Broadly, results are consistent with the idea that nicotine (e-cigarettes) withdrawal makes the task overall more difficult, requiring increased attentional resources in order to perform at non-withdrawal levels. Results from this study with e-cigarettes are consistent with withdrawal effects observed with cigarettes, suggesting similar underlying mechanisms of use.

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POS2-26**TOBACCO USE, CESSATION KNOWLEDGE AND ATTITUDES OF SENIOR NURSING STUDENTS IN TWO CANADIAN BACCALUREATE NURSING PROGRAMS**

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SIGNIFICANCE: Registered nurses, as the largest group of health professionals, could play an important role in disease prevention, especially in assisting patients to quit smoking. Little information is known about the tobacco use, cessation knowledge and attitudes of senior nursing students towards engagement in nicotine addiction management in Canada. The objectives of our project were to estimate the prevalence of tobacco use, knowledge regarding tobacco cessation techniques, attitudes and perceived competency of senior nursing students to address tobacco issues with future patients. **METHODS:** An online survey was administered to senior undergraduate nursing students in two baccalaureate degree programs at the University of Alberta. The survey comprised 32 questions regarding demographics, tobacco use, tobacco education received in nursing program, knowledge and perceived competencies regarding tobacco cessation interventions. **RESULTS:** A total of 294 senior nursing students were invited to participate in the online survey, with 258 (87.7%) completing the survey. Prevalence of current cigarette, cigar/cigarillo and waterpipe smokers (use within the past 30 days) was 9.7%, 5.4%, and 5.4% respectively, and ever smokers being 39.5%, 37.7%, and 43.5% respectively. Nursing students reported learning most about public health and disease causation epidemiology, and least regarding pharmacotherapy, counseling and motivational interviewing. The majority reported feeling comfortable administering medications to assist with tobacco cessation, however, they indicated that they did not feel that they had enough training about interventions to do so

and did not consider themselves competent to counsel smokers seeking help to quit. **CONCLUSIONS:** Current tobacco use was relatively high among the nursing students who responded to our survey. These data, allied to the perceived lack of confidence to initiate independent tobacco cessation activities with potential patients, underscore the importance of initiating tobacco cessation programs targeted at nursing students and developing education modules specifically directed toward improving competency in tobacco addiction management.

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POS2-27**EPIGENOMIC APPROACH TO UNRAVEL METHYLATION SIGNATURES REACTIVE TO SMOKING IN FINNISH POPULATION**

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SIGNIFICANCE: DNA methylation mediates the environmental effects on gene expression regulation. Cigarette smoking represents one of the strongest environmental influences on DNA methylation, with differential methylation patterns detected in current vs. never smokers. Results from epigenome-wide association studies (EWAS) conducted to date suggest that methylation patterns are partially population-specific. Identification of smoking-responsive DNA methylation loci specific to a population will aid in reliable classification of smokers. Furthermore, population-specific methylation changes serve as biomarkers to treat smokers efficiently. **METHODS:** We aimed to (1) identify population-specific methylation patterns in current vs. never smokers from Finland (2) identify gender-specific and age-specific differences, and (3) replicate the results in a Finnish twin cohort sample. We used the population-based FINRISK/DILGOM2007 data, with self-reported smoking status to perform an EWAS on current (n=119) vs. never (n=247) smokers, using 450k methylation data obtained from whole blood. **RESULTS:** We identified 56 significant CpG sites that were differentially methylated between current vs. never smokers, including a known smoking-related gene *AHRR*. Though many of our significant CpGs have been identified in previous studies, we also identified novel CpG sites that may be specific to the Finnish population. Gender-specific EWAS identified different CpGs in males (n=58 current smokers, n=83 never smokers) and females (n=61 current smokers, n=149 never smokers). Similarly, age-specific EWAS identified different CpGs in 25-50 years group (n=67 current smokers, n=109 never smokers) and 51-74 years group (n=52 current smokers, n=138 never smokers). Finnish Twin Cohort methylation data is used to replicate the findings from EWAS performed on Finnish population. **CONCLUSIONS:** In conclusion, Finnish population-specific EWAS identified several smoking-responsive methylation changes that have been reported in earlier studies. In addition, we identified novel methylation changes that may be specific to Finnish population, and might serve as population-specific biomarkers.

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POS2-28**ASSESSMENT OF THE PARAMETERS THAT INFLUENCE NICOTINE DELIVERY IN ELECTRONIC CIGARETTES**

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SIGNIFICANCE: Nicotine may exist in three different forms due to the presence of two nitrogen atoms in its structure ($pK_{a1} = 3.12$, $pK_{a2} = 8.02$): diprotonated ($Nich_2^{2+}$), monoprotonated ($Nich^+$) and free base nicotine (Nic). Nicotine partitioning between these forms affects its physicochemical properties and bioavailability. Free-base nicotine is thought to be the only form that diffuses through epithelial tissues in human body. Thus, assessing the total amount and the form of nicotine delivered to the human body is of high importance. In tobacco cigarettes, nicotine is present in its protonated forms, however, all forms of nicotine may be present in e-liquids of electronic cigarettes (ECIGs) as indicated by the wide range of commercial pH values of the corresponding aqueous extracts (pH ~ 4.8-9.6). When present in protonated forms, nicotine is associated with a counter anion commonly



believed to be a carboxylate ion. Physical and chemical parameters have been shown to affect nicotine yield in cigarette mainstream smoke. However, the extent to which these factors play a role in ECIG is still unknown. Hence, a series of studies will be presented to assess the vaporization of nicotine from ECIGs and the parameters that may affect the nicotine yield in aerosols. **METHODS:** Newly developed extraction and gas chromatography-mass spectrometry (GC-MS) methods were developed to determine total nicotine and nicotine partitioning in ECIG liquids and aerosols. The corresponding counter nicotine anions were quantified using high performance liquid chromatography (HPLC). **RESULTS:** Results report the percentages of Nic in standards and commercial ECIG liquids and aerosols as a function of the many variables associated with ECIGs including e-liquid pH, original nicotine concentration, type of the counter ion and power. **CONCLUSIONS:** It is reported that nicotine partitioning varies considerably across commercial ECIG liquids, and that these differences can persist when the liquids are vaped. To the extent that nicotine form can affect nicotine delivery to bloodstream, these findings suggest that ECIG liquids of a given total nicotine concentration may result in different nicotine uptake efficiencies when vaped. The nature of the counter anions was shown to have no effect on total nicotine delivery from ECIG, in agreement with previous reports about tobacco cigarettes. Polycarboxylic acid counter anions, however, decompose during vaping leading to enrichment of the aerosol with free base nicotine.

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POS2-29

EFFECT OF AEROSOLIZED CANNABIDIOL ON HUMAN BRONCHIAL EPITHELIAL CELLS

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BACKGROUND: Although electronic cigarettes (EC) were originally developed to deliver aerosolized nicotine to lungs, recent data has shown that users can also use them for inhaling other drugs, including cannabinoids like tetrahydrocannabinol (THC) and cannabidiol (CBD). Little is known about the health effects of vaporized cannabinoids. The aim of this study was to test the acute inhalation toxicity of vaporized CBD. **METHODS:** We exposed bronchial epithelial cells (H292) cells to aerosol generated from EC refilled with flavored solution with and without (control) CBD as well as with nicotine only (comparator). Aerosol was generated from an eGo tank EC with a smoking machine using the following puffing conditions: 55ml puff volume, 3sec duration, 30sec intervals. H292 cells were cultured in a monolayer and exposed to EC aerosol via air-liquid interface (ALI). The *in vitro* toxicological effects were assessed after 30min exposure (55 puffs) using the following methods: 1) a trypan blue exclusion assay (to measure cell viability) and 2) neutral red uptake assay (to examine metabolic activity). **RESULTS:** We found significant differences in viability and metabolic activity as compared to air after exposure of H292 to the flavored aerosol with CBD. However, no significant differences were observed in the toxicity of CBD-containing vs. CBD-free products. When the effects of flavored aerosol with CBD were compared with that of nicotine we found that nicotine had less of a cytotoxic effect for both viability and metabolic activity, however these differences were not significant. **CONCLUSIONS:** Exposure to CBD aerosol generated from EC has a cytotoxic effect on H292 cells. However, this cytotoxic effect seems to be primarily caused by flavoring additives. Future studies are needed to examine the effects of CBD by itself as well as with other flavors to determine the long term effects of this product.

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POS2-30

ELECTRONIC CIGARETTES INCREASE CELLULAR REACTIVE OXYGEN SPECIES AND REDUCE CELLULAR ANTIOXIDANT CAPACITY

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BACKGROUND: Electronic cigarettes (ECs) are devices that deliver nicotine via an aerosol from a humectant-nicotine mixture heated by an atomizer. ECs also contain genotoxins such as heavy metals, aldehydes and propylene glycol in addition to other carcinogens similar to the ones found in tobacco smoke. Cigarette smoke is the main risk factor for head and neck squamous cell carcinoma (SCC). Previous studies have shown that tobacco smoke causes significant DNA damage in head and neck SCC cells. Despite unknown long term health effects, the use of ECs has increased drastically over the past decade. More than 13% of American high school students and 10% adults reported using ECs in 2015. This popularity and lack of studies on the health effects of EC use remains a major concern. **AIM:** To examine the effects of EC aerosol exposure in cancer oral epithelial cells by evaluating the cellular reactive oxygen species (ROS) levels, and total antioxidant capacity (TAC). **METHODS:** Oral cancer epithelial cells (UM-SCC-1) were exposed to low doses (10 puffs/5L) of EC aerosol (NJOY and eGo) extract for short and long term. For short-term effects, cells were exposed to EC aerosol for 10 minutes and 1h. For long term effects, cells were exposed to EC aerosol every other day for 2 weeks. Mainstream smoke extract was used as a positive control. Levels of ROS and TAC were evaluated using the 2',7'-dichlorofluorescein diacetate (DCFDA) Cellular ROS Detection Assay Kit (Abcam), and the Antioxidant Assay (Cayman), respectively. **RESULTS AND CONCLUSION:** Short and long term exposure to EC aerosols caused a significant increase in ROS levels. Interestingly, we observed an increase in TAC at 10 minutes exposure for both EC aerosols followed by a significant decrease in TAC after 1h for NJOY, but not for eGo. This observation suggests that the effect on TAC is EC aerosol dependent. These data suggest a mechanism by which EC aerosol exposure can affect the cells by dysregulating the TAC and ROS machinery. By decreasing the TAC, cellular oxidative stress increases which can potentially lead to increased genotoxicity and tumorigenesis.

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POS2-31

CONSTITUENT YIELDS IN THE SMOKE OF ROLL-YOUR-OWN CIGARETTES: THE EFFECT OF TOBACCO TYPE, TUBE CHARACTERISTICS, AND SMOKING INTENSITY

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Roll-your-own (RYO) cigarettes are prepared by smokers from loose tobacco rolled into a paper leaf or inserted into an empty cigarette tube with the aid of a personal cigarette-making machine. Consumption of such cigarettes increases in the U.S. and worldwide, as a response to increased taxation on manufactured cigarettes. Similar to manufactured cigarettes, constituent yields in the smoke of RYO cigarettes, and subsequent exposures in smokers, may depend on a variety of factors, including tobacco blend and amount, cigarette physical characteristics, and the intensity of smoking. Adding to this complexity, RYO prepared by using pre-made cigarette tubes can present a custom combination of tobacco variety and cigarette tube characteristics. We analyzed nicotine and the tobacco-specific nitrosamines NNN and NNK in RYO cigarettes prepared in our laboratory by using a personal cigarette-making machine (Top-O-Matic, Republic of Tobacco L.P.). We used 16 types of loose and pipe tobacco representing three brands (Good Stuff, Gambler, and Golden Valley), each available in a range of varieties (ex., regular, gold, menthol). Each tobacco type was used with the cigarette filter tubes of various designs (king-size and 100-mm, regular and gold), and the prepared cigarettes were smoked on a smoking machine using ISO smoking regimen. The constituents were analyzed by liquid chromatography-tandem mass-spectrometry. The yields of NNN and NNK in all tested cigarettes averaged 150 and 128 ng/cigarette, respectively. The yields were higher in cigarettes made with "regular" than with "gold" tubes and in cigarettes made with 100-mm tubes than with king-size

tubes. There was substantial variation in the relative effect of tobacco variety and cigarette tube characteristics on smoke yields across the tested brands. Overall, the results show that smoking machine yields of carcinogenic constituents in the smoke of tested RYO cigarettes are comparable to those in manufactured cigarettes. Future studies should establish the range of constituent yields in RYO cigarettes made by the actual users, and use biomarker-based approach to characterize exposures in smokers of these cigarettes.

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POS2-32

INCREASED SENSITIVITY AND ABILITY TO DIFFERENTIATE NICOTINE DOSE IS EVIDENT IN SMOKING BUT NOT NON-SMOKING POPULATIONS

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INTRODUCTION: Individuals regularly consuming tobacco products represent a population with long-term exposure to nicotine. Nicotine is a transient receptor potential subtype A1 (TRPA1) agonist and menthol, a nicotine replacement therapy (NRT) additive TRPM8 and TRPA1 agonist. Nicotine and menthol can cause burning sensations, however eucalyptus represents an alternative to mask nicotine induced burning. Furthermore, TRPA1 is involved in acute nociception, allodynia and hyperalgesia and may influence transitions from acute to chronic pain conditions. The aim of this study was to assess differences between smokers and non-smokers in intra-oral psychophysical responses to differing doses of nicotine and determine if smoking status influences the effectiveness of NRT additives. **METHODS:** A nicotine dose-response (NDR) and a eucalyptus additive (EucaA) study was performed on non-smokers (N=30 and 17) and otherwise healthy smokers (N = 25 and 23) who received in a randomized, double-blind, cross-over fashion 4 different nicotine polacrilex gums. The NDR study contained 0, 2, 4 and 6 mg nicotine gum and the EucaA study contained 4 mg of nicotine gum alone or in combination with eucalyptus in the core and/or coat. Irritation and burning were assessed on a digital visual analogue scale (VAS) throughout a standardized 10 min chewing regime. Area of irritation and burning were assessed on an intra-oral body chart 5 min and immediately following chewing. A taste-experience questionnaire assessed acidity, bitterness, saltiness, sweetness, strength of the taste, freshness, and gum softness on a 10 cm VAS. **RESULTS:** The NDR study showed that regardless of dose, non-smokers had similar irritation and burning profiles in response to all gums containing nicotine, whereas smokers showed graded responses. The EucaA study revealed that the additive partially masked the burning sensations but only in smoking populations. **CONCLUSIONS:** More sensitive and heightened intra-oral psychophysical responses to long-term exposure of nicotine, via cigarette smoking, are novel findings that reflect a significant modulation of neurophysiologic mechanisms of the oral somatosensory system.

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POS2-33

THE *IN VITRO* ASSESSMENT OF AN E-CIGARETTE (VYPE EPEN)

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SIGNIFICANCE: There has been significant growth in the number of smokers currently using next generation products including e-cigarettes. E-cigarette products do not contain tobacco and the toxicants are greatly reduced in comparison to conventional tobacco products, suggesting they are potentially much safer than conventional cigarettes. The use of products like e-cigarettes, therefore, holds great

potential for reducing the harm associated with tobacco use but this needs to be scientifically proven. In 2001, the US Institute of Medicine introduced a framework for studying the potential of novel products to contribute to tobacco harm reduction. The US FDA have since provided a draft framework to assess novel tobacco and nicotine products for their harm reduction potential. The EU Tobacco Products Directive however, provides another approach for tobacco regulation, providing guidance for tobacco products and e-cigarettes. **METHODS AND RESULTS:** We have developed a framework of tests to understand our products, characterise the aerosol emissions and assess the biological impact. This study describes the *in vitro* assessment of a commercially available e-cigarette; Vype ePen comparing results to a reference 3R4F cigarette. Vype ePen was assessed using *in vitro* toxicological assays specifically measuring mutagenicity and cytotoxicity, and showed greatly reduced responses relative to cigarettes. Human cellular based *in vitro* assays that model some of the key events for chronic obstructive pulmonary disease and cardiovascular disease were employed. The data from these assays indicated that the biological response to Vype ePen aerosol was significantly lower relative to the reference cigarette. *In vitro* dosimetry techniques qualified the aerosols delivered to the cells, ensuring consistent deliveries, matched for puff profile and mass deposition. **CONCLUSION:** The *in vitro* assays employed were able to distinguish responses between Vype ePen e-cigarettes and a 3R4F reference cigarette. E-cigarettes have the potential to be reduced risk versus cigarettes, however further studies investigating the longer terms effects of e-cigarettes on consumers is required to substantiate disease relevant risk reduction.

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POS2-34

CHANGES IN CIGARETTE DESIGN OVER THE PAST DECADE AMONGST TOP BRANDS

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SIGNIFICANCE: The 2009 Family Smoking and Prevention Tobacco Control Act gave the Food and Drug Administration (FDA) the authority to regulate tobacco products, including a requirement that manufacturers disclose their product design, contents, and emissions, and requirements for substantial equivalence determinations before the marketing of new or modified products. As part of these regulations, descriptors such as "Light" and "Ultra Light" have been eliminated and replaced with color descriptors such as "Gold" and "Silver" or other descriptive terms such as "Smooth". The current study sought to examine whether the design features of leading cigarette products had changed substantially following the advent of FDA regulation. **METHODS:** Top U.S. cigarette brands from both 2006 and 2016 were collected, and main physical cigarette design parameters tested. **RESULTS:** Mean ventilation did not change substantially (26.8% in 2006 vs. 28.1% in 2016; $p = 0.478$). However, cigarette length (2006 = 81.2mm, 2016 = 82.1), tobacco weight (2006 = 0.1333g, 2016 = 0.6793g), tobacco length (2006 = 57.7mm, 2016 = 53.2mm), filter length (2006 = 23.4mm, 2016 = 23.8), filter density (2006 = 130.71mg/cm³, 2016 = 118.88 mg/cm³), and cigarette pressure drop (2006 = 106.78mmH²O, 2016 = 115.74mmH²O) showed significant changes in measurements ($p \leq 0.012$). We find that cigarette features have remained broadly stable over the last decade, though there were trends toward heavier tobacco weight, longer cigarette and filter lengths with shorter tobacco rod lengths, and less dense filters. **CONCLUSIONS:** Researchers should continue to monitor cigarette design over time.

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**POS2-35****IMPORTANCE OF NEGATIVE RESULTS IN TOBACCO REGULATORY SCIENCE: NEGATIVE RESULTS WITH THE RAT MICRONUCLEUS ASSAY FOR NNK AND THE UTILITY OF THE COMET ASSAY IN ASSESSING NNK GENOTOXICITY.**

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One key component to public health-based tobacco regulatory science field includes a detailed knowledge of harmful and potentially harmful constituent (HPHC) toxicity and potential exposures resulting from tobacco products. It is important to consider both "positive" and "negative" results as they relate to HPHC toxicity and the field of tobacco regulatory science. Positive results include data describing observed toxicity such as cancer slope factors, mode of action analyses, and exposure assessments. However, "positive" does not imply "favorable." Instead, "positive" refers to studies that record findings that significantly differ from concurrent and appropriate controls present in the study design. By contrast, a science-driven approach to tobacco regulation also focuses on negative results: not only studies showing a lack of effect, but also the identification of study designs that cannot answer scientific questions important to tobacco regulation. Recent results generated in collaboration with the FDA National Center for Toxicological Research (NCTR) investigating the mutagenicity and clastogenicity of NNK are a case in point. These results assess the relative genetic toxicity of NNK, a confirmed genotoxin, via the oral, inhalation, and intra-peritoneal routes using the rat micronucleus and comet assays. Using the comet assay, NNK genetic toxicity was readily observed in several organs. By contrast, the rat micronucleus was negative regardless of the route of administration of NNK. One possible explanation for this disparity is that the CYP enzymes required to metabolically activate NNK to its toxic form are present in the tissues tested with the comet assay and not present in the bone marrow, which is the tissue relevant to the micronucleus assay. Even without an explanation for this disparity, the lack of positive findings for the micronucleus assay in blood from rats for which NNK exposures were confirmed, indicates that the rat micronucleus assay may not be capable of assessing the genetic toxicity of tobacco products containing differing amounts of NNK.

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POS2-36**CHARACTERISING KEY THERMOPHYSICAL PARAMETERS TO HEAT AND NOT BURN TOBACCO IN A PROTOTYPE TOBACCO HEATING PRODUCT**

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Heating instead of burning tobacco has the potential to significantly reduce the levels of combustion-derived toxicants in the aerosol formed as compared to cigarette smoke. A number of "tobacco heating products (THPs)" are commercially available in some countries. Different heating methods (charcoal source vs battery-powered resistive heater) and heating temperature profiles have been described in patents or literature. In principle the heating temperature applied has to be sufficiently high to release tobacco volatiles, nicotine, and any added aerosol agents such as glycerol, but not too high as to cause extensive tobacco pyrolysis or induce self-sustained smouldering as in a lit cigarette. In this work we describe 5 steps to characterise a novel tobacco heating product, irrespective of its heating mechanism. Step 1 - thermogravimetric analysis (TGA) of the tobacco material in its final "consumable" form is conducted using a relevant heating rate and atmosphere. The technique is widely used in characterising biomass thermal behaviour and the literature indicates the first major thermal breakdown region for the common biopolymers (e.g., cellulose, hemicellulose, pectin and lignin), also present in natural tobacco and/or engineered tobacco materials (reconstituted tobacco), is around 250 to 350°C, depending on the material and the heating parameters used. Step 2 - Characterising the maximum heating temperature applied to the

tobacco material. This could be approximated by the heater temperature and/or directly measured using a fine thermocouple inserted to the specific location of the tobacco consumable that experiences the maximum temperature. Step 3 - Analysis of the key pyrolysis and combustion markers for the tobacco: the level of CO, CO₂, NO and NO_x. Step 4 - Quantification of a broad range of known cigarette smoke toxicants. Step 5 - Examination of the physical integrity of the tobacco consumable post intended use to assess the extent of any degradation resulting from any pyrolysis/combustion of the material. We illustrate the use of this 5 step approach with a prototype THP and present our overall conclusions as to whether the inhalable aerosol is generated through thermal evaporation and distillation, or pyrolysis and combustion processes as in a burning cigarette.

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POS2-37**DELAY AND PROBABILITY DISCOUNTING BETWEEN COMMODITIES AS A FUNCTION OF NICOTINE DEPENDENCE**

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SIGNIFICANCE: The literature indicates that smokers discount delayed monetary rewards more than nonsmokers or former smokers but is less clear on whether there relationship hold when monetary rewards are discounted as a function of the probability that they will be delivered. Further there is some controversy about the degree of domain-independence, that is, whether individuals who discount the value of delayed monetary rewards also discount the value of delayed other rewards more steeply. These issues speak to whether discounting as a general process is a marker for specific smoking profiles, independent of commodity or type of cost. **METHODS:** Current smokers, former smokers and never smokers were recruited to explore the role of smoking history and nicotine dependence in the valuation of commodities differentially related to cigarettes: alcohol, money. All participants performed the MCQ (Kirby et al 1999 JEP: General 128, 78-87) to assess delay discounting (choice between small rewards available immediately versus larger rewards available after a delay) as a function of commodity type and three delayed commodity amounts. An MCQ task was developed to assess probability discounting (choice between small rewards available with p(receipt)=1 versus larger rewards available with p(receipt)< 1). Both MCQs were compared to standard discounting tasks. Participating were sensitive to delay and probability, and were affected by commodity amount. **RESULTS:** Never and current smokers conformed to previously reported findings for delay and probability discounting for money but also for alcohol. However, differences between former smokers and never smokers varied as a function of discounting type and commodity. For delay discounting, former smokers discounted delayed money only more than never smokers. However for probability discounting, former smokers discounted money more but alcohol less. **CONCLUSIONS:** These data indicate that only delay discounting for monetary rewards differentiates smoking profiles, although discounting of the different commodities was correlated within subjects. Probability discounting was unrelated to smoker status.

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POS2-38**NICOTINE PRETREATMENT INCREASES SENSITIVITY TO INSTRUMENTAL EXTINCTION**

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SIGNIFICANCE: As a test of two opposing hypotheses, the present experiment was performed to examine the durable effects of nicotine pre-exposure on sucrose reinforcement and responding in extinction. **METHODS:** Rats were pre-treated with ten doses of 0.4 mg/kg nicotine (n = 9) or saline as a control (n = 9), and then all experienced operant acquisition, extinction, and reacquisition sessions. Pre-session ad-lib feeding was used to devalue the sucrose reward prior to some sessions. **RESULTS:** Reward devaluation by prefeeding resulted in significantly less responding for both groups. The reward devaluation procedure failed to



produce discernible differences between the saline and nicotine pre-treated rats under conditions of reinforcement, such that between-group differences were not observed in either acquisition or reacquisition. In extinction, however, the nicotine pre-treated group demonstrated significantly less responding. CONCLUSIONS: Nicotine pretreatment resulted in faster extinction, and the motivational deficits created by nicotine exposure were most evident when the sucrose reward was devalued in extinction. The extinction sessions were carried out a week or more after the termination of drug dosing, so the effects of nicotine exposure appear to be durable, but evident only under particular motivational conditions.

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POS2-39

PRODUCT CHARACTERIZATION AND STABILITY TESTING ON STANDARDIZED ELECTRONIC NICOTINE DELIVERY SYSTEM

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We present characterization data on a reference electronic nicotine delivery system (ENDS) developed under a grant from the National Institute for Drug Abuse. The ENDS product is a "vape-style" device and comprises a replaceable pre-filled liquid reservoir ("tank") and a rechargeable power supply unit. Important features include: breath actuation, a tank and battery of sufficient capacity to satisfy users for > 1 day on a single unit, primary packaging of the tank with excellent oxygen and water vapor barrier properties to ensure a long shelf life, and power control to maintain a constant aerosol output from puff to puff. Registration lots of ~3000 tanks were manufactured and subsequent release testing certified that the product met specifications for the e-liquid (nicotine content, impurities, pH) and aerosol (nicotine content, total particulate matter (TPM), impurities, particle size). Specifications are based on developmental data from the research ENDS and scientific and regulatory literature. Lots entered stability trials in late 2015 at standard pharmaceutical storage conditions. Through August 2016, data have been acquired through 6 months at 40°C/75% relative humidity (RH) and 9 months at 25°C/60% RH. E-liquid attributes show minimal to no trends with storage time. Of note, nicotine content has not changed at the 25°C condition despite decreasing about 10% after 6 months at 40°C. Nicotine-related impurities myosmine and nicotine N-oxide increase ~10 ppm over 9 months at 25°C but remain well below specification levels. Aerosol properties (TPM, nicotine content, carbonyl degradation products, and particle size) are not trending during storage thus far. The second phase of the small business contract is underway. The contract includes execution of a pharmacokinetics (PK) study in the last quarter of 2016, along with a safety assessment of the e-liquid ingredients and additional chemistry characterization. The ENDS product has a Drug Master File registered with FDA's Center for Drug Evaluation and Research as of December 2015. Following completion of the PK study and non-clinical requirements from FDA, the product will be available to clinical researchers.

FUNDING: National Institute of Drug Abuse and NJOY

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POS2-40

ARE SMOKERS BECOMING MORE HARDCORE? CHANGES TO THE PREVALENCE OF HARDENING INDICATORS IN THE CONTEXT OF DECLINING SMOKING PREVALENCE IN VICTORIA, AUSTRALIA, 2001-2012

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BACKGROUND: Between 2001 and 2012, a comprehensive tobacco control program in the state of Victoria, Australia contributed to significant reductions in smoking prevalence. The hardening hypothesis predicts that as these reductions occurred, the remaining population of smokers will have become more hardcore; that is, less interested in quitting, with higher levels of nicotine dependence, and higher rates of co-morbidities. In this study, we examined whether the prevalence of hardening indicators has increased (supporting the hardening hypothesis) or decreased (contrary to the hardening hypothesis) as population smoking prevalence has declined. METHODS: Annual cross-sectional telephone surveys ran-

domly sampled Victorian adults aged 25+ from 2001 to 2012 (min N=1963 in 2001; max N=4503 in 2008), weighted to adjust for age and sex distributions. Smoking prevalence was measured each year, along with several behavioural indicators of hardening. The prevalence of smokers categorized as hardcore in each year was also examined. Adjusted linear and logistic regression analyses examined changes over time. RESULTS: Contrary to the hardening hypothesis, as the prevalence of smoking reduced from 20.3% in 2001 to 14.2% in 2012, the prevalence of hardcore smokers and five of the six hardening indicators (cigarettes per day; daily smoking; no quit attempt ever; no quit attempt in past 5 years; no intention to quit) also decreased. Furthermore, these changes occurred to the same extent among males and females, younger and older smokers, and smokers from disadvantaged and advantaged socio-economic groups. CONCLUSIONS: Rather than hardening, the remaining population of smokers in Victoria appears to be softening over time: they are smoking less frequently and fewer cigarettes per day, are more interested in quitting, and are more likely to have attempted to quit at least once in their lifetime and at least once in the past five years. These findings complement similar patterns observed in New Zealand, the United States, and the European Union. They challenge the assumption that the adoption of a harm reduction approach is necessary to achieve further reductions in smoking prevalence.

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POS2-41

NICOTINE YIELDS IN ROLL-YOUR-OWN CIGARETTES MADE FROM DIVERTED NICOTINE PATCHES

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BACKGROUND: Correctional services are increasingly restricting smoking by inmates and staff within correctional facilities. Nicotine patch misuse associated with the introduction of smoke-free prisons has previously been reported. Two main methods for making cigarettes from tea-leaves and patches are currently known. Both involve sandwiching a normal tea-leaves between two patches and then applying these "sandwiches" against a heat source (boiling water such as an electric kettle or a radiator over night) This study attempted to model these methods in the laboratory and measured the content of nicotine in the leaves and in the smoke when the leaves were burnt. METHODS: "Sandwiches" were made from three brands of nicotine patches and 0.8g of tea-leaves. These were then (a) laid flat over a heat radiator kept on overnight, approximately 16 hours at ~40°C or (b) placed in a glass beaker that was then placed in a larger beaker with gently boiling water, to create a double boiler, for 30 min at ~100 °C. The tea was then removed from the sandwich and rolled via cigarette rolling paper into 0.8 g cigarettes. All three products were smoked on a Borgwaldt LX-1 smoking machine following the Coresta Method N°22. Finally 3R4F cigarettes were also smoked as a control. The smoke was collected on a Cambridge filter, extracted with 20ml of isopropanol containing 0.5mg/ml quinine as the internal standard, and resulting extract was analyzed using GC-NPD. RESULTS: Nicotine was transferred to the tea using both methods. The double boiler method provided the highest yield 4.2-23.8 mg/gram while the radiator yield provided the lowest 2.6-14.5 mg/gram. The patch brand also had a significant effect on nicotine transfer with nicotine yields ranging from 2.6±0.2 to 23.8±6.3 mg/gram. On average 2.3±0.7 mg of nicotine was released from single cigarette into mainstream smoke, a yield higher than our reference cigarettes. CONCLUSIONS: Both methods of creating "Teabacco" transferred nicotine from the patch to the tea leaves effectively. Correctional facilities may need to consider use of nicotine patches under supervision or use alternative smoking cessation medicines.

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**POS2-42****EVALUATION OF OUTDOOR SMOKING RESTRICTIONS IN ONTARIO, CANADA**

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SIGNIFICANCE: There have been few reported evaluations of the implementation and effects of outdoor smoking bans. The new Smoke-free Ontario Act regulations banning outdoor smoking on playgrounds, sports fields, and restaurant and bar patios provide a unique opportunity to learn from an outdoor smoking policy in a large jurisdiction. **METHODS:** The evaluation included street intercept surveys with 1,305 respondents 46% of whom were smokers in 4 municipalities, an online survey of tobacco enforcement staff and key informant interviews. **RESULTS:** Smokers reported smoking less frequently at all affected venues in 2015 compared to pre-ban. The greatest drop was on restaurant and bar patios (83% to 47%). A significant decrease was noted in self-reported smoking over time on both playgrounds (42% to 18%) and sports fields (64% to 39%) in municipalities with no pre-existing bylaw. Self-reported exposure to SHS at all affected venues decreased in 2015 compared to pre-ban. The greatest drop was at restaurant and bar patios (85% to 57%). Two-thirds of respondents were aware of the ban on smoking on restaurant and bar patios; while just 54% were aware of the sports fields and playgrounds bans. The majority of respondents believed that their use of venues would not be affected by the bans (73% sports fields and playgrounds, 71% park festival or fairs, and 51% restaurant and bar patios); 33% believed their use of restaurant and bar patios would increase. Almost half of smokers (42%) believed that the new bans would help them quit or cut down on number of cigarettes. Enforcement staff perceived compliance to be highest at restaurant and bar patios (89% strong compliance), followed by playgrounds (71%) and sports fields (55%). **CONCLUSION:** The outdoor bans appear to have had a positive effect on reducing smoking behaviour and exposure to SHS at affected venues. However the levels of self-reported SHS exposures are still high. Together these findings suggest that more work needs to be done to increase public awareness and compliance at sports fields and playgrounds. Capacity constraints, signage and a similar pre-existing bylaw were the main challenges to implementing the regulations.

FUNDING: Ontario Ministry of Health and Long-term Care

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POS2-43**BLUNT CULTURE: SOCIAL MEDIA USER ENGAGEMENT WITH CIGARILLO AND MARIJUANA-RELATED ACCOUNTS ON INSTAGRAM**

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OBJECTIVE: With the rapidly changing tobacco use and media landscape, tobacco control science and policy often lag behind. Social media, such as Instagram, are disproportionately popular among populations traditionally at risk for dual tobacco and marijuana use, such as youth, young adults and ethnic minorities. The objective of the present study was to investigate the level of engagement of social media users with LCC and dual use related content posted by influencer accounts (e.g., brands and smoking-related community accounts) on social media. **METHOD:** Keyword rules were used to collect LCC-related posts from the Instagram API from 03/01/16 to 02/29/16. Posts were coded for dual product use and user engagement strategies (brand ambassador recruitment/celebrity "shout-outs") and were classified as co-use and tobacco only, using a combination of machine learning methods, keyword algorithms, and human coding. A sample of vendor and social community accounts with the highest output activity was selected to retrieve lifetime post volume. Post metadata (e.g., number of likes, ratios of likes to followers, comments to followers) were analyzed to assess user engagement over time. **RESULTS:** Over the twelve-month period, LCC-related post volume increased from 107,280 to 139,981 posts per month. Co-use related volume increased from 50,950 to 70,803 posts and the total number of post likes increased by over 40%. LCC brand and social community accounts generating the highest engagement featured celebrities (Executive Branch Cigarillos) and sponsored musicians/DJs (Swisher Sweets). Community accounts featuring ostensible "peers" and using sex appeal (The Stoner Chicks, Blunt Culture) had higher engagement, compared to the accounts that predominantly featured product images (Cigar Social Club). **IMPLICATIONS:** Such consumer engagement strategies as music-themed promotion and celebrity endorsements have been stopped for cigarettes due to youth appeal but are widely used by LCC companies on social media. The marketing

proliferation and high level of engagement with dual use messages on Instagram warrants urgent need for surveillance and serious attention from public health.

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POS2-44**CHINESE URBAN SMOKERS' BELIEFS OF PREMIUM BRAND CIGARETTES AND THE IMPACT ON BRAND SWITCHING BEHAVIOUR: FINDINGS FROM ITC CHINA SURVEY**

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SIGNIFICANCE: The China National Tobacco Company (CNTC) produces a huge number of cigarette brands with most sales being of non-premium brand cigarettes (NPBCs). However, because household incomes have risen rapidly and tobacco prices have remained stable, premium brand cigarettes (PBCs) have become more affordable, especially in Chinese cities. Since PBCs yield greatest profits, CNTC has aggressively marketed and promoted them, claiming that PBCs are better in quality and taste, less harmful than NPBCs, and ideal for gifting. Little is known, however, about the prevalence of and reasons for PBC use among Chinese smokers. **METHODS:** Data are from a longitudinal cohort of Chinese urban smokers of Wave 3 (2009) and Wave 4 (2011-12) of the International Tobacco Control (ITC) China Survey in 7 cities. Adjusted general estimating equations (GEE) were used to estimate prevalence of PBCs and NPBCs and reasons for use. **RESULTS:** From Wave 3 to 4, PBC prevalence almost doubled (10.5% to 19.8%, $p < 0.0001$). PBC smokers ($N = 7141$) were more likely to report that their brands were higher in quality (OR=1.44, CI:1.15-1.80) and less harmful (OR=1.25, CI:1.02-1.54), compared to NPBC smokers. PBC smokers were also more likely to have received PBCs as a gift (OR=2.06, CI:1.66-2.57). Wave 3 NPBC smokers that switched to PBCs by Wave 4 were more likely to believe that the quality of PBCs was higher (OR=1.7, CI:1.10-2.64) than Wave 3 NPBC smokers who did not switch. **CONCLUSIONS:** Chinese urban smokers believe that PBCs are higher in quality and less harmful, and prefer PBCs in cigarette gifting – all consistent with CNTC's aggressive marketing strategies. The higher affordability of PBCs, the misconception of lower harm and the perception of higher quality, all contribute to Chinese smokers continuing to smoke or switching up to PBCs. These factors all constitute significant barriers to cessation. Strong tobacco control strategies, such as tax increases leading to price increases, education campaigns against the misperception about PBCs, and further limitations on CNTC's marketing, are critical in order to counteract the attractiveness of PBCs and to increase motivation to quit.

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POS2-45**PHARMACISTS' VIEWS ON RESTRICTING TOBACCO AND E-CIGARETTES SALES TO PHARMACIES ONLY: A CROSS-SECTIONAL SURVEY IN NEW ZEALAND**

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BACKGROUND: A tobacco forecasting model has been used to suggest that tobacco retail outlet reduction may help contribute to the tobacco endgame in New Zealand (NZ), (Pearson et al, *Tob Control* 2015;24:e32-8). Such outlet reduction



could involve restricting sales to pharmacies only (van der Deen et al, *JAMA* 2014;12:559). We therefore aimed to obtain the views of pharmacists towards such strategies to inform potential feasibility. **METHODS:** Structured face-to-face interviews with pharmacists in the Wellington City region (capital city of NZ) were conducted in March/April 2015. The response rate was 97% (30/31). **RESULTS:** Pharmacists thought the likelihood of their pharmacy selling tobacco (if tobacco was made a "pharmacies only" product as part of an endgame strategy) was: 23% "not likely at all", 33% "not very likely", 17% "somewhat likely", 15% "very likely", and 13% "extremely likely". But these figures changed "if such a program was proved to be effective in Iceland" (a country which has considered this option and may do so again) to 43%, 20% and 17% for the latter three categories. Nicotine-containing e-cigarettes are currently illegal to sell in NZ but when asked if their pharmacy would be likely to sell these, "if made pharmacy only", most pharmacists were positive (33% "somewhat likely", 40% "very likely", and 17% "extremely likely"). More generally, the pharmacists agreed (17%) or strongly agreed (80%) that pharmacists and pharmacy staff have a role in supporting smoking cessation and providing pharmacotherapy to smokers wanting to quit. In terms of the provision of another public health measure in NZ that operates via pharmacies of clean injecting equipment to injecting drug users, 40% agreed and 30% "strongly agreed" with this program. **CONCLUSIONS:** This small survey is suggestive of moderate level of pharmacist support in limiting tobacco sales to pharmacies as part of a tobacco endgame strategy – especially if it can be shown to work elsewhere. Most would also be supportive if e-cigarettes were to be made pharmacy-only products.

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POS2-46

BE MARLBORO IN THE PHILIPPINES: INFLUENCES AND APPEAL AMONG YOUTH

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BACKGROUND: The Philippines is a key market for tobacco companies. More than a quarter of Filipino adolescents ages 13-15 report ever having smoked cigarettes and one in ten non-smoking youth report intentions to start in the coming year. Advertising is a powerful tool to promote tobacco initiation and use among youth. Of particular concern is Philip Morris' (PMI), *Be Marlboro*, a global marketing campaign introduced in the Philippines in 2013. This mixed-methods study examined the influence of the campaign on youth intentions to smoke. **METHOD:** A cross-sectional survey of 626 13-17 year-old adolescents was conducted in spring 2016 in Metro Manila, Philippines. Multivariable logistic regression with intention to smoke as the outcome used the following covariates: demographic characteristics; smoking status; receptivity to; and the likeability, appeal, as well as brand purchase intention and prior exposure to, *Be Marlboro* advertisements, compared to those for three comparison brands. Six focus groups were also conducted to examine young peoples' response to the campaign. Themes were compared within and across groups. **RESULTS:** A minority of survey respondents (11.1%) reported intention to smoke. After adjusting for covariates, the likeability (OR=2.00; 1.12-3.59) and brand purchase intention (OR=1.50; 1.10-2.05) of *Be Marlboro* significantly increased the odds of youth intention to smoke. Similarly, both moderate (OR=5.21; 1.45-18.68) and high receptivity (OR=11.04; 3.20-38.15) to advertisements significantly increased intention to smoke compared to low receptivity to advertisements. No differences were observed by sex, smoking status, or socio-economic status; and no significant effects on intention to smoke were observed for the comparison brands. Among focus group participants, non-smokers and lower-SES youth responded more positively to the campaign, describing the ads as promoting "adventure" and "freedom." **CONCLUSION:** *Be Marlboro* is associated with increased intention to smoke among Filipino youth who like the ads, perceive them to be effective, and are receptive to tobacco advertising. The study findings demonstrate how *Be Marlboro* contributes to youth intention to smoke.

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POS2-47

TOBACCO POWER WALLS INFLUENCE ADOLESCENT SMOKING RISK BY CHANGING PERCEIVED NORMS OF SMOKING: AN EXPERIMENTAL STUDY OF MEDIATING MECHANISMS

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Tobacco use is a learned and socially mediated behavior and cigarette advertising, especially at Point-of-Sale (POS), is known to increase the likelihood that adolescents will start smoking. Tobacco "power walls", which are usually placed in a highly conspicuous location at POS (typically behind the cashier) and display hundreds of different cigarette packages, are known to be a key source of the impact of POS tobacco advertising on risk for smoking in adolescents. However the mechanisms by which tobacco power walls influence adolescents' intention to smoke is not well understood. The current study sought to assess potential mediators of the power wall effect in an experimental study where the visibility of the tobacco power wall is manipulated to be hidden or observable behind the cashier. Our study was conducted in the RAND StoreLab (RSL), a true-to-life convenience store developed to experimentally evaluate how tobacco advertising at POS influences tobacco use risk and behavior. A sample of 146 adolescents (age 11-17; 58% female; 56% Caucasian, 29% African-American) was randomized to shop in the RSL under two conditions: one where the power wall was located in its typical position behind the cashier and the other where it was hidden behind an opaque wall. Participants shopped in the RSL and, upon exiting, completed measures of future risk of smoking, perceived smoking norms (percent of peers who smoke), and perceived availability of cigarettes. Participants' movements in the store were electronically tracked, including the amount of time they spend in front of the cashier. Results revealed that the tobacco power wall significantly increased the risk of future smoking by 14.3% (total effect) compared to when the power wall was hidden ($p=.01$) and 14% of this effect was mediated by participants' perceived smoking norms (i.e., the power wall increased their perceptions of the percentage of their peers who smoke, which in turn increased their risk of smoking). Although the condition in which the tobacco power wall was present led to participants' spending more time in front of the cashier, it did not mediate the effect study condition ($p=.62$). Perceived availability of cigarettes also did not play a role in the association between study condition and smoking risk ($p=.46$). In summary, the tobacco power wall increases adolescents' smoking risk and this effect is partly explained by the effect of the power wall on teens' perceptions of the how normative smoking is.

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POS2-48

PREVALENCE AND PREDICTORS OF E-CIGARETTE TRIAL AMONG ADOLESCENTS IN ARGENTINA

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BACKGROUND: Over the last few years, the increasing use of electronic cigarettes, commonly known as "e-cigarettes", has become a new public health problem that threatens to interfere with established tobacco control strategies. Since 2011, Argentina has had a complete ban on marketing and sale of e-cigarettes. However, e-cigarettes are marketed online and can be easily bought in stores. We conducted a longitudinal study to evaluate the prevalence and the determinants of trying an e-cigarette among early adolescents in Argentina. **METHODS:** A school-based longitudinal study was conducted in 2014-15, in 3 large cities in Argentina. In both waves, trial of e-cigarette use was assessed by asking: "Have you ever tried an e-cigarette?". Among students who reported never smoking an e-cigarette at baseline, we assessed demographics, media use, sensation seeking, smoking behavior, network member smoking, use of other substances, and perception of e-cigarette risk as potential risk factors for e-cigarette trial at follow up (mean between-wave interval 17.1 months) using multilevel logistic regression models with random intercepts for schools. **RESULTS:** E-cigarette trial prevalence increased by 322% from baseline (1.8%; $n=57$) to follow up (7.1%; $n=139$). Among those who had not smoked e-cigarettes at baseline, 7% had tried e-cigarettes by follow-up. Independent predictors of e-cigarette use at follow up included: higher sensation seeking (OR: 1.49 95% CI 1.21-1.84); being a current smoker (OR: 2.58

95% CI 1.38-4.83); having close friends that smoke cigarettes (OR: 1.93 95% CI 1.25-2.99) and being highly exposed to tobacco product ads online (OR: 1.87 95% CI 1.04-3.36). Attending a public school was the only protective factor (OR: 0.40 95% CI 0.22-0.73). Of the 111 students who were current smokers and had not tried an e-cigarette at baseline, 17% had tried an e-cigarette at follow-up and 63.2% of them were still current smokers (dual use). CONCLUSION: In Argentina, illicit trial of e-cigarettes among early adolescents is low but appears to be rapidly increasing. Identifying students at risk could help identify policies and programs to prevent increasing use in this population.

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POS2-49

SECONDHAND SMOKE EXPOSURE IN PREGNANT WOMEN: ANALYSIS OF THE NEWBORN EPIGENETIC STUDY COHORT

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SIGNIFICANCE: Secondhand smoke (SHS) exposure during pregnancy is linked to negative birth outcomes, though many women are unaware of their level of exposure, limiting the utility of self-report. The current study aimed to identify individual and environmental factors associated with SHS exposure in a sample of pregnant women. METHODS: Participants were drawn from a prospective study of pregnant women conducted between 2009-2011 in Durham, North Carolina. Demographics and maternal health factors were collected. Blood samples were collected during pregnancy and assayed for cotinine. Mean cotinine levels were compared before and after a statewide ban on smoking in public areas (implemented 1/1/2010). The sample included 850 women, mean age=27.6, SD= 5.7; 53% Black/African American, 39.1% White, 7.9% Hispanic/Other; 14% less than high school, 20.8% high school degree/GED, 23.3% some college, and 38.9% college graduate. RESULTS: Using recommended cut points, 190 (22.4%) women were identified as active smokers, though only 10.1% of women self-reported smoking. Among self-reported non-smokers with plasma cotinine levels indicating SHS exposure (515 women, 60.6%), 35.8% denied SHS exposure at work and/or home. Further, SHS exposure was highest in younger ($F(2, 653)=9.17, p<.001$), less educated ($F(3, 639)=6.62, p<.001$), Black/African American ($F(2, 657)=8.38, p<.001$) women. Controlling for race, age, wave of study recruitment, and education, non-smokers' (indicated by plasma cotinine) mean cotinine levels were significantly higher prior to 2010 ban compared to after the ban, $F(1,634)=12.15, p=.001, d=.39$. CONCLUSIONS: Results replicate previous findings that certain demographic characteristics are linked to higher risk for SHS exposure in pregnancy. Self-report may be an unreliable measure of actual SHS exposure, and living or working in environments without obvious SHS did not confer sufficient protection for pregnant women. Notably, a statewide ban on smoking in public spaces reduced SHS exposure for non-smokers. These data can inform SHS prevention efforts for pregnant women and influence public policy, especially in a region lacking in comprehensive smoke-free legislation.

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POS2-50

EVALUATING IMPLEMENTATION OF FLAVORED TOBACCO POINT-OF-SALE RESTRICTIONS ON RETAIL ENVIRONMENTS IN MINNEAPOLIS AND SAINT PAUL, MINNESOTA

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SIGNIFICANCE: Point-of-sale (POS) restrictions are seen as a potentially effective policy strategy as cheap, flavored tobacco products flood the market. Increasing varieties and wide availability of flavored cigars, shisha, blunt wraps and e-cigarettes make these products appealing to young people. Minneapolis became one of a few jurisdictions to restrict the sale of flavored tobacco products (excluding menthol) to adult-only tobacco shops in January 2016. The neighboring city of Saint Paul followed in April 2016. This research examines the impacts of implementing these local restrictions on the retail environment. METHODS: POS assessments were conducted in a random sample of convenience and grocery stores to assess availability of flavored tobacco products. Minneapolis assessments (n=41) took place in November 2015 and June 2016 and Saint Paul assessments (n=36) were completed in February and June 2016, pre- and post-adoption of policies, respectively. Assessments (n=14) were also conducted in Brooklyn Park, a comparison city, in June 2016. RESULTS: Following policy implementation, access to flavored tobacco products greatly decreased. Post-implementation, flavored tobacco products were licensed to be sold in approximately 20 of Minneapolis's 300-plus vendors. Saint Paul saw a similar decline. Significantly fewer vendors were selling flavored tobacco post-policy implementation in Minneapolis (39% post vs. 85% pre; $p<.0001$) and Saint Paul (8% post vs. 97% pre; $p<.0001$). In Minneapolis, the most common violation was the presence of flavored cigars which was noted in 32% of retailers post-policy. In both cities, unflavored tobacco product inventory increased (Saint Paul: $p<.0001$; Minneapolis: $p=0.0011$), filling the shelf space previously occupied by flavored products. Flavored tobacco was significantly more available in the comparison city where 100% of vendors sold flavored tobacco products. CONCLUSIONS: These data demonstrate that POS restrictions are effective in limiting access to flavored tobacco products. Additional efforts to increase compliance with POS policies may be needed. Future efforts will examine the impact of these policies on youth tobacco use.

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POS2-51

SPATIAL AND TEMPORAL DISPERSION DIFFERENCES BETWEEN EXHALED E-CIGARETTE AEROSOL AND CIGARETTE SMOKE EMISSIONS

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The prevalence of e-cigarette use is increasing amongst smokers worldwide. Many of today's most controversial regulations for e-cigarettes, including use in indoor spaces, are founded on read across from existing tobacco product regulation. There are fundamental differences between the two product categories with regards to potential environmental exposures, notably since e-cigarettes do not contain tobacco or generate side-stream emissions. Here we assess the spatial and temporal patterns of exhaled e-cigarette aerosol at a bystander's position, and compare it with conventional tobacco cigarette emissions. Smokers were asked to use e-cigarettes or smoke conventional cigarettes in a room-simulating chamber. Volunteers used the products at different distances from the bystander, represented by a heated mannequin, and under different room ventilation rates. Aerosol particle concentrations and size distributions at the bystander's position were assessed using a Fast Mobility Particle Sizer and an Electrical Low Pressure Impactor instrumentation. For both product types, the particle concentrations registered following each puff were in the same order of magnitude. However, the main differences were observed a few minutes after the start of the experiments. For e-cigarettes, the particle concentration returned rapidly to background values within seconds after each puff, while for conventional cigarettes it increased with



successive puffs, returning to background levels after 30-45 minutes. Unlike for e-cigarettes, this was dependent upon the ventilation rate. Particle size measurements showed that e-cigarette aerosol particles evaporated almost immediately after exhalation thus affecting the removal of particles through evaporation rather than displacement by ventilation. Significant differences between emissions from electronic and conventional cigarettes are reported. Exhaled e-cigarette particles are mainly liquid droplets evaporating rapidly with the distance; conventional cigarette smoke particles are far more stable and linger.

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POS2-52

BUILDING CAPACITY FOR TRAINING TOBACCO TREATMENT SPECIALISTS THROUGH A TRAIN-THE-TRAINER PROGRAM: A COMPARISON OF THREE TRAINING MODELS

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INTRODUCTION: Trained tobacco treatment specialists (TTSs) and high quality TTS training programs are needed to improve access to evidence-based tobacco dependence treatment. To meet this demand, the University of Massachusetts (UMass) Medical School developed the Train the Trainer in Tobacco Treatment (T4) program to build a cadre of trainers to deliver the accredited UMass TTS training programs. This paper reports on the feasibility and quality of TTS trainings led by Certified UMass TTS Trainers (Trainer-led) compared with trainings led by UMass staff at UMass (On-site) and at host sites (Off-site). **METHODS:** Data were collected between September 2014 and November 2015. Feasibility was assessed by the number of Trainers, Trainer-led programs and participants. Quality was assessed by comparing participant exam results and evaluations of the three training program types. **RESULTS:** Eighteen Certified Trainers completed the T4 program in 2014, and 50% conducted at least one TTS training. There were six Trainer-led (98 participants), three On-site (91 participants) and five Off-site (139 participants) programs. There were no significant differences across training types in participant exam scores [On-site=87.60 (SD=7.08); Off-site = 85.76 (SD=7.74); Trainer-led=87.57 (SD=5.57)] or perceived improved ability to deliver tobacco dependence treatment [On-site=2.93, Off-site=2.88, Trainer-led=2.93; $p=0.37$ (3-point Likert scale, 1=not at all, 3=a great deal)]. Overall satisfaction with the course was high in all models [On-site=3.85; Off-site=3.73, Trainer-led=3.80 (4-point Likert scale, 1=very dissatisfied, 4=very satisfied), with a significant difference between On-site and Off-site ($p=0.024$)]. Very few differences were found in ratings of module content and instructor performance. **CONCLUSIONS:** The Trainer-led model expanded the number of UMass-trained TTSs and resulted in equivalent participant knowledge and perceived improvement in their ability to deliver tobacco dependence treatment compared to existing training models. This model offers a potentially more accessible and affordable option for training TTSs as one of three equally effective training methods.

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POS2-53

COMPLIANCE WITH FEDERAL REGULATIONS OF WARNING LABELS IN TOBACCO MAGAZINE ADVERTISEMENTS, 2010 – 2014

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BACKGROUND: Family Smoking Prevention and Tobacco Control Act mandates warning labels in cigarette and smokeless tobacco advertising. No studies examined warning labels in tobacco advertisements. **METHODS:** We analyzed 945 advertisements from Kantar Media that appeared in magazines, 2010-2014. Inter-coder reliability was above 0.90 using Krippendorff's alpha for all variables. **RESULTS:** Majority of advertisements ($n=828$, 87.6%) had warning labels; 67 advertisements had two labels. Warning labels were framed ($n=816$, 98.6%) except in 12 e-cigarette advertisements (1.4%). Top warning labels for cigarettes was "cigarette smoke contains carbon monoxide" ($n=110$, 31.1%) and for smokeless

tobacco was "smokeless tobacco is addictive" ($n=75$, 35.9%). Majority of warning labels appeared in footer ($n=374$, 45.2%) or lower left corner ($n=325$, 39.3%) of advertisements. Area of framed warning labels ($M=58.8$, $SD=62.2$) occupied on average 9.88% ($SD=8.30$) of entire advertisement. Warning labels were absent in 117 advertisements (12.4%): 3 cigarette (0.8%), 69 cigar (51.9%), 2 pipe (100%), and 43 e-cigarette (51.2%) advertisements. Half of advertisements ($n=554$, 58.6%) had disclaimers: 221 cigarette (61.9%), 199 smokeless tobacco (95.2%), 35 snus (24.5%), 33 cigar (24.8%), 51 e-cigarette (60.7%), and 15 dissolvable tobacco (88.2%) advertisements. Majority of disclaimers were age-related (e.g., legal age tobacco) ($n=511$, 59.9%) or product/ingredient-related (e.g., organic tobacco does not mean a safer cigarette) ($n=233$, 27.3%). **CONCLUSION:** Tobacco companies used warning labels that do not communicate disease risks. Labels occupied small percentages of advertisements. These practices violate mandates to rotate warnings and devote 20% of advertisement area to warnings. Oversight is necessary to ensure compliance with regulations.

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POS2-54

SMOKING ASSESSMENT AND CESSATION ASSISTANCE IN COMMUNITY HEALTH CENTERS AFTER IMPLEMENTATION OF AN ELECTRONIC HEALTH RECORD-BASED INCENTIVE PROGRAM

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SIGNIFICANCE: Despite evidence that brief smoking cessation interventions in primary care settings are effective, delivery of appropriate cessation services remains low. The Centers for Medicare and Medicaid Services' Meaningful Use of Electronic Health Record (EHR) Incentive Program could increase the use of EHRs for providing cessation assistance for Medicaid and Medicare patients. This study examined if smoking status assessment, smoking cessation assistance, and odds of being a current smoker, changed after implementation of Stage 1 Meaningful Use. **METHODS:** This observational study used data from both discrete EHR fields and free-text fields (via natural language processing) extracted from 26 community health centers with an EHR in place by 6/15/2009. Adjusted odds ratios were computed for each binary outcome (smoking status assessment, readiness to quit assessment, counseling given, medications ordered/discussed, current smoking), comparing 2010, 2012, and 2014, separately for pregnant and non-pregnant patients. **RESULTS:** Odds of smoking status assessment and cessation assistance increased significantly after meaningful use implementation (2014) for all outcomes among non-pregnant patients, with a corresponding significant decrease in odds of smoking ($p<0.01$). Among pregnant women, there were no significant differences in odds of current smoking or cessation medications ordered/discussed in 2014 vs. 2012. Compared to non-pregnant patients, a lower percentage of pregnant women were assessed for readiness to quit or provided counseling in 2014. **CONCLUSIONS:** The findings suggest that implementation of EHR-based incentive programs can increase the odds of smoking status assessment and cessation assistance, which could lead to substantial decreases in smoking rates among vulnerable populations.

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POS2-55

IMPACTS OF SMOKE-FREE LEASE EXEMPTIONS ON COMPLIANCE AND SMOKING BEHAVIOUR IN AFFORDABLE HOUSING

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SIGNIFICANCE: Multi-unit housing is a major source of tobacco smoke exposure from adjacent units, common areas and outdoor locations. Exposure may be especially high in affordable or subsidized housing (i.e., social, public, community, not-for-profit). Comprehensive smoke-free policies are increasingly adopted to protect tenants from tobacco smoke exposure, however little is known about the impacts of including lease exceptions (i.e., grandfathering existing tenants) on compliance and smoking behaviour. We examined two Canadian affordable housing providers with comprehensive smoke-free policies- one with and one without lease exemptions. This study provides new knowledge that supports the adoption and implementation of comprehensive smoke-free policies for protection and cessation outcomes. **METHODS:** Three focus groups (26 participants in total) and 5 key informant interviews were conducted with housing and public health staff involved in policy development and implementation. In-depth qualitative interviews were also conducted with 56 smoking and non-smoking tenants across the two case studies. Qualitative data were coded and analyzed using a Framework Approach. **RESULTS:** Both types of smoke-free policy encouraged positive changes in smoking behavior, such as reducing smoking or quitting. However, unintended consequences of grandfathering, such as new tenants smoking in grandfathered units, undermined the policy and contributed to continued smoking. Allowing existing tenants to smoke in their units while others are not permitted also presented challenges for policy enforcement. Non-compliance was more difficult for staff to identify and created uncertainty among tenants about policy provisions. The continued presence of tobacco smoke may deter tenants from lodging complaints if they feel that nothing can be done to amend the situation. **CONCLUSIONS:** Overall, the adoption of a smoke-free policy, regardless of the policy type, encouraged positive changes in smoking behaviour. Providing cessation support services before and after policy implementation for tenants who would like to reduce or quit smoking, including options for tenants with specific challenges or needs, is particularly important in affordable housing where access may be limited. Adequate staff resources for proactive enforcement and consistent and clear communication are also necessary to encourage compliance and create a supportive environment for tenants who want to quit or have recently quit.

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POS2-56

HOW DOES THE IMPACT OF PICTORIAL HEALTH WARNINGS VARY BY ETHNICITY AND TYPE OF CIGARETTE SMOKED?

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SIGNIFICANCE: Empirical evidence strongly suggests that tobacco pictorial health warnings (PHWs) on tobacco packaging produce greater warning salience, and stimulate cognitive processing and behavioural responses more effectively than text-only warnings. However, little is known about whether or how PHWs' effects vary by socio-demographic characteristics, or between factory-made and roll-your-own (RYO) smokers. **METHODS:** We assessed the impact of newly introduced PHWs on warning salience (noticing or reading the PHWs), cognitive processing (PHWs resulted in thinking about health risks or PHWs perceived to increase chance of quitting) and behavioural responses (forgoing a cigarette due to PHWs or avoiding PHWs) among 809 smokers in the New Zealand arm of the International Tobacco Control Policy Evaluation Study. Responses were compared by a range of socio-demographic variables (e.g. ethnicity, and measures of individual and area-based deprivation) and whether participants smoked factory-made or roll-your-own cigarettes. **RESULTS:** Responsiveness to PHWs differed by ethnicity and type of cigarette smoked but not by measures of individual and neighbour-

hood deprivation. Māori (the indigenous people of New Zealand) and Pacific people generally reported stronger responses to PHWs; for example, the adjusted OR of forgoing a cigarette due to a PHW was 2.8 (95% CI 1.6 to 4.8) among Māori, 4.4 (1.6 to 11.9) among Pacific peoples when compared with European/Other. However, RYO smokers generally reported weaker warning salience, cognitive processing and behavioural responses; for example, the adjusted OR of forgoing a cigarette due to a PHW was 0.4 (0.2 to 0.7) among exclusive RYO smokers compared to factory-made smokers. **CONCLUSIONS:** There are two main implications of the findings. Firstly, effective PHWs have the potential to reduce smoking-induced inequality by eliciting greater responses among Māori and Pacific people, where smoking prevalence and deprivation levels are higher. Secondly, although the reasons for weaker responses to PHWs reported by those who smoked RYO cigarettes are uncertain (e.g. it could be because soft packaging allows PHWs to be obscured or distorted by folding, or RYO smokers may be less susceptible to current PHW messages), the findings suggest possible interventions could be further explored. For example, hard packaging designs may increase the prominence and durability of PHWs on RYO packaging; and specific PHWs could be tested that may have greater impact on RYO smokers.

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POS2-57

NICOTINE CONTENT OF E-CIGARETTE PRODUCTS IN ONTARIO, CANADA

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SIGNIFICANCE: In Canada, despite a restriction on nicotine-containing e-cigarettes, products with and without nicotine are widely available. To date, there is little empirical evidence examining the presence of nicotine in products on the Canadian market. **METHODS:** E-cigarette products were purchased using a systematic protocol at 80 retail outlets, including from 5 outlets of each of the following store types (vape shops, supermarkets, convenience stores, gas station convenience stores) in each of four Ontario cities (Toronto, Ottawa, Kitchener-Waterloo, Thunder Bay) in January-February 2015. Products were tested for the presence of nicotine using gas chromatography. Accuracy of nicotine labelling was examined with respect to the presence of nicotine as well as its quantity. **RESULTS:** A total of 166 e-cigarette products were purchased, including disposable products (33.1%), refillable products (13.9%), and e-liquids (53.0%). Overall, approximately equal proportions of products were labelled as "without nicotine" (41.0%), and "with nicotine" (44.0%), while 15.1% of products were not labelled. Gas chromatography revealed that almost half of the products (47.6%) contained nicotine. With respect to the presence of nicotine, 10 products (6%) were mislabelled: 5 products labelled as "without nicotine" had nicotine present, 2 products labelled as "with nicotine" did not contain nicotine, and 3 unlabelled products had nicotine present. Just over one-quarter (27.4%) of products labelled as "with nicotine" (n=73) fell outside their labelled concentration (allowing for a 10% tolerance in concentration). Among these mislabelled products (n=20), most contained lower amounts of nicotine than labelled (85.0%). All of the mislabelled products were e-liquids (100.0%), the vast majority were sold in vape shops (90.0%), and they were found in each of the four cities. **CONCLUSIONS:** The findings suggest that, while many Canadian e-cigarettes were correctly labelled, inaccuracies were common, particularly among nicotine-containing e-liquids sold in vape shops. Policy implications will be discussed.

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POS2-58

ATTITUDES TOWARDS CLEAN NICOTINE AND TOBACCO HARM REDUCTION IN AUSTRALIAN ADULT SMOKERS

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SIGNIFICANCE: Clean nicotine delivery devices, such as e-cigarettes, could address nicotine dependence in smokers, while exposing them to substantially less risk of harm than combustible cigarettes. While e-cigarette use is increasing, it is unknown to what extent Australian smokers are interested in using them, the intended purpose for using e-cigarettes, and how this differs by demographic and smoking-related variables. **METHODS:** We surveyed 1538 Australian smokers recruited from a market research panel. Participants were questioned about their use of e-cigarettes and NRT, as well as their attitudes towards the use of "clean nicotine" and tobacco harm reduction. **FINDINGS:** 21% of participants reported ever use of e-cigarettes and 42% of participants thought they would probably or definitely use e-cigarettes as a cessation aid in the future. The majority of participants expressed interest in using clean nicotine as a short-term cessation aid (75.7%), as a long-term substitute for cigarettes (72.4%), and as a partial replacement for cigarettes (74.9%). Despite this, around 50% of participants endorsed the statement that using nicotine products long-term is undesirable because it maintains an addiction to nicotine. A binary logistic regression showed that intention to use e-cigarettes was associated with younger age, higher education, and higher levels of nicotine dependence. **CONCLUSIONS:** There was a tendency to support tobacco harm reduction but also to have negative attitudes towards the maintenance of addiction that this approach entails. These findings have implications for promotion of tobacco harm reduction approaches with either e-cigarettes or NRT.

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POS2-59

ASSESSING COLLEGE AND UNIVERSITY TOBACCO POLICIES IN TEXAS

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SIGNIFICANCE: Almost all adults (98%) who use tobacco products report first-time use by age 26, yet very few tobacco intervention efforts target young adults. Restricting tobacco use on college campuses through comprehensive policy is an effective effort that can impact many young adults. This study examines the diversity of tobacco policies at 206 colleges and universities in Texas. **METHODS:** Campus tobacco/smoking policies for Texas 2- and 4-year colleges/universities (n=206) were collected and rated on a scale from 0 to 10 with a higher score indicating an increasingly comprehensive tobacco/smoking policy. The scale was developed with a panel of tobacco experts in Texas. The policy scale ranked a number of variables, including restrictions on smoking tobacco, electronic nicotine delivery systems (ENDS), smokeless tobacco, and marketing/advertising on college campus, indoor and outdoor tobacco use and campus owned vehicles. Each policy was rated and differences were examined on policy strength between between 1) 2- and 4-year colleges, 2) 2-year vs. private 4-year vs. public 4-year colleges and 3) schools in rural and urban areas. **RESULTS:** Of the 206 campus policies, only 28 schools scored 10 indicating a comprehensive ban on all tobacco and smoking products. Two-year versus 4-year schools were significantly different with a larger portion of 2-year schools having a comprehensive policy when compared to 4-year schools [χ^2 (1,188)=4.091, p=.043]. There was also a significant difference among 2-year, private 4-year, and public 4-year schools [χ^2 (1,187)=7.977, p=.019]. Post-hoc analyses indicated that 2-year colleges were more likely to have a comprehensive tobacco policy compared to private 4-year colleges. No significant differences were found between rural and urban campuses. **CONCLUSIONS:** Many campuses received a lower ranking because they prohibited smoking only in some areas of campus and most policies did not comprehensively ban smokeless tobacco products or ENDS. Understanding the current climate for college tobacco policies in an important step in facilitating change to ultimately reducing the use of tobacco and nicotine products by young adults.

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POS2-60

EVALUATING THE EFFECTIVENESS OF LOCAL POINT-OF-SALE EFFORTS TO INCREASE THE PRICE OF CIGARS

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BACKGROUND: While the consumption of cigarettes in the US has declined in recent years, the use of cigars has increased. Cigars, which are available in flavors and are cheaper than other tobacco products, are also popular with youth. Increasing the price of cigarettes has been effective in reducing consumption. However, less is known about the effectiveness of strategies designed to increase cigar prices. The city of Saint Paul implemented a policy in August 2014 to set the minimum price per cigar at \$2.10. In April 2016, the minimum price was increased to \$2.60; a minimum price for packs of four or more was also set at \$10.40. Minneapolis implemented similar restrictions in January 2016. The purpose of this study was to evaluate the impact of these novel policies designed to raise the cost of cigars by setting minimum prices. **METHODS:** Point-of-sale assessments were conducted in a random sample of tobacco adult-only retailers, convenience, and grocery stores to assess the availability and price of cigars pre- and post-policy implementation. Minneapolis assessments (n=45) took place in November 2015 and June 2016 and Saint Paul assessments were completed in February and June 2016 (n=41). Assessments (n=15) were also conducted in Brooklyn Park, the comparison city, in June 2016. **RESULTS:** After policy implementation, the average price of the cheapest single cigar increased significantly from \$1.05 (sd=\$0.39) to \$2.39 (sd=\$0.44) in Minneapolis and from \$2.11 (sd=\$0.09) to \$2.52 (sd=\$0.28) in Saint Paul. The mean prices were significantly higher than those in Brooklyn Park (\$0.99, sd=\$0.12; p<.0001). Significant increases were also observed for two-pack cigars from \$1.81 (sd=\$0.60) to \$5.24 (sd=\$0.15) in Minneapolis and for five-pack cigars from \$4.78 (sd=\$1.25) to \$9.90 (sd=\$1.44) in Saint Paul. No differences in the availability of single cigars were observed pre- and post-policy. The majority of retailers in Minneapolis (72%) and Saint Paul (88%) that sold single cigars were compliant with the new pricing requirements. **CONCLUSIONS:** This study highlights the potential of a non-tax approach to increase the price of cigars by setting minimum price restrictions.

FUNDING: ClearWay Minnesota; Blue Cross and Blue Shield of Minnesota

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POS2-61

ASSESSING EFFECTS OF FLAVORED TOBACCO POINT OF SALE RESTRICTIONS ON MENTHOL TOBACCO MARKETING AND AVAILABILITY

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BACKGROUND: While the overall consumption of cigarettes in the U.S. has declined in recent years, the proportion of menthol cigarette market share has increased. Although the 2009 Tobacco Control Act banned flavored cigarettes, menthol cigarettes were excluded. Menthol cigarette use has been associated with greater initiation and flavored products enhance the appeal of tobacco for young people. In 2016, the cities of Minneapolis and Saint Paul restricted the sale of flavored tobacco products to adult-only tobacco retailers but excluded menthol or mint flavored products. The purpose of this study was to assess the impact of these flavored tobacco restrictions on the availability and marketing of menthol tobacco products. **METHODS:** Retail store assessments were conducted in a random sample of convenience and grocery stores to assess the availability and marketing of menthol tobacco products pre- and post-policy implementation. Minneapolis assessments (n=41) took place in November 2015 and June 2016 and Saint Paul assessments (n=36) were completed in February and June 2016. Assessments (n=14) were also conducted in Brooklyn Park, the comparison city, in June 2016. **RESULTS:** In both Saint Paul and Minneapolis, no significant differences were observed in the overall availability of menthol tobacco after policy implementation. Among all three cities, the percent of menthol inventory was highest in Minneapolis (35.7%). No significant difference in menthol inventory was observed in Minneapolis while St. Paul experienced a significant decline from 34.9% to 27.3% (p=0.01). In Saint Paul, the proportion of ads for menthol tobacco (relative



to non-menthol ads) significantly decreased from 52.3% to 43.2% ($p=0.02$). Fewer stores in Saint Paul sold menthol cigars post-policy implementation (42% vs. 19%; $p=0.04$). **CONCLUSIONS:** This study suggests that non-menthol flavored tobacco restrictions have limited impact on the availability and marketing of menthol tobacco products. Policies focused on restricting the availability of menthol products at the point-of-sale are warranted.

FUNDING: ClearWay Minnesota; Blue Cross and Blue Shield of Minnesota

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POS2-62

EXPLORING ATTITUDES AND AWARENESS OF KEY OPINION LEADERS TOWARDS THE FDA AND TOBACCO REGULATORY POLICY

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INTRODUCTION: Key opinion leaders (KOL's) can play a crucial role in tobacco control by influencing attitudes and beliefs of their community members. They facilitate the buy-in of their communities on tobacco control, on tobacco regulation, and other community-relevant tobacco prevention activities. This study explores and identifies themes from 10 KOL focus groups in African American (AA), American Indian (AI), Hispanic/Latino (H/L), Korean (K), and non-Hispanic White (NHW) communities. This presentation will focus on an analysis of the KOL focus groups to obtain a clearer understanding of prevention strategies needed to address tobacco regulation and control in priority populations. **METHODS:** We recruited 88 KOL's that represented the selected study communities, AA (26%), AI (16%), H/L (18%), K (19%), and NHW (21%), and various occupational backgrounds including, health, education, business, religious, media and government. The KOLs were asked to complete an anchoring survey that addressed knowledge about their communities and the Food and Drug Administration (FDA), which has authority over the regulation of tobacco products since 2009. Survey topics covered FDA regulatory authority, attitudes towards the FDA, and perceptions of community and retailer tobacco regulation knowledge. **RESULTS:** 83% of the KOL's recognized the FDA logo and 63% correctly identified the name of the agency. 52% of the KOL's were aware that the FDA had the authority to regulate tobacco products, but only 41% believed that retailers in their community would be aware of this role. When asked if their community viewed the FDA as credible, 42% responded positively. Thematic analysis suggests differences among communities in regards to trusting the FDA. KOL's from the AA and AI communities displayed higher levels of distrust toward the FDA. KOL's from the AA, AI and H/L focus groups indicated a willingness to work with regulatory agencies to improve retailer compliance. Across all focus groups there was a lack of clarity in the role of the FDA with many confusing the FDA with other federal agencies such as the CDC or USDA. **CONCLUSIONS:** The findings from this study inform regulatory agencies on the gaps of tobacco policy awareness in KOL's, who are potential partners for the FDA in tobacco regulatory efforts. The information gained from KOL's creates a stronger foundation for future tobacco regulatory messages and tobacco control educational campaigns that are likely to be received well in ethnically diverse populations.

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POS2-63

MENTHOL CIGARETTE SMOKING AND MEASUREMENTS OF SELF-REPORTED SENSORY AND BEHAVIORAL ECONOMIC DEMAND FOR CIGARETTES

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Menthol cigarettes are disproportionately used by Black smokers. The minty flavor has been hypothesized to mask the harshness of tobacco and contribute to the perception that menthol cigarettes are less harmful and addictive than non-men-

thol cigarettes. These factors enhance the appeal and attractiveness of menthol cigarettes, and increase the probability of persistent smoking and difficulty quitting. This study examined differences between menthol and non-menthol smokers on self-reported sensory reward and behavioral economic demand for cigarettes as a function of race. Data were from 439 new registered users of BecomeAnEX, a web-based smoking cessation program. Individuals were current smokers and 18 years of age or older. Participants completed the modified Cigarette Evaluation Questionnaire (mCEQ) to measure cigarette reward, satisfaction, and aversion, and a Cigarette Purchase Task to assess hypothetical cigarette consumption at increasing prices (demand). We focus on elasticity (changes in the rate of consumption as a function of changes in price) as our index of cigarette demand. There was a significant race x menthol interaction for elasticity. Menthol smoking was associated with lower elasticity among Black (10.6%) smokers ($b = -.14$; $p < .001$), but was unrelated to elasticity among White (89%) smokers ($b = .002$, $p = .832$). Race and menthol were independently but not conjointly associated with mCEQ ratings. Menthol smokers reported greater satisfaction ($b = 1.12$) and reward ($b = 2.23$), as did White smokers ($b = 1.74$, for satisfaction; $b = 3.10$ for reward; all p 's $< .05$). Black smokers reported significantly higher aversion, or negative sensory experiences from their cigarettes relative to White smokers ($b = -.81$, $p < .05$). Menthol smoking was only associated with less price elasticity among Black smokers; even though Black smokers reported less satisfaction and reward, and greater aversion from their cigarettes relative to White smokers. Policy implications I suggest that i states increase the price of cigarettes as one potential intervention to curb tobacco use, Black menthol smokers may show proportionally lower decreases in their cigarette consumption.

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POS2-64

COMPARISON OF LITTLE CIGARS TO REFERENCE CIGARETTE: PHYSICAL PROPERTIES, NICOTINE CONTENT AND MAINSTREAM SMOKE SEMIVOLATILE HPHCS

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As cigarette consumption has declined in the last decade, sales of cigar products such as little cigars have significantly increased. Yet little work has been done to understand the levels of toxins in little cigar mainstream smoke as compared to cigarettes. Little cigars now fall under the Food and Drug Administration's regulatory authority and thus data regarding their mainstream smoke (MSS) HPHC yields are needed. In this study, four little cigars, Cheyenne Full Flavor, Cheyenne Menthol, Swisher Sweets Original, and Swisher Sweets Cherry were evaluated to address this knowledge gap. Physical properties were investigated and semivolatile HPHCs, including N'-nitrosonornicotine (NNN), 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK), benzo[a]pyrene (BaP) and nicotine, were determined in the MSS and compared to those from a reference cigarette (3R4F). MSS was generated using the International Organization for Standardization (ISO) and Canadian Intense Regimen (CIR). Examination of the physical properties including length, circumference, tobacco mass, pressure drop, filter and filter paper materials and tobacco texture showed that the main differences were in the rod length, tobacco mass, and pressure drop. The little cigars were ~15mm longer, contained ~100-200 mg more tobacco, and the pressure drop was significantly higher (~1.3X) than the 3R4F. No ventilation holes were found in the filter paper of the little cigars. For both puffing regimens, MSS yield of the semivolatile HPHCs measured for little cigars was higher than the 3R4F when normalized by MSS nicotine yield. Nicotine content of the little cigar tobacco filler was lower than the 3R4F (1.6X). Transfer efficiency of nicotine to the MSS was comparable for both product types using the more intense CIR, but the little cigars were roughly twice as efficient as the 3R4F for the ISO regimen. When normalized to the mass of total particulate matter collected or tobacco consumed, the Swisher Sweets little cigars showed the highest levels of NNN and NNK in the MSS of all products. BaP levels were highest in the Cheyenne products.

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POS2-65

FEMININE MARKETING APPEALS IN A 14 COUNTRY STUDY: PREVALENCE AND PATTERNS

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Tobacco companies have long relied on cigarette packaging as an important marketing tool. In many LMICs, smoking among women is increasing. There are studies about the tobacco industry marketing tactics directed at women, but there is surprisingly little research on the variety and prevalence of packaging aimed at women. This study examined unique cigarette packs from 14 countries to access the nature and extent of feminine marketing appeals. The Tobacco Pack Surveillance System (TPackSS) project systematically collects unique cigarette packs sold in low- and middle-income countries with high tobacco use. In 2013, TPackSS collected 3,240 packs from 14 countries: Bangladesh, Brazil, China, Egypt, India, Indonesia, Mexico, Pakistan, Philippines, Russia, Thailand, Turkey, Ukraine, and Vietnam. Packs were assessed by two independent coders for a wide variety of design features and marketing appeals, including feminine lexical and imagery appeals. Data analysis was conducted using Stata14. Across the full sample, 8% of packs had at least one feminine lexical appeal and 9% had at least one feminine imagery element. All 14 countries had at least one pack with each type of appeal. Fashion terminology was the most common lexical appeal (e.g., "style" or "stylish"). Common imagery included flowers, butterflies, and pink color schemes. Over a quarter (23%) of the unique packs purchased in Russia (27%) and Ukraine (27%) had at least one feminine appeal. Feminine appeals were also common in China (15%) and Egypt (14%). Almost half (48%) of the packs with a feminine appeal were also slim packs. Twenty out of the 36 lipstick packs (55%) had at least one feminine appeal present on the pack. The most common brand families with a feminine appeal were Kiss, Vogue, and Glamour. Feminine appeals are being used across all 14 countries in this sample and are most prevalent on unique packs in Russia and Ukraine. This study's findings are limited by our cultural predisposition to how we define femininity. Knowing the tobacco industry's target markets helps tobacco control advocates appropriately inform consumers and develop strategies to effectively counteract these tactics.

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POS2-66

POINT-OF-SALE MARKETING AND PRACTICES IN VAPE SHOPS

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OBJECTIVE: The number of vape shops in the US has increased considerably in the recent years. However unlike tobacco retail stores, research on the point-of-sale (POS) marketing and other important sale practices of vape shops has been scant. The current study aims to fill this gap. METHODS: Names and addresses of seventy-four vape shops, currently operating in a Midwestern metro city area were obtained using online search. Trained researcher audited all 74 vape shops and assessed both exterior and interior POS marketing. Audits focused on presence of advertisements, displays and promotions as well as important products and services offered at the point-of-sale. RESULTS: 80% of vape shops carried external advertisements and 96% featured advertisements inside the stores. Majority of advertisement, both exterior (56%) and interior (96%) were for e-juices. 92% of vape shops had e-cigarette displays inside the shops. 60% of vape shops offered some type of price promotion on their products, most commonly offering dollars or cents off on purchases. 64% shops offered free e-juice sampling, 60% had a self-serve e-juice bar and 72% offered in-house e-juice mixing. 98% of the vape shops carried flavored e-juice with tobacco, fruit/candy and menthol being the most common flavors available. 48% had age of sale warning displayed inside the shop. CONCLUSION: POS marketing is prevalent in vape shops and its effects on uptake and maintenance of vaping needs to be investigated. Such investigation might help strengthen policies such as the recently enacted FDA deeming regu-

lations by drawing attention to the unique features and POS marketing practices at vape shops.

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POS2-67

TOBACCO 'RIGHTS' AND BEHAVIORAL MODIFICATION IN A COMPREHENSIVE SINGLE PAYER SYSTEM: A QUALITATIVE ANALYSIS OF TOBACCO USE IN US MARINES STATIONED IN OKINAWA, JAPAN

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INTRODUCTION: Tobacco use among U.S. servicemembers costs the federal government more than \$6.5 billion annually. These members are covered under a comprehensive single payer healthcare program, so money spent on tobacco draws resources away from other priorities. The Department of Defense spends \$1.6 billion alone, which is \$300 million more than the Marine Corps' Overseas Contingency Operations budget for 2016. Of all service members, U.S. Marines stationed overseas have the highest tobacco use prevalence. This paper examines norms and beliefs related to tobacco use among Marines and Sailors stationed on Okinawa, Japan. Results of this study can inform tobacco cessation programs. METHODS: 30 one-on-one in-depth, semi-structured interviews were conducted with Marines and Sailors, including healthcare workers. Sessions were recorded, transcribed and analyzed in MAXQDA, a qualitative data management and analysis program. RESULTS: Analysis identified 5 major themes related to tobacco use: (1) the military is authorized to limit service members' civil rights including tobacco use, (2) tobacco restrictions are justified if they prevent harm to others, (3) Marines prioritize limiting harms to others over limiting harm to themselves, (4) enforcement of current tobacco policies is tied to the perceived harm to others, and (5) smoke breaks are an accepted excuse to remove oneself from a stressful situation. Analysis also identified 2 novel tobacco cessation techniques: (1) expand the *buddy* concept to create artificial support networks for tobacco cessation, and (2) tie promotion eligibility to tobacco use. CONCLUSIONS: This culture is supportive of tobacco use, but local leaders could change that culture by expanding the buddy system to develop unit cessation support networks. Leaders could also allow for non-tobacco use work breaks: pull-up breaks would extricate Marines from work and support the culture of physical fitness. Garnering support to ban tobacco use throughout the Corps could be accomplished by emphasizing tobacco's harms to non-users and the Corps as a whole: decreased night vision and delayed healing of injuries. These effects degrade combat effectiveness and are less abstract to a young population than chronic diseases. IMPLICATIONS: Comprehensive single payer systems lack traditional economic incentives like surcharges to encourage healthy behavior because there are no payments for healthcare. In this setting, policies to discourage tobacco use must be sold as limiting harm to non-users and the population as a whole. The views expressed in this abstract are those of the author and do not reflect the official policy of the Department of Army/Navy/Air Force, Department of Defense, or U.S. Government.

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POS2-68

DIFUSSION OF METALS FROM THE HEATING ELEMENTS INTO E-CIGARETTES LIQUID

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SIGNIFICANCE: Electronic cigarettes are currently widely used but their short and long term health effects are not defined yet. Several authors found several metals in the vapor phase. Our work aims to determine the diffusion of metals from two commercial heating resistances in propylene glycol (PG). Moreover, we studied the impact of airflow in the boiling liquid on the diffusion of metals. METHODS: 30 ml of pure PG are heated to its boiling point in a distillation unit. Two new com-



mercial heating elements (resistances) of e-cigs are boiled with it. In the first test, PG is heated for 3 hours. Samples are taken before and at the end of the test. In the second test, an air flow of 0.5 L/min in blown in the boiling liquid. A sample is taken before heating and at several intermediate point before the last point of 96 minutes of heating. The liquid samples are analyzed for metals and trace elements using X-Ray Fluorescence. RESULTS: Fe, Ni, Cu, Zn and Co are found in new PG. Additionally, Sr, Ca, Cl, Br, K, Ti and P are also found, but in concentrations lower than the limit of quantification (LOQ). After three hours of boiling of PG with the two heating elements, the concentration of Ni increases 5.5 times, of Cu 13 times, of Zn 14 times and of Co 3.7 times. Cr, Pd and Mn are found in concentration below LOQ in new PG; however, they are found in significant concentrations after three hours of boiling. The concentration of Fe remains quite unchanged. In the second test, Fe and Co decreases with time, constant concentration with time is found in the case of Zn, Cr, Pb and As. The concentration of Ni and Cu increases 10 and 4 times respectively after 96 minutes of heating. Additionally, Sr, Ca, Cl, Br, K, Ti and P, are also found in the liquid, but in concentrations lower than LOQ. CONCLUSIONS: The results show that several metals pass from the resistances to the liquid body after heating. The concentration of Ni, Cu, Zb, Co, Cr, Pd and Mn increases several times after three hours of heating at the boiling point of PG. The flow of air in the boiling liquid has a significant impact on the diffusion of metals from the heating resistance. It increases the concentration of some metals in PG after heating (Ni and Cu), but also decreases with time the concentration of Fe and Co, or keep constant the concentration of other metals (Zn, Cr and Pb). Other metals are found in the liquid in constant concentrations. These results show that airflow in PG has a significant impact on the diffusion of metals from the heating elements into the liquid.

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POS2-70

BASALINE NICOTINE DEPENDENCE MODERATES THE IMPACT OF NICOTINE REDUCTION ON CHANGES IN NICOTINE DEPENDENCE

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Recent research has demonstrated that switching smokers to very low nicotine content (VLNC) cigarettes can reduce cigarettes smoked per day (CPD) and severity of nicotine dependence. Individuals who score higher on measures of nicotine dependence are less successful in their attempts at smoking cessation, and so may be less likely to experience the positive effects of nicotine reduction on smoking rates and nicotine dependence. The present analysis tested whether baseline nicotine dependence moderated the effect of nicotine reduction on nicotine dependence using data from a previously published clinical trial (Donny et al., 2015). 839 adult daily smokers were randomly assigned to receive either their usual brand or investigational cigarettes with one of five nicotine contents (15.8, 5.2, 2.4, 1.3, 0.4 mg nicotine / g tobacco) for six weeks. Participants reported CPD using daily telephone diaries, and completed measures of nicotine dependence at baseline and at the Week 6 visit (Fagerström Test for Nicotine Dependence (FTND) and Brief Wisconsin Inventory of Smoking Dependence Motives (WISDM)). Linear regression analyses were used to examine interactions between baseline dependence measures and cigarette nicotine content on the change in these measures. Baseline nicotine dependence did not moderate the impact of nicotine reduction on CPD. However, baseline total WISDM scores significantly moderated the impact of nicotine reduction on these scores at Week 6. Those with higher baseline WISDM scores had larger decreases in nicotine dependence during the study. Indeed, when participants were divided by median baseline WISDM score, there was only a significant impact of nicotine reduction on WISDM scores for participants in the top 50% of baseline WISDM scores. The pattern was similar for FTND. These data suggest that smokers who score higher on measures of nicotine dependence are likely to experience the greatest reductions in nicotine dependence as a result of a reduction in the nicotine content of cigarettes.

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POS2-71

USING COMMUNITY READINESS MEASURES TO ASSESS AND ADVANCE ENGAGEMENT IN TOBACCO POLICY CHANGE BY CAMBODIAN AND PACIFIC ISLANDER COMMUNITIES

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SIGNIFICANCE: Tobacco control policies have contributed to creating the largest social norm change and the decline of the tobacco use in the country. However, there remains little engagement of Asian American, Native Hawaiian and Pacific Islander (AANHPI) communities in tobacco policy change, while there is also still a high prevalence of tobacco use in these communities. METHODS: Utilizing a community based participatory research approach, the "Community-led Policies and Leadership to Eliminate Asian American and Pacific Islander Tobacco Disparities (ComPLEAT)" project used community readiness measures to assess stages of readiness to engage in successful policy change among Cambodians in Long Beach and Native Hawaiians and Pacific Islanders in San Diego. RESULTS: Using a community readiness matrix, measures were collected in key readiness categories at the beginning of the project and after a leadership and policy training component. Using a facilitative and participatory process, readiness data were collected among key representatives of each community. At baseline, while both communities scored similarly low on categories of research/data and policy advocacy, Long Beach's Cambodian community scored higher (3.43) on the infrastructure/capacity building category compared to San Diego's NHHPI community (2.73). The 4-prong policy change intervention helped advance post-intervention scores of both communities. CONCLUSIONS: Engaging community partners in tobacco control policy change requires first a focus on infrastructure development and capacity building. The results from the community readiness measures suggest that community leadership trainings and technical assistance to communities at appropriate stages of readiness can help advance engagement of marginalized AANHPI communities in tobacco policy change. In addition, understanding community and culturally specific strategies to tobacco policy change are important to understanding how to engage Cambodian, Native Hawaiian, and Pacific Islander communities in tobacco policy change.

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POS2-72

EFFECTIVENESS OF SMOKING-BAN LEGISLATION ROMANIA

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SIGNIFICANCE: Several studies all over the world have shown the positive impact of smoking ban policies in decreasing second hand smoke exposure. A common method used to quantify SHS, measuring PM 2.5, has been used in many studies, but just a few in Romania. Measurements in Romania between 2013-2016 reveal the "real map" of SHS/PM 2.5 exposure of Romanian students, and workers with very high levels of PM 2.5 noted in places where smoking was allowed, and also high level where smoking was prohibited. In March 2016 a new regulation against smoking in public spaces was put in place. AIM: Measuring PM 2.5 after March 2016, to show efficacy of the new smoking-ban legislation. METHODS: A TSI Sidepak Aerosol Monitor has been used in repeated measurements of the PM 2.5 values in targeted locations: where smoking was allowed (6 pubs and 3 clubs), and where smoking was prohibited (public institutions, Medical Care Insurance House,



County Major House, County Central Library), in the period between 2015-2016. The measurements were repeated after the smoking ban was passed. RESULTS: Significant decrease in values of PM 2.5 was observed at each targeted place: pubs – before, average 593 $\mu\text{g}/\text{m}^3$, and after 43,83 $\mu\text{g}/\text{m}^3$, clubs- before, average 758 $\mu\text{g}/\text{m}^3$, and after 24,63 $\mu\text{g}/\text{m}^3$. In Public Institutes, where smoking wasn't allowed at all, even at the beginning of the study the measurements shown an average 34,5 $\mu\text{g}/\text{m}^3$ in County Major House before, and 8,68 $\mu\text{g}/\text{m}^3$ after the new legislation. The same evolution of the data we found at the Medical Care Insurance House before, the average of PM 2,5 was 26,22 $\mu\text{g}/\text{m}^3$ and 7,04 $\mu\text{g}/\text{m}^3$ after. At the Library, where we expected to have an elevated level of PM 2,5 due to dust the start average was 14,76 $\mu\text{g}/\text{m}^3$, and then 9,99 $\mu\text{g}/\text{m}^3$. We should mention, that the only place where smoking was not observed for the start measurement was the Library. CONCLUSIONS: Although smoking was banned in public institutions in Romania prior to the ban in public spaces, smoking was evident. Measurements made after the new law and change of authority in enforcing the new regulation has shown significantly lower levels of PM 2,5 and no evidence of smoking.

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POS2-73

PLAIN SNUS PACKAGING: PERCEPTIONS OF ATTRACTIVENESS AND THE TYPICAL USER

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SIGNIFICANCE: Past research on plain tobacco packaging has focused on cigarettes, whereas the present study explored perceptions of plain snus (Swedish moist snuff) packages. We were interested in differences between original and plain snus packages in terms of appeal and characteristics of the typical user, and we were interested in the variation of judgments across brands (brand differentiation). METHODS: In total, 643 Norwegian participants aged 16 to 30 were recruited from a market research web-panel and were allocated to one of three experimental conditions. One group rated pictures of 10 original branded snus packages (BPs), a second group rated 10 plain packages (PPs), and a third group rated 10 plain packages with health warnings (PPWs). RESULTS: PPs obtained similar levels of attractiveness ratings as BPs did. PPWs were rated as slightly less attractive compared to BPs, but the test of statistical significance was inconclusive. In comparison with BPs, both types of plain packages (PPs and PPWs) received lower ratings on the user characteristic "Social", and PPWs received lower ratings of the characteristics "Sporty" and "Elegant". The ratings of attractiveness and user characteristics varied more across brands for original (BPs) designs in comparison with the two types of plain packaging. CONCLUSIONS: Although plain packaging per se (without the additional health warning) did not appear to make snus less attractive overall, the clear decrease in variation of brand ratings suggests that plain packaging could reduce the potential for developing snus brand image.

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POS2-74

AN ASSESSMENT OF NICOTINE LEVELS ON OFFICE SURFACES BEFORE, DURING AND AFTER USE OF ELECTRONIC CIGARETTES

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Nicotine has been reported to be deposited on surfaces in areas where people have smoked conventional cigarettes and it has been suggested that this may present a potential health hazard to bystanders. At this time, there are limited studies available that examine whether nicotine is deposited on surfaces following use of electronic cigarettes (e-cigarettes). Nicotine levels on surfaces were measured before, during and after *ad libitum* use of closed and open system e-cigarettes by three experienced e-cigarette users in a typical small office (38 m³) which was

under natural ventilation conditions. The products used were the bluTM tobacco flavoured rechargeable closed system e-cigarette (1.8% nicotine) and the bluTM refillable open system e-cigarette containing tobacco flavoured e-liquid (1.8% nicotine). Smoking or vaping had not occurred in the room previously. Surface wipe samples were taken from 30 cm² surfaces on walls and desks and nicotine was extracted from the wipes and analysed using gas chromatography. Detectable levels of nicotine were found on the surfaces prior to commencing e-cigarette use. This may be expected since it has been reported "*nicotine is ubiquitous in the environment*" and "*nicotine is a common environmental contaminant found on indoor surfaces*". There was no difference in the levels of nicotine detected on the surfaces before, during or after use of both the closed and open system e-cigarettes. The average concentration of nicotine detected on the walls and desk during each test phase for both e-cigarette products was <1.5 $\mu\text{g}/\text{m}^2$. Using the closed or open system e-cigarette products indoors did not lead to an increase in nicotine levels on the surfaces analysed. This is consistent with previous reports that e-cigarette users exhale negligible levels of nicotine into ambient air due to the high retention rate of nicotine in the body. The results reported here also support the recent pilot study observations of Goniewicz and Bush (2015) that found no difference in the levels of nicotine detected in e-cigarette users' and non-users' homes. This study indicates that there is little risk of nicotine deposition on surfaces from use of the e-cigarettes tested and should not pose an issue to bystanders.

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POS2-75

CORRELATES OF ATTITUDES ON ACCEPTANCE OF SMOKING IN FRONT OF CHILDREN FROM UNIVERSITY COMMUNITY MEMBERS: EVIDENCE FROM PUBLIC UNIVERSITIES IN SOUTH CAROLINA

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SIGNIFICANCE: Secondhand smoke (SHS) exposure is a pediatric health dilemma affecting children in numerous adverse ways. Children are very influenced by parent's health choices and behaviors and are much more likely to smoke when they have parents who smoke. This study measures faculty, staff, and student attitudes toward smoking in front of children by smoker status and major demographic characteristics. METHODS: We use data collected from four public universities in South Carolina (N=1,790). We measured tobacco use, perceptions towards smoking, and socio-demographic characteristics. We used bivariate tests and logistic regression to measure relationships among attitudes towards smoking in front of kids and smoking status and demographic factors. RESULTS: Our sample were 67% female (n=1,205), 33% male (n=578), 70% white (n=1,258), 21% African American (n=374), and 15% agreed that it is acceptable for parents to smoke in front of children. Results suggest that there is a statistically significant relationship between attitude towards smoking in front of children and race, gender, cigarette smoking status, while no statistical relationship was detected by role (faculty, staff, or student), age, whether or not respondents had any children under 18 years of age living with their household. There were racial and gender disparities regarding the attitude towards smoking in front of children. The odds of agreeing with the statement is higher among men (OR=0.51, p <0.01) and Blacks (OR=0.58, p <0.05). Former (OR=0.30, p <0.01) and never (OR=0.17, p <0.01) users had lower odds of agreeing, and 19-20 (OR=0.59, p <0.05) and 21-24 (OR=0.58, p <0.05) year old individuals had lower odds of agreeing with the statement. CONCLUSIONS: Results present several concerns. Tobacco smoke disparities are at an all-time high with black children and this study unfortunately supports that blacks agree at a much higher level than whites that it is acceptable to smoke in front of their children. Men had 2 times higher odds of agreeing that smoking in front of children is okay. Younger responders (< 18 years old) did not see it as important not to smoke in front of children and unfortunately we are experiencing numerous teen pregnancies in our country resulting in many teenage mothers. This study demonstrates the importance of robust education of all adults on the deleterious effects of SHS exposure on their child and the importance of not exposing their children to SHS as a way of promoting their health and preventing many children from experiencing preventable illnesses and deaths.

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**POS2-76****HEALTHCARE PROVIDERS' ATTITUDES ON IMPLEMENTATION OUTCOMES FOR A TOBACCO PREVENTION DECISION TOOL: PRELIMINARY FINDINGS**

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BACKGROUND: Primary care providers play a critical role in tobacco screening, counseling and early intervention among youth. Following guideline recommendations for primary care tobacco prevention, we are developing a patient-facing preference-based decision tool through an iterative process that includes patient cognitive interviews and provider focus groups. The decision tool will screen for use and susceptibility to conventional and alternative tobacco products, and facilitate patient-provider communication about tobacco prevention. We presented a prototype of the decision tool to providers to elicit their feedback on integrating the tool into existing clinical workflow within their practice. **METHODS:** We conducted a focus group in July 2016 with seven providers from University of Florida Health Pediatrics (3 pediatricians, 1 nurse, 3 LPN/MAs). After presenting them with a prototype of the decision tool, participants were asked to comment on implementation-related themes. Focus group questions were organized around seven implementation outcomes of the decision tool prototype: acceptability, adoption, appropriateness, feasibility, fidelity, implementation cost, and sustainability. **RESULTS:** Discussions of acceptability centered on inclusion of alternative tobacco products and the innovation of assessing susceptibility to tobacco use in the decision tool. Adoption of the tool would be contingent upon ease of use and assimilation into clinical workflow. Providers endorsed that cognitive testing of the tool with patients would improve its appropriateness. Factors that could improve feasibility include reducing respondent burden to ensure that patients complete the process and integrating information from the tool into the patient portal (MyChart). Feedback relevant to fidelity included ensuring that the tool is user-friendly and that practice facilitators are available at time of implementation. Discussion of implementation cost centered on implementation of the technology, in addition to offering incentives to patients. Finally, the key to sustainability will be addressing the competing time with other health risk assessment activity. **CONCLUSIONS:** Our focus group generated rich feedback related to the implementation of a decision support tool for tobacco prevention in pediatric primary care. Findings demonstrate the feasibility of designing a focus group around the framework of implementation outcomes, prior to implementation. Engaging key stakeholders to discuss implementation outcomes prior to the development of an intervention can enhance implementation success.

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POS2-77**A QUALITATIVE STUDY EXAMINING POLICY-RELEVANT CONTEXTS OF WATERPIPE SMOKING AMONG UNIVERSITY STUDENTS IN SIX EASTERN MEDITERRANEAN COUNTRIES**

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SIGNIFICANCE: Waterpipe (WP) smoking rates in the Eastern Mediterranean Region are some of the highest worldwide, especially among young people, and they exceed cigarette smoking rates in select jurisdictions. The current research aims to improve our knowledge of the policy-relevant contexts of WP smoking, among six countries in the Eastern Mediterranean Region. **METHODS:** In-depth interviews were conducted in 2015-2016 across six Eastern Mediterranean countries,

specifically Bahrain, Egypt, Jordan, Lebanon, Palestine, and the United Arab Emirates. Interview participants were young adult university students (18-29 years) who had previously smoked WP tobacco, recruited from universities participating in this study and represented both genders. Directed content analysis was used to analyze the transcripts. A coding scheme was created and finalized after researchers practiced coding a number of selected transcripts. Development of codes and themes was inductive as the details of the discussions guided us through building the concepts and assumptions. **RESULTS:** A total of 53 in-depth interviews were conducted in 2015-2016. Findings were organized around six themes: WP product characteristics; the WP café setting; socio-cultural context; perceived health consequences; patterns of WP smoking; and health warning labels. Results indicate that WP smoking is commonly perceived as a safe alternative to cigarettes. Waterpipe tobacco is widely accessible and affordable among young people, and certain WP tobacco flavor varieties were associated with varying appeal and health consequences among smokers. There is a lack of knowledge among smokers about nicotine content and other constituents in WP tobacco and their associated health effects. Warnings labels were effective at communicating health risks associated with WP smoking. **CONCLUSION:** Misperceptions about the health consequences of WP smoking are common, even among an educated cohort of young people. Regulatory frameworks for WP smoking should be developed and enforced, including WP-specific health warning labels that can elucidate the harmful effects of WP smoking.

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POS2-78**EXAMINING THE PREVALENCE OF E-CIGARETTE USE AND FACTORS ASSOCIATED WITH E-CIGARETTE USE AMONG A SAMPLE OF YOUTH IN GUATEMALA**

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INTRODUCTION: The use of e-cigarettes has increased in many countries in recent years, especially among youth populations. However, few data are available on the prevalence and correlates of e-cigarette use among youth in low- and middle-income countries (LMIC) where there is limited to no regulation of these products. Therefore, we examined the prevalence of e-cigarette use and identified the behavioural characteristics among a sample of secondary school youth in Guatemala, a LMIC. **METHODS:** The COMPASS research platform was translated into Spanish and pilot tested in two public and two private schools in Guatemala to assess modifiable risk behaviours among youth as part of the COMPASS Guatemala study. These pilot data were used to examine the prevalence of e-cigarette use and risk factors associated with e-cigarette use in a sample of Guatemalan secondary school students. **RESULTS:** A total of 1277 students were surveyed and 8.7% reported currently using e-cigarettes. Students that reported currently using an e-cigarette were significantly less likely to have between 1 and 70 quetzals (0.13 to 9.27 USD) each week to spend on themselves or to save (AOR=0.2, 95%CI 0.1, 0.5), more likely to have more friends that smoked cigarettes (AOR=3.0, 95%CI 1.4, 6.7), more likely to be current cigarette smokers (AOR=2.0, 95%CI 1.0, 3.7), and more likely to be current binge drinkers (AOR=9.4, 95%CI 3.6, 24.7). Discussion: Almost one in ten youth in our sample from Guatemala reported currently using e-cigarettes. Use of e-cigarettes was more prevalent among students who reported currently using cigarettes or alcohol. Our data suggest that e-cigarette use among youth in Guatemala schools, both public and private, warrants additional monitoring to inform prevention initiatives moving forward.

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POS2-79

PREFERENCE FOR SWEET VERSUS TOBACCO-FLAVORED E-CIGARETTES AND WATERPIPE TOBACCO IN PREGNANT WOMEN

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SIGNIFICANCE: There has been a proliferation of available flavors for non-cigarette tobacco and nicotine products, yet little is known regarding perceptions and use of flavors in vulnerable populations. The impact of flavors on perceptions and use of tobacco/nicotine products is especially salient during pregnancy due to impact of maternal use on both mother and fetus, and potential for fetal toxicity from flavors as well as nicotine and combustion products. We investigated: (a) the impact of sweet vs. tobacco flavors on preferences for e-cigarettes (e-cigs) and waterpipe tobacco (WPT), and (b) the impact of flavor preferences on use of e-cigs and WPT in a diverse, low-income sample of pregnant tobacco users and controls. **METHODS:** 58 pregnant women (55% tobacco users; $M_{age}=27$; 69% minorities) were recruited from a larger study of perinatal smoking and fetal toxicity. Detailed interviews were conducted assessing preferences for and use of sweet (mint, cloves/spices, fruit, chocolate, alcohol, candy) vs. tobacco-flavored e-cigs and WPT. **RESULTS:** Rates of lifetime use of e-cigs and WPT in pregnant women were 41% and 78%, respectively; rates of use during pregnancy were 7% and 16%, respectively. Pregnant women showed increased preference for sweet vs. tobacco-flavored e-cigs ($ps < .05$) and sweet vs. tobacco-flavored WPT ($ps < .01$), with more pronounced preferences in current e-cig and WPT users ($p \leq .07$). 43% and 64% of lifetime users and 50% and 79% of pregnancy users endorsed use of e-cigs and WPT, respectively, because these products "come in flavors I like". Preferences for sweet-flavored e-cigs and WPT were associated with greater use of e-cigs and WPT during pregnancy ($rs > .24$, $ps \leq .05$) as well as greater intentions to use e-cigs and WPT after the baby is born ($rs > .25$, $ps \leq .06$). **CONCLUSIONS:** Results highlight increased use of and preferences for sweet vs. tobacco-flavored e-cigs and WPT by pregnant women. Results also revealed links between preferences for sweet flavors and use and intention to use e-cigs and WPT during and after pregnancy. Results provide scientific data to inform regulation of flavored tobacco products in reproductive age women.

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POS2-80

THE IMPACT OF SMOKELESS TOBACCO USE AMONG HIV POSITIVE MEN ON ANTIRETROVIRAL TREATMENT IN MUMBAI, INDIA

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SIGNIFICANCE: There has been little examination of tobacco use among HIV positive individuals on antiretroviral therapy. Over the past decade, some evidence has emerged to suggest an association between smoked tobacco and HIV disease progression and a negative impact on the response to antiretroviral therapy (ART). There is however, no literature on the association of smokeless tobacco use and HIV. This paper seeks to address this gap by assessing chewed tobacco use among HIV positive men receiving ART from hospitals in the greater Mumbai area. While about 20% of these men smoke an average of two cigarettes per day, almost 50% of men on ART consume substantial amounts chewed tobacco. This paper is one of the first to address the relationship of smokeless forms of tobacco to HIV status and other lifestyle variables including alcohol. **METHODS:** The data for this paper were collected from a cross sectional, baseline sample of 940 HIV positive men who reported consuming alcohol in the previous 30 days, recruited into a study to evaluate the effects of multilevel interventions to reduce alcohol use

and increase medication adherence. The survey included variables on alcohol and tobacco use, four and thirty day ART adherence, quality of life, self and external stigma, CD4 and viral load and other variables. **CONCLUSIONS/IMPLICATIONS:** The results of the baseline survey showed that 421 (45.4%) of 940 HIV positive men who consumed alcohol and were on ART used smokeless tobacco with over 90% reporting daily use and consumption levels averaging five (5) chews in a day. In a multiple logistic regression, use of smokeless tobacco was associated with higher consumption of alcohol and associated problems (AUDIT), higher CD4 count, poorer quality of life, greater self-stigma and a lower education level. Results suggest that ART programs in India and globally should treat tobacco use as a potential contributor to relative health/HIV status and a marker of behavioral and psychological factors that can negatively affect program outcomes.

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POS2-81

STRENGTHENING OUR SMOKING CESSATION SERVICES IN MALAYSIA

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SIGNIFICANCE: In 2015, the Ministry of Health Malaysia endorsed its National Strategic Plan for Tobacco Control. We target to become a smoke-free nation by 2045. The 'O' of MPOWER strategy, is one of the components which will be strengthened through the quit smoking clinics. Based on our National Health and Morbidity Survey (2015), the national prevalence of current smokers is 22.8% (95%CI: 21.86 – 23.81); among men 43.0% and women only 1.4%. Interestingly, slightly more than half, 52.3% (95%CI: 49.85 – 54.81) of these current smokers made an attempt to quit within the past 12 months and these quit attempts among rural and urban smokers were comparable. Thus, it is important to strengthen the smoking cessation services in our country. This study attempts to identify the availability of this service whether it is adequate to assist our current smokers to quit. **METHODS:** This study is a preliminary descriptive documentation for a bigger cross-sectional evaluation study on the smoking cessation training program for health care providers. All available quit smoking clinics within the government's primary care clinics in the whole country were identified, wherever possible the actual health care provider who runs this quit smoking clinic is also documented. The current population estimate of Malaysia was obtained from the Department of Statistics 2016. **RESULTS:** Each state has more than one quit smoking clinic. Currently 21% of the government hospitals (29/137) and 7% of the health clinics (201/2837) are actively providing smoking cessation services. Almost 80% of these services are ment by medical assistants and nurses, and only one fifth are medical doctors. **CONCLUSION:** Mapping out the distribution of the government's smoking cessation clinics throughout Malaysia against the population density and approximately number of smokers per area gives us a better direction towards executing a targeted approach within our limited resources at hand. This allows us to train private health care providers and embark on an integrated quit smoking services with the government sector, thus strengthening our smoking cessation services in the country.

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POS2-82

AN EVALUATION OF ELECTRONIC CIGARETTE FORMULATIONS AND AEROSOLS FOR HPHCS TYPICALLY DERIVED FROM COMBUSTION

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In May 2016, the U.S. Food and Drug Administration (FDA) published draft guidance entitled *Premarket Tobacco Product Application for Electronic Nicotine Delivery Systems*. FDA recommends reporting quantities of designated Harmful and Potentially Harmful Constituents (HPHCS) in e-cigarette e-liquids and aerosols. This list may be subdivided into tobacco or matrix derived compounds, thermal



degradation products, and combustion related constituents. E-liquids and aerosols are known to contain trace levels of tobacco derived constituents due to inclusion of tobacco derived nicotine. However, combustion related HPHCs are not likely to be found. One reason is due to the relatively low operating temperatures of e-cigarettes relative to tobacco cigarettes. The objective of this work was to utilize highly sensitive, selective, and validated methods to determine if three classes of combustion related HPHCs are detectable in e-cigarette e-liquids and aerosols. These combustion related compounds are listed in the FDA's draft guidance and include three aromatic amines, five volatile organic compounds, and the polycyclic aromatic hydrocarbon benzo[a]pyrene (B[a]P). Results from a set of internally prepared fortified reference e-liquids, commercially available e-liquid refills and e-cigarettes will be presented. The results from the analysis of fortified reference e-liquids show that these analytes do efficiently transfer to the aerosol. Transfer rates for these fortified e-liquids ranged from 40 percent to quantitative transfer, depending on the HPHC. However, our analyses also demonstrate that combustion related compounds are not present at measurable levels in the commercially available e-liquid refills or e-cigarette aerosols tested.

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POS2-83

AIRBNB – THE PREVALENCE, RELATIVE COST, AND AVAILABILITY OF SMOKING ALLOWED ACCOMMODATIONS IN 4 CANADIAN CITIES

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SIGNIFICANCE: The sharing economy has deeply changed some industries including the hospitality sector. Airbnb is a web-based service that enables hosts and guests to broker accommodations in private homes. The traditional hospitality sector has increasingly gone smoke-free over the last decade. This study identified the prevalence of smoking-allowed accommodations available in the Canadian cities of Victoria, Vancouver, Toronto and Montreal, and compared the cost and availability of listings to those that are smoke-free. **METHODS:** Data were used with permission from InsideAirbnb.com – an independent website that compiles information about listings on Airbnb in dozens of cities around the world. Data include listing: cost, future availability, amenities including if smoking is allowed. The data were compiled as follows: Victoria, Aug 1, 2016; Vancouver, Dec 3, 2015; Toronto, July 4-5, 2016; and Montreal, May 4, 2016. **RESULTS:** The total number of listings available across the 4 cities was N=27,245 including Victoria (n=1,691), Vancouver (n=4,728), Toronto (n=10,207), and Montreal (n=10,619). The proportion of listings that permitted smoking was 4.1% in Victoria, 3% in Vancouver, 4.8% in Toronto and 10.0% in Montreal. In each city, the average and median price for one-night accommodations in smoke-allowed listings was less than those listed as smoke-free; in Vancouver the average cost for a one-night stay in smoking allowed accommodation was \$103, compared to \$128 for one night in a smoke-free listing. In each city, smoke-free accommodations were less available than smoking-permitted listings; 30-day availability was 10.5 days for smoke-free listings compared to 13.2 days for smoking-allowed. **CONCLUSIONS:** The availability of smoking allowed accommodations varies across the 4 Canadian cities; prevalence of smoking-allowed accommodation in Airbnb is less than the estimated proportion of Canadian households that permit smoking (12.5%). In this sample of Airbnb listings in 4 Canadian cities, smoke-free accommodations on average were more likely to be booked and cost more than smoking-allowed listings. In the future it will be important to monitor how the prevalence of smoking allowed listings changes to respond to market demand. Visitors trying to save money may stay in smoking-allowed listings. This study highlights the need to consider public health issues including smoke-free policies when considering how to regulate the sharing economy.

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POS2-84

TOBACCO REGULATION AT THE POINT-OF-PURCHASE IN VULNERABLE COMMUNITIES

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INTRODUCTION: In 2009, the Food and Drug Administration (FDA) obtained regulatory authority over tobacco products. As a result, they identified point-of-purchase as a key location to ensure compliance with tobacco regulation. **METHODS:** Via 500 individual interviews with retailers at the point-of-purchase, this study provides an understanding of the relationship among tobacco policy awareness, knowledge, and retailers' attitudes, tobacco product promotion and perceived retail benefits of selling tobacco products in American Indian (AI), Hispanic/Latino (H/L), African-American (AA), Korean (K), and non-Hispanic White (NHW) communities in Los Angeles. Observation data from corresponding stores was also compiled. These data indicate the type of tobacco products available, the display of promotional materials, and display of required items (licenses and age of sale warning signage). **RESULTS:** Findings revealed significant differences among communities in regards to those viewing cigarettes as beneficial for business. 79% of AI retailers said they found sales of cigarettes to be beneficial, compared to 53% of HL and 67% AA retailers (p<0.01). Similar significant differences were found in regards to e-cigarettes with 28% of AI retailers viewing sales of e-cigarettes as beneficial to their business, compared to 13% of AA and 12% of HL retailers (p<0.01). There was a significantly higher proportion of AA retailers (78%) that viewed cigarillos as beneficial compared to H/L (51%) and AI (49%) retailers (p<0.05). There was a significantly higher amount of H/L retailers (33%) who were not sure if the FDA was a trustworthy source of information followed by AA (23%) and AI (15%) retailers (p<0.01). When asked if the FDA had the right to regulate tobacco products there were significant differences between the different communities with higher amount of AA retailers (79%), responding yes compared to 68% of HL and 61% of AI retailers (p<0.01). **CONCLUSIONS:** This study informs regulators of differences between communities in regards to attitudes such as perceived benefits of selling tobacco products and trustworthiness of the FDA, and highlights communication strategies for regulatory and public health agencies to engage with retailers at the point-of-purchase to help increase compliance with tobacco regulation.

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POS2-85

DISAGREEMENT ON ELECTRONIC CIGARETTE REGULATION WAS ASSOCIATED WITH LESS SUPPORT FOR TOBACCO CONTROL POLICY IN HONG KONG

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INTRODUCTION: Electronic cigarette (EC) is increasingly popular and may undermine support for tobacco control policies. We investigated if disagreement on EC regulation was associated with less support for stronger tobacco control policies in Hong Kong. **METHODS:** In 2015, 4517 subjects (males 48.5%; mean age 50.4, SD 17.7 years) with oversampling of current and ex-smokers were interviewed through landline random digit dialing. Disagreements on 4 proposed EC regulations on publicity, use in smokefree area, sales to minors, and nicotine-free EC sales were recorded. Support for 8 stronger tobacco control policies were assessed. Logistic regression yielded adjusted odds ratios (AORs) of support for stronger tobacco control in relation to disagreement (vs agreement) on EC regulation, adjusting for age, sex, family income, smoking status, smoking family members and knowledge on secondhand smoke. Data were weighted by the distribution of sex, age, and smoking status according to Hong Kong census data. **RESULTS:** Disagreement on EC regulation ranged from 6.2% to 28.3%. Each disagreement was significantly associated with lower AOR (0.24-0.53) for annual tobacco tax increase, smokefree area extension and banning tobacco display in retail stores. Commonly lower AORs (0.26-0.61) for banning smoking in all public outdoor areas, showing smoking related diseases, enlarging pictorial warning on cigarette packs, total ban on tobacco sales and use were observed in relation to disagreement. Compared with agreement on all 4 EC regulations, disagreement on any EC regulation was significantly associated with lower AORs of 5 supporting



stronger tobacco control policies, i.e. increasing tobacco tax annually (0.36), banning smoking in all public outdoor areas (0.49), banning tobacco display in retail stores (0.44), total ban on tobacco sales (0.56) and use (0.55). Similar pattern of lower AORs were observed for disagreement on all EC regulations compared with agreeing all. CONCLUSIONS: Disagreement on EC regulation was associated with less support for stronger tobacco control policy. Future research should assess whether advocacy for EC regulation could also garner public support for tobacco control.

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POS2-86 MENTHOL POLICY ATTITUDES

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Menthol was first added to cigarettes in the 1920s. Current law prohibits the use of characterizing flavorings in cigarettes, except for menthol. The purpose of this study was to understand more about public opinion on banning menthol cigarettes among adults. The survey was conducted through online/telephone surveys among 1300 AmeriSpeak panel adults aged 18 and older. Survey topics included tobacco use and attitudes on tobacco policies. Among the whole sample, 44% of respondents had ever used cigarettes (ever users). Forty-six percent of ever users were current cigarette smokers and 86% of ever users had ever tried menthol cigarettes. Among ever menthol cigarette users (N=497), 38% had initiated smoking using a menthol flavored cigarette and 32% of ever menthol cigarette users have always used menthol cigarettes. Only 16% of the full sample were aware of a ban on flavored cigarettes (excluding menthol), while 61% agreed that menthol cigarettes should be banned. White, Non-Hispanic adults (52%) were significantly more likely to agree with a menthol ban compared to African Americans (35%) ($p=0.007$). White, Non-Hispanic adults (53%) were more likely than African Americans adults (34%) to agree that the removal of menthol cigarettes would improve the health of people in the US ($p=0.05$). In response to a hypothetical government ban on menthol flavoring in cigarettes, significantly more Whites (69%) than African Americans (19%), believed that people would switch to non-menthol cigarettes ($p<0.0001$) or switch to menthol electronic cigarettes ($p<0.0001$; 55% Whites vs 29% African Americans), while more African Americans (55%) than Whites (24%) believed people would quit using all tobacco products if there was as menthol ban ($p<0.0001$). It is important to understand the current public opinion of a potential menthol ban and assess attitudes/preferences specific to African Americans given they were more likely to disagree with a menthol ban but also more likely to report that people would quit if a ban was implemented. These findings by race are even more important given the evidence that the tobacco industry targets mentholated brands to African American communities.

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POS2-87 THE LONGITUDINAL DATA ANALYSIS AND FORECAST OF PRICE ELASTICITIES OF CIGARETTES IN ROMANIA

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SIGNIFICANCE: Although the prevalence of cigarette smoking in Romania has declined from a peak of 33-35% in late 1990's to 26.7% in 2011, Romania is still one of the biggest markets for tobacco in Central- and Eastern Europe. One factor that likely contributed to this decline is the significant rise in prices for manufactured cigarettes, the tobacco product almost exclusively used in Romania. Excise tax increases are among the most effective tobacco control interventions due to elasticity of demand effects that especially affect low-income smokers. Cigarette prices impose a significant burden on the average income in Romania, which has a poverty rate of 25.4%, highest in the European Union. We conducted a longitudinal analysis of price and income effects on cigarette smoking in Romania during

1981-2011 to build the evidence base for possible increases in national tobacco taxes. METHODS: Because there are no longitudinal (panel) data on cigarette consumption in Romania, we transformed the nationally representative, cross-sectional 2011 Romania Global Adult Tobacco Survey dataset to a quasi longitudinal dataset, using reported data on year of starting and quitting cigarette smoking among 4,517 respondents 15 years and older. This longitudinal transformation permits the multidimensional modeling of the effects of tax (price) interventions on reported consumption. RESULTS: Our analysis yielded a long-run demand curve of cigarette consumption, which allows for assessing the effects of tax increases over time. Price-elasticities of prevalence and consumption, derived from cross-sectional data, provide a more comprehensive view of tax increase effects on Romanian smokers. Results suggest that the declines in cigarette smoking prevalence in Romania over the last decade are largely attributable to the significant increases in cigarette taxes and prices. CONCLUSIONS: The price elasticity estimate for 2017 can assist evidence-based tobacco control policy planning in Romania. Further increases in cigarette taxes and prices will likely lead to additional reductions in smoking in Romania.

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POS2-88 PERCEPTION AND USE OF E-CIGARETTES AMONG HISPANICS/LATINOS: RESULTS OF FOCUS GROUPS IN FOUR U.S. CITIES

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SIGNIFICANCE: Electronic cigarettes (e-cigs) and other vaping devices have rapidly increased in use among young adults in the U.S. despite the paucity of scientific data on health effects. According to a 2014 CDC report, 12.6% of U.S. adults had ever tried an e-cig. The percentage of use for Hispanics/Latinos (H/Ls) was 8.6%. The aim of this study is to explore perceptions, knowledge, attitudes, and beliefs about e-cigs among diverse sample of H/Ls living in four U.S. cities: Miami, Chicago, Bronx, and San Diego. Such data can inform the development of a targeted culturally appropriate campaign to prevent the use of e-cig among low income H/Ls. METHODS: During the summer of 2014, 26 English- and Spanish-speaking focus groups (6-10 persons per group, N = 182) were conducted among smokers and non-smokers, young (18-35) and old (36-65), men and women, of different SES and acculturation levels, including e-cig users and non-users. Surveys data were completed by these participants. Focus group discussions were conducted in English or Spanish and were audio-recorded and transcribed. Data were analyzed using qualitative software and following thematic analysis procedures. RESULTS: 12% of the sample reported past use of e-cigs and other vaping devices according to the focus group participant surveys. Users stated that easy access, appeal of the different flavors and smells, limited restrictions in use, and socializing with others made these products attractive, as well as constituting a method to quit smoking. Older adult tobacco users (35+ years) who experimented with e-cigs expressed negative attitudes as they could not "taste" the tobacco flavor and overall dissatisfaction with the devices compared to conventional cigarettes. CONCLUSIONS: Older H/Ls (35+) and Spanish-speaking immigrants were most likely to use regular cigarettes whereas younger adults (women and men), US-born or more acculturated, were most likely to report using e-cigarettes. Differences also emerged in knowledge, attitudes, behaviors and perceptions of tobacco risk by H/L sub-group, smoking status, city, SES and acculturation. These findings have implications for health communication campaigns and regulatory policies.

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**POS2-89****THE ASSOCIATION BETWEEN WARNING LABEL REQUIREMENTS AND SMOKING PARTICIPATION BY EDUCATION-FINDINGS FROM GLOBAL ADULT TOBACCO SURVEY (GATS)**

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INTRODUCTION: The Guidelines for the implementation of Article 11 of the WHO Framework Convention on Tobacco Control (FCTC) require that cigarette health warning labels should include pictures and be 50% or more of the principal display area. This study aims to examine how these requirements are associated with smoking participation, investigate whether and how this association varies by educational attainment, and inform the US Food and Drug Administration (FDA) about the effectiveness of warning label policies. **METHODS:** We pooled individual-level data from Global Adult Tobacco Survey (GATS) in 18 countries and employed logistic regression methods to study the association between warning label requirements and smoking participation. The difference in the association by educational attainment was further examined using interactions between policies and education. All regressions controlled for country-level stage of the tobacco epidemic and literacy rate and individual-level socio-demographic characteristics such as age, gender, household size, employment status, and wealth. The tobacco control environment was also controlled for using non-warning related MPOWER scores. **RESULTS:** At the time of survey, 7 out of 18 countries had imposed warning labels that met the guidelines by occupying at least 50% of the display area. Such requirements are on average associated with a 3% lower smoking prevalence rate ($p < 0.05$). However, an examination by education illustrates that this association is non-significant for groups without a formal education or with only a primary education. In contrast, graphic warning labels that meet guidelines are associated with a 5% lower smoking prevalence rate among the population with a secondary education or higher ($p < 0.001$). **CONCLUSIONS:** Graphic warning labels accounting for $\geq 50\%$ of the total display area are associated with lowered smoking prevalence among populations with at least a secondary education. Findings also suggest that large graphic warning labels may not be as effective among lower-educated people. Future policies need to address the disparity in the effectiveness of warning labels in reducing smoking among groups with different educational attainment. As the FDA has authority over warning labels on tobacco products, the implementation of warning labels that meet the FCTC guidelines may help reduce tobacco use in the United States, but attention is needed to increase their effectiveness among less educated populations.

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POS2-90**ASSOCIATIONS BETWEEN EXPOSURE TO TOBACCO DIRECT MAIL COUPONS AND CHANGES IN SMOKING STATUS IN A NATIONALLY REPRESENTATIVE SAMPLE OF US ADULTS**

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OBJECTIVES: Direct-to-consumer marketing is an influential tobacco marketing strategy. We examined if receiving tobacco coupons via mail/email was associated with becoming current cigarette smokers among nonsmokers, and continuation of cigarette smoking among current smokers. **METHODS:** Data were from the US Population Assessment on Tobacco and Health (PATH) Study adult sample ($n=32,320$) collected during 2013-2014. Participants were classified as nonsmokers or current smokers one year ago (T0) based on their self-reported smoking status on the same day 12 months before the survey. Participants also reported their current smoking status at the time of survey (T1), whether they received tobacco coupons through direct mail/email during the six months prior to T1, and demographics. Weighted multiple logistic regression models were used to assess the associations between receipt of tobacco coupons in the 6 months prior to T1 and cigarette smoking status at T1, stratified by T0 smoking status, and adjusted for age, gender, education, race/ethnicity, poverty status, and census

region. **RESULTS:** At T0, 18.9% of US adults were current smokers. During the 6 months prior to T1, 16.9% of US adults reported receiving tobacco coupons via mail/email (12.4% among T0 nonsmokers, 36.2% among T0 current smokers). Among T0 nonsmokers, receipt of tobacco coupons was associated with current smoking at T1 (AOR=2.30, 95% CI=2.01, 2.63), with the effect significantly varied by education (interaction $p=0.006$); <High school or GED: AOR=2.79; High school: AOR=2.53; Some college: AOR=1.64; College or above: AOR=2.46). Among T0 current smokers, receipt of tobacco coupons was associated with current smoking at T1 (AOR=1.39, 95% CI=1.13, 1.70). The association also varied by education (interaction $p=0.003$; <High school or GED: AOR=Not significant; High school: AOR=1.74; Some college: AOR=1.39; College or above: AOR=Not significant). **CONCLUSIONS:** Direct-to-consumer tobacco coupons may promote progression of smoking among nonsmokers and continuation of smoking among smokers in the US adult population. This marketing strategy may also, in part, contribute to the tobacco use disparities by education.

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POS2-91**UNDERSTAND THE RAPID CHANGING ELECTRONIC VAPING PRODUCT MARKET: AN EXAMINATION FROM THE SUPPLY SIDE**

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BACKGROUND: A growing number of studies have been conducted to understand the demand side of electronic vaping product (EVP) market, examining how demand-side factors, such as demographics (age, gender, race/ethnicity, and sexual orientation), SES status, health and smoking status influence use patterns and topography. However, systematic and comprehensive studies of EVP industry and the supply side of this market have been scarce. This study aims to fill in this critical research gap. **METHODS:** This study synthesizes data from a variety of sources, including commercial retail store scanner data, company financial reports and SEC filings, industry analysts' reports, and data compiled from company websites, online searches, and existing scientific literature. We examine distribution purchase channels, product evolution, brand and company competition, marketing and pricing strategies, and key players in EVP industry. **RESULTS:** Over time sales occurred online and in vape shops have increasingly become a significant component in the total EVP market. The types of EVPs have also evolved from early generations of cigalike e-cigarettes to more sophisticated EVPs with more power, function, and ability to customization. The industry has gone through considerable consolidation over the past few years. The EVPS market has changed from a low entry barrier market with many small producers/vendors to a market dominated by the tobacco industry and a few number of large independent e-cigarette companies. Heavy marketing and large price-reducing promotion have been the main tools for the tobacco industry to increase the market share of their products. **CONCLUSIONS:** The evolution of EVP market was shaped by not only the demand-side factors, but also industry strategies and behaviors. Product innovation, market consolidation, and price-reducing strategies have shaped the pathways of growth of EVPs. EVP-related public policies need to take into account not only user perceptions, preferences, and behaviors, but also industry's strategies and behaviors.

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POS2-92

CANCER CARE PROVIDERS' CHARACTERISTICS AND ATTITUDES TOWARDS SMOKING CESSATION IN COLOMBIA AND MEXICO

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SIGNIFICANCE: Cancer care providers (CCP) are uniquely positioned to promote tobacco cessation, since tobacco consumption is associated with poor outcomes among cancer patients. However, CCP attitudes towards cessation are influenced by many factors, including their own smoking status and knowledge. In Mexico, a study was conducted in 1999, but a comparable study was not identified in Colombia. **METHODS:** A cross-sectional pilot study was conducted on CCP working at the Cancer Institute, Colombia and the National Cancer Institute, Mexico. Study participants filled out an online confidential questionnaire designed to evaluate tobacco use status and cessation practices they implement at their cancer centers. To detect differences between countries, independent sample t-tests and Chi-squared tests were conducted. Regression analyses were conducted to identify significant determinants of actively providing cessation assistance. **RESULTS:** Among respondents (n=172), prevalence of current cigarettes smoking was 11%, while the prevalence of second hand smoke exposure was 10% (no significant difference was found between countries). At the initial cancer patient visit, 65% of CCP ask patients about smoking/tobacco use, 39% ask about secondhand smoke exposure, 7% ask about use of electronic nicotine delivery devices, 46 % advise patients to stop tobacco use, and 23% actively provide cessation assistance. Fewer CCP (24%) address smoking/tobacco use at follow-up. Three dominant barriers to CCP cessation effort were: concern about cancer patients' resistance to quitting (72%), lack of training/experience in tobacco cessation (66%), and lack of cessation resources/referral cessation services (62%). Only 23% report themselves to be adequately trained to provide cessation interventions. **CONCLUSIONS:** The WHO Framework Convention on Tobacco challenges the world tobacco epidemic through the globalization of tobacco control. However, our preliminary findings highlight an urgent need for expanded formal education on tobacco prevention and control for cancer care providers and to implement tobacco cessation interventions for cancer patients, particularly in middle-income countries.

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POS2-93

THE IMPACT OF MEDICAID COVERAGE FOR TOBACCO CESSATION TREATMENT ON SMOKING AMONG PREGNANT WOMEN AND BIRTH WEIGHT

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INTRODUCTION: Smoking prevalence is 50 percent higher in Medicaid enrollees than in the total population. Pregnant women on Medicaid are 2.5 times more likely to smoke than the general population. To reduce smoking in pregnancy among low income women, Medicaid has covered tobacco cessation treatment in the United States since 1996. However, data on its effectiveness is sparse. **PURPOSE:** The current study aimed to evaluate the impact of Medicaid cessation coverage on smoking prevalence before, during and after pregnancy; birth weight outcomes; quit rates during pregnancy; postpartum relapse rates and maintained abstinence postpartum among pregnant women on Medicaid. **METHODS:** We analyzed cross-sectional data from Pregnancy Risk Assessment and Monitoring System (PRAMS) in eleven states from 1997 to 2005. We used the difference-in-difference (DID) method to investigate the impact of Medicaid cessation coverage on smoking behavior and birth outcomes. We controlled for tobacco taxation and smoke-free indoor laws in our model. **RESULTS:** Availability of Medicaid cessation

treatment was associated with a significantly lower smoking prevalence before pregnancy, but not during and after pregnancy compared to states without cessation coverage. For states that provide Medicaid tobacco cessation treatment, smoking prevalence before pregnancy was 3.9 percentage points lower compared to states that do not provide the treatment. Living in a state with Medicaid cessation treatment was associated with a higher quit rate for those who smoked in the past two years but quit 3 months before pregnancy. There was a non-significantly higher quit rate during pregnancy and lower postpartum relapse rate in treatment states. There was no significant long term effect on maintaining abstinence postpartum (quit before or during pregnancy and remained abstinent after delivery). Quitting before pregnancy significantly increased abstinence during pregnancy, and decreased relapse after delivery. Living in a state with Medicaid cessation treatment was significantly associated with maintaining abstinence postpartum for those who quit before pregnancy and are abstinent in the latter two time points. **CONCLUSION:** Access to Medicaid coverage for tobacco cessation treatment significantly decreases smoking prevalence before pregnancy, but not during and after pregnancy. Medicaid cessation program has the importance of encouraging and supporting quitting before pregnancy but it has no significant impact on postpartum abstinence and the relapse rate.

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POS2-94

CHANGES IN ATTITUDES TOWARD SMOKING AND SECONDHAND SMOKE POLICY DURING A THREE-YEARS IMPLEMENTATION STUDY TO PROMOTE A SMOKE FREE UNIVERSITY IN ROMANIA 2014-2016.

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SIGNIFICANCE: Smoking habits of health professional students in Romania were unknown despite the fact that they play a crucial role in supporting health behavior change among their patients. In 2014, we initiated the first smoke free university project to raise awareness and change attitudes regarding smoking, to increase future health care providers' willingness and skills to promoting cessation, and to create an anti-tobacco culture on the university campus. The project introduced a new course to teach students about the harms of tobacco and how to help their patients quit, initiated coalition to promote a smoke free university, and involved students, academic and administrative leaders to ensure project success. **METHODS:** We conducted an annual census of students in 2014 (n=3210), 2015 (n=3991), and 2016 (n=2995) for a response rate between 66-77% of the total student population. The majority of respondents were female (73%). The 2016 evaluation was conducted one month after the introduction of the smoke free law in public spaces. Data was analyzed using the SPSS v22. **RESULTS:** The prevalence of smoking remained unchanged (34.0% in 2014 vs. 33.5% in 2016 NS.). The willingness to quit smoking also remained unchanged (14.2% in 2014 vs. 12.9% in 2016 NS). Students became more conscious of the fact that smoking health professionals are less likely to give smoking cessation advice to their patients (41.1% in 2014 vs. 46.4 % in 2016 p<0.0001). More students were aware of the existing smoking ban at the university (90.5% in 2014 vs. 95.5% in 2016 p=0.0001). Significantly more students declared that the smoke free university policy is enforced (45.1% in 2014 vs. 62.8% in 2016 p<0.0001). Significantly more students support smoke free policies at different places: in restaurants (83.6% in 2014 vs. 91.2% in 2016 p<0.0001), in discos/bars/pubs (58.6% in 2014 vs. 78.1% in 2016 p<0.0001), in all enclosed public places (75.4% in 2014 vs. 80.6% in 2016 p<0.0001). **CONCLUSIONS:** The intervention did not decrease smoking prevalence nor desire to quit smoking. However, students attitudes toward smoke free policies was significantly increased during the three years and the majority say that the policies are enforced, a major improvement for university students, staff, and faculty.

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POS2-95

SOCIOECONOMIC VARIATIONS IN SMOKING PERCEPTIONS, BELIEFS AND BEHAVIOURS AMONG ADULT SMOKERS FROM ITC AFRICAN COUNTRIES

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SIGNIFICANCE: The strong link between socioeconomic status (SES) and smoking perceptions, beliefs and behaviors has been explored mostly in Western and high-income countries (HICs) and less in low- and middle-income countries (LMICs). This study examines the effect of SES on smoking perceptions, beliefs and behaviors among smokers from Mauritius, Kenya and Zambia. **METHODS:** Data were analyzed from the International Tobacco Control (ITC) Surveys in Kenya, Zambia and Mauritius ($N=2,638$), face-to-face surveys of nationally representative samples of adult smokers. The measures of this study are nicotine dependence, quit attempts, salience of health warnings, knowledge of harms of smoking, and support for smoking bans. **RESULTS:** Higher levels of education was associated with lower nicotine dependence ($p=0.011$), more quit attempts ($p=0.006$), more likelihood of noticing health warnings ($p=0.005$), more awareness that smoking causes heart disease ($p=0.009$), stroke ($p=0.009$), and lung cancer ($p<0.0001$), and more likely to support smoking bans at work ($p=0.005$). While, higher income was associated with quit attempts ($p=0.002$), and more likelihood of noticing ($p=0.0001$) and reading ($p=0.017$) health warnings. Education and income were not closely correlated ($r=0.39$) in the three countries. **CONCLUSIONS:** Overall, these findings were consistent with results from Western and HICs i.e., higher SES was associated with similar smoking measures. However, income and education in the three African countries were not closely correlated. Education was associated with most of the smoking perceptions, beliefs and behaviors. These findings highlight the need for governments to target smokers with low levels of education. For example, delivering evidence-based effective tobacco control interventions such as using pictorial health warnings on cigarette packs in Kenya and Zambia, since they have been proven to significantly increase knowledge of harms of tobacco use than text warnings. Additionally, given that smokers with low education levels were more nicotine dependent, it is crucial that they have access to cessation counselling and affordable over-the-counter smoking cessation products.

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POS2-96

INFLUENCE OF LIQUID COMPOSITION AND DESIGN CHARACTERISTICS ON TOXICANT EMISSIONS FROM POPULAR E-CIGARETTE PRODUCTS

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SIGNIFICANCE: Electronic cigarette (ECIG) popularity has risen during the last decade, especially among tobacco smokers and youth, due to the perception that it is a safer alternative for nicotine delivery than cigarettes. The basic compartment of ECIG includes a battery, a coil, an e-liquid reservoir and a mouthpiece. The e-liquid is commonly made of polyol solvents like propylene glycol (PG) and/or glycerol (VG), and may contain nicotine and flavorings at various concentrations. ECIGs were first deemed inefficient in nicotine delivery, but later reports showed that depending on the combination of device characteristics and user puffing behavior, they are able to deliver equal or higher nicotine levels than combustible cigarettes. Available in hundreds of device designs and thousands of flavors, electronic cigarettes may have widely differing toxicant emission characteristics. Thus, periodically surveying characteristics of ECIG products available in the marketplace is valuable for implementation of regulations based on scientific evidence. **METHODS:** In this study we assessed liquid characteristics and aerosol emissions of 10 of the most popular brands of ECIG in the US market. Different flavors and

designs from the same brand were selected to form a total of 27 products in the sample set. These products included disposable, pre-filled cartridge and tank-based ECIGs. **RESULTS:** Characteristics of the battery power, the design specifications and the e-liquid composition (PG/VG ratio, water, and nicotine content and pH) were determined and their effects on determining the aerosol chemical properties, mainly nicotine and carbonyls yield, were evaluated. Results showed that popular ECIG brands emit quantities of nicotine that can exceed those of combustible tobacco cigarettes. **CONCLUSIONS:** Nicotine delivery varies widely across products but carbonyl emissions showed little variations. ECIG users are then exposed to toxicologically significant levels of carbonyl compounds, especially formaldehyde. Regression analysis showed the importance of design and e-liquid characteristics as determinants of nicotine and carbonyl emissions.

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POS2-97

PUBLIC SUPPORT OF BANNING SMOKING IN VEHICLES WHEN CHILDREN ARE PASSENGERS IN NORWAY

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BACKGROUND: The Norwegian Medical Association, with support from the Office of the Commissioner for Children and the network alliance Tobacco-Free, has proposed to introduce a ban on smoking in cars when children are present. Pointing to issues of enforcement, privacy and parents already being considerate, the Minister of Health and the previous Health Director have dismissed this proposal. Norwegian Institute of Public Health has investigated the support for such a proposal among the Norwegian public opinion. **MATERIAL AND METHODS:** A nationwide survey of 5,543 participants was conducted in December 2014 and January 2015 under the auspices of IPSOS MMI. Respondents were asked to consider several possible new tobacco control measures, among others a ban on smoking in cars, through self-reported location on 5-point scales ranging from 1 (no support) to 5 (full support) for each measure. Multivariate logistic regression was applied to analyse relationships between independent variables and the odds ratio for declaring full support to ban smoking in cars when children are present. Percentage distributions were used for comparing adherence to the ban on smoking in vehicles with four other access-limiting measures against smoking. For this purpose, response categories for each measure were grouped into 'no support' (1.2), 'partial support' (3.4) and 'full support' (5). **RESULTS:** A clear majority of the sample supported a proposal prohibiting smoking in cars when children are present. Of all respondents, 78% stated their full support. The proposal received substantially more support than other proposed access-limiting measures that ban smoking in parks and bus shelters. This was also true among daily smokers. **INTERPRETATION:** The strong endorsement of the proposal increases the likelihood of compliance and suggests that implementation could be introduced without enforcement problems.

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POS2-98

IMPACT OF ANTI-TOBACCO LAW ON ROMANIAN PUBLIC INSTITUTIONS

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BACKGROUND: Several studies have highlighted that smoking habits represent a major health problem in Romania. One reason for this are fine particles which can get deep in the lungs with major health effects. Previous studies have showed that indoor tobacco ban policies reduce PM2.5 concentration. The Global Adult Tobacco Survey 2011 indicated a rate of 26,7% of cigarette smokers in Romania. In March 2016 the anti-tobacco law in Romania changed, banning smoking totally in public in-



door places. **METHODS:** The study was carried out in 2015 and 2016 as a longitudinal study. A TSI 510 Aerosol Monitor was used to carry out the measurement at three public institutions: County Council, County Library, and National Health Insurance House, in seven target locations. The PM2.5 values were compared before and after the implementation of the law. **RESULTS:** Initial PM2.5 means in each location were higher than post-law values, with the exception of one point ($p=0.0002$, mean in 2015: 12 mg/m³, mean in 2016: 24 mg/m³). Initial values in each location exceeded WHO recommendations prior to implementation and none exceeded post-law. **CONCLUSIONS:** Anti tobacco law presents an effective method to mitigate second hand smoke exposure in public institutions. Although Romanian law bans smoking in public institutions, evidence of SHS is still present.

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POS2-99 SMOKE FREE MEDICAL UNIVERSITY PROJECT IN TARGU MURES ROMANIA, THREE YEARS RESULTS (2014-2016).

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SIGNIFICANCE: Tobacco use is also in Romania the leading cause of preventable morbidity and mortality. Healthcare students as later medical provider play a strategic role in the future smoke free society. Prior to the national tobacco ban legislation 2016, we initiated the first Smoke Free University program in 2014. Our aims were to evaluate the students' perception of their future model role and self-confidence advising patients for cessation and the opinion about the attended anti-tobacco training courses. **METHOD:** A serial census was arranged for all study years, using the WHO supported GHPSS methodology. Evaluation was made 2014, 2015, 2016 in medical, dental, pharmacy schools and the nursing college. Participation rates (females 73%) of subsequent years were 76% ($n=3210$), 67% ($n=3001$), and 66% ($n=2995$). The 2016 evaluation preceded immediately the introduction of national smoking ban in all public spaces. Data were analysed by IBM-SPSS v.22. Significance level of Chi-square probe was $p<0.05$. **RESULTS:** Students believe healthcare providers are role models for their patients (2014=74.8%, 2016=76.6%) and should provide information about smoking cessation: 2014=93.6%, 2016=92.9%. Advice received would increase the patients' chance to quit: 2014=78.9%, 2016=80.5%. For this reason all students should receive training in smoking cessation: 2014=91.5%, 2016=90.8%. Students admitted they were given detailed information about the health risks of smoking: 2014=76.4%, 2015=81.1%, 2016=80.7% however they told they were not trained about the patients' smoking motivations: 2014=32.6%, 2015=43.4%, 2016=44.2%. Attending rates of smoking cessation trainings increased: 2014=18.2%, 2015=27.3%, 2016=31.8%. Self-confidence for supporting patients in cessation also increased: 2014=80.3%, 2016=82.0%. Smoking prevalence of students remained unchanged: 2014=34.0%, 2015=33.5%, 2016=33.4%. **CONCLUSIONS:** Despite of positive changes in attitudes of students as future health care providers toward patients their own smoking prevalence levelled off at a high rate, which emphasizes the significance of especially tailored primary and secondary prevention programs in medical, dental, pharmaceutical schools and nursing colleges as well.

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POS2-100 THE POLISH ANTI-TOBACCO LAW – ITS LEGACY AND ITS POLICY LESSONS

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SIGNIFICANCE: In the 1980s Poland had the highest cigarette consumption in the world. After collapse of communism in 1989 transnational tobacco companies (TTCs) entered Poland. TTCs kept cigarette prices low, lobbied politicians and spent US\$100 million annually on advertising. TTCs predicted an increase of cigarette sales in Poland by up to 20% by the year 2000. Instead, the 1990s saw a decline in cigarette consumption by 10%. Progressive anti-smoking laws were passed by the Polish parliament, introducing large health warnings on cigarette packs and a ban on tobacco advertising, promotion and sponsorship. The legislation was lauded by the WHO as an "example to the rest of the world". The aim of this project is to understand why post-communist Poland was able to adopt effective policy responses rapidly, despite the entry of powerful TTCs, and what policy lessons can be drawn for countries in which the market is now undergoing a process of liberalisation. **METHODS:** The study draws upon documentary materials from Polish governmental archives, tobacco industry archives, and media archives. In-depth interviews were conducted with key informants active in the 1980s and 1990s in Polish health policymaking, health advocacy, and tobacco industry. In addition, a witness seminar and witness conference about the Polish Anti-tobacco Law were organised. **RESULTS:** The formation of a powerful anti-tobacco advocacy coalition in Poland was crucial in pushing through progressive anti-tobacco policy. Anti-tobacco advocates successfully exploited the policy context in post-communist Poland – the relegation of tobacco to an issue of low politics, the increasing role of experts in policymaking, and the end of societal political apathy. The anti-tobacco coalition also effectively fostered the shift in the discourse on smoking, whereby smoking was replaced by healthy lifestyles as a symbol of Western freedom. **CONCLUSIONS:** Poland's past successes in implementing effective anti-tobacco policy can provide a reference point in formulating anti-tobacco strategies in countries currently undergoing market liberalisation. In addition, there is urgent need to use the positive past experiences in tobacco control to formulate a plan for the eradication of smoking in Poland in the next decade.

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POS2-101 THE ECONOMICS OF TOBACCO AND TOBACCO TAXATION IN ROMANIA

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Tobacco smoking and other forms of tobacco use impose a large and growing public health burden globally and in Romania. Tobacco use is high in Romania, with nearly 5 million adults smoking tobacco products and over 33,000 Romanians dying prematurely each year from the diseases caused by smoking. While Romania has signed and ratified the WHO Framework Convention on Tobacco Control, much progress remains to be achieved in meeting the obligations and guidelines of the treaty. Similarly, while tobacco taxes have increased sharply in Romania since its accession to the European Union in 2007, cigarettes are more affordable today than they were at the start of the new millennium. Tobacco growing in Romania has changed dramatically over the past few decades, and currently accounts for a very small share of overall agricultural activity. In contrast, cigarette manufacturing has increased since Romania joined the EU, with much of production exported to other EU member states. New estimates, based on time-series analysis and analysis of the data from the Romanian Global Adult Tobacco Survey, show that increases in cigarette taxes and prices over the past decade have contributed to reductions in overall cigarette consumption and smoking prevalence. These estimates are used to project the impact of significant increases in cigarette taxes that would reduce the affordability of cigarettes to past levels. These projections demonstrate that significant tax increases would reduce the number of smokers



in Romania and, as a result, the number of future deaths expected to be caused by smoking. At the same time, higher cigarette taxes would lead to a substantial increase in tax revenues. In addition, we discuss the likely economic impact of these tax increases, focusing on their effects on employment, illicit tobacco trade, and the poor. Finally, we provide recommendations for future tobacco tax policy in Romania.

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POS2-102

IMPACT OF PUFFING PARAMETERS ON E-CIGARETTE AEROSOL CHEMISTRY

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E-cigarettes have gained in popularity in the past few years and understanding the potential exposure to the end user has become increasingly important. Deeming regulations released by the FDA in May 2016 propose full chemical characterization of the e-cigarette aerosol. In general, the chemistry of e-cigarette aerosols has been shown to be dramatically different from that of conventional cigarettes. E-cigarette aerosol have significantly lower deliveries of harmful or potentially harmful constituents. E-cigarette devices heat aerosol carriers such as propylene glycol and glycerin, and ingredients such as nicotine and flavors. Some of the energy delivered to the device during vaping can potentially lead to the thermal degradation of e-liquid components. It has been previously reported that aerosols from e-cigarettes may contain thermal degradation products (e.g. carbonyls such as formaldehyde, acetaldehyde, acrolein, and crotonaldehyde). These thermal degradation products are produced by various e-cigarette use conditions, such as elevated temperatures of the heating coils or poor wicking of the e-liquid. Most reports on thermal degradation products investigated a single set of puffing parameters and it did not evaluate the impact of different aerosol collection conditions on the formation of carbonyls. Depending on the device, the energy provided and dissipated during puffing is a function of device design elements and the puffing profile exercised by the end user during the use of the device. Our work examines the impact of different puffing parameters on the formation of formaldehyde, acetaldehyde and acrolein. We evaluated different puff durations (3 to 6 seconds), puff intervals (15 to 120 seconds), and puff volumes (55 to 140 mL) for prototype devices and commercially available e-vapor products. Our work suggests that carbonyl deliveries increase towards the end of the life of the cartridge, where "dry puffing" conditions become more pronounced. Additionally, increasing puff duration and decreasing the interval between successive puffs increases the formation of carbonyls. The relationship between the temperature of the heated zone and the formation of formaldehyde was also examined.

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POS2-103

PICTORIAL WARNING AWARENESS AND INTENTION TO SMOKE OF SENIOR HIGH SCHOOL STUDENTS AT PONOROGO, INDONESIA

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INTRODUCTION: Smoking is a leading causal of death on non communicable diseases worldwide, while this danger is generally known by most people, Indonesia still leads on worldwide cigarette consumption. To overcome this situation, the government of Indonesia propose and deliver a new regulation by June 2014, which states that pictorial warning should be added to all cigarette packing available. This research aims to understand whether pictorial warning have any impact on cigarette consumption. **METHODS:** This research is an observational study with cross sectional design by means of survey questionnaire. Data will be calculated using univariate for baseline characteristics and bivariate Pearson's chi square

test of correlation for the impact of pictorial warning. **RESULTS:** Participants were 400 Students, with 275 male (68.8%) and 125 female (31.2%) students. Correlation between pictorial warning awareness and health risk knowledge of smoking is significant and greatly proportional, either on smokers ($r=0.822$, $P<0.001$) or non smokers ($r=0.698$, $P<0.001$). Significant correlation also analyzed between knowledge of cigarette health risk and intention to smoke, although with smaller correlation coefficient, both with smokers ($r=0.308$, $P<0.001$) and non smokers ($r=0.324$, $P<0.001$). **CONCLUSION:** There is small proportional correlation between pictorial warning awareness and intention to smoke.

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POS2-104

HEAVY SMOKERS BEHAVIOR AT HIGH CARDIOVASCULAR RISK WITH MULTIPLE CHRONIC CONDITIONS ASSISTED PROGRAM FOR SMOKING CESSATION

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INTRODUCTION: Heavy smokers (HS) are unfavorable predictors for smoking cessation and for these smokers, usually it is necessary drug treatment in an attempt to help them stop the addiction. To assess the psychosocial and clinical characteristics and smoking history in HS assisted in ambulatory with multiple chronic and high cardiovascular risk conditions. **METHOD:** A longitudinal study conducted in Integral Assistance Unit Smoking Cessation (IAU-T), Juiz de Fora (Brazil), from May/2012 to June/2016, referring to 31 consecutive treatment groups for tobacco cessation, including awareness, cognitive-behavioral approach sessions (ACB) weekly and multidisciplinary team with rotation of the ACB meetings, as the topics covered. It was defined as HS who smoked ≥ 20 cigarettes/day; high nicotine dependence the Fagerstrom Test (TF) ≥ 5 points; depression, the PHQ-2 ≥ 3 points; alcohol abuse, Audit-C ≥ 5 points. **RESULTS:** Sample of 208 users, with an average of 6.7 patients/meeting. Of assisted patients, 60.3% were women, 62.6% were sedentary. Comorbidities present: hypertension, 91.3%; diabetes, 51%; chronic kidney disease, 35.2%; previous atherosclerosis disease, 38.9%; obesity, 36.5%; alcohol abuse, 24.4%; COPD, 26%; Asthma, 13%; previous history of cancer, 3%; depression, 48.8%; cognitive impairment, 89.7%, symptoms of obstructive sleep apnea (OSA), 61.9%. How HS, diagnosed 70.3% of the sample. Comparing these with those who smoked < 20 iu/day, we found that HS were predominantly younger ($p < .001$) and white ($p < 0.018$); more abdominal obesity ($p < 0.003$) and more likely to OSAS ($p < 0.09$). Allied, had higher frequency of depression ($p < 0.01$) and alcohol abuse ($p < 0.027$); higher nicotine dependence ($p < 0.0001$), higher concentrations of carbon monoxide exhaled ($p < 0.0001$) and using bupropion ($p < 0.029$). **CONCLUSION:** The sample showed a population which, although was observed the presence of various comorbidities and the characteristic of being at high cardiovascular risk, still showed a high prevalence of HS, associated with unfavorable predictors of tobacco cessation and clinical worsening. Health professionals need to address systematically population with similar profiles.

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POS2-105

METHOD FOR IDENTIFYING AND MANAGING ELECTRONIC PRODUCT HAZARDS FOR E-VAPOR DEVICES

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E-Vapor devices (e.g. "e-cigarettes", "tanks", "mods") are electronic products typically powered by lithium ion batteries. The potential hazards associated with poor electronic design, construction and quality management of e-vapor devices are beginning to receive more attention. We present a systematic approach to evaluate e-vapor device electronic safety. Our approach includes identifying design weaknesses, evaluating battery safety and conducting human factors analysis. It also includes independent third-party testing using IEEE Standard 1725 for Rechargeable Batteries for Cellular Telephones as an electrical evaluation standard.



The results of this approach enable the mitigation of electronic product hazards associated with the e-vapor device by implementing appropriate design improvements and providing adequate warnings and instructions.

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POS2-106

SMOKING HABITS AND AWARENESS ABOUT ANTI-SMOKING ACTS AMONG GENERAL PUBLIC IN GURGAON, HARYANA, INDIA

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BACKGROUND: India is the world's third largest tobacco-growing country. The Indian scenario as far as tobacco consumption is concerned is far worse because of the prevalence of the tobacco chewing habit which covers a wide spectrum of socioeconomic and ethnic groups and is spread over urbanized area as well as remote village. Tobacco use is alarming in terms of its current and projected future impact on global mortality. Recent shift in global tobacco consumption to developing countries indicate that an estimated 930 million of the world's 1.1 billion in India alone. Despite the facts, that the harmful effects of tobacco chewing and smoking are widely known, many young people start smoking during adolescence, largely because they believe that smoking will boost their social acceptability and image. This study was contemplated with an aim to assess tobacco / smoking habits and awareness about anti-smoking act among general public in Gurgaon, Haryana, India. **METHODS:** A structured questionnaire consisting of 14 questions related to tobacco/smoking habits and awareness about anti-smoking act were asked to general public and their response was recorded. Random sampling method was used and data was collected from a cross-sectional survey. Anti-tobacco counselling was given on the spot and followed. **RESULTS AND CONCLUSION:** The study population consisted of total 430 individuals, male 364 (84.65%) and females 66 (15.34%). Then the questionnaires were asked and statistically analyzed. Around 286 (78.57%) from 364 males were indulged in some form of tobacco usage (smoker =32.86%, tobacco chewer = 16.78%, both =11.18 %, alcohol +tobacco user =21.67%). In the present study, most common cause of tobacco use was pleasure 40.5%, inducing factor were friends 53.1% followed by parents and siblings. 36.20% patients used tobacco as second hand exposure in job places. 54.8% were aware about the anti-smoking act in public places, so only 8.6% people from all males enrolled, were smoking in public places.

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POS2-108

IT'S A VERY GREY AREA - HOW RETAILERS ARE BEING ENCOURAGED TO PROMOTE TOBACCO IN A DARK RETAIL MARKET

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SIGNIFICANCE: Tobacco promotion in the UK retail environment has been severely curtailed: tobacco products were removed from sight in all retail outlets in 2013-2015, while in 2016-2017 restrictions were placed on pack size, price-marked packs were banned, and standardised packaging was introduced. As a consequence of these constraints, tobacco companies have found new ways of working with retailers to promote tobacco. This qualitative study explored retailers' perceptions and experiences of how tobacco company representatives (reps) engaged with them over the period of regulatory change. **METHODS:** As part of the DISPLAY study, we conducted a qualitative longitudinal study of retailers' experiences of implementing the changes, comprising annual interviews over 5 years with a sample of retailers (n=24) in four contrasting Scottish communities. **RESULTS:** While some retailers reported decreasing levels of interest from tobacco reps over the period, others felt that reps became more 'pushy' to maintain their share of sales as the market darkened. Retailers were offered financial and other incentives, often linked to sales but sometimes simply in return for stocking key brands. Retailers described reps advising them to use various strategies for drawing customers' attention to their brands: placing them directly next to competitor brands in the gantry so that the customer could see them when gantry flaps

were opened, giving a customer the wrong pack 'by mistake', and making verbal suggestions to customers to try particular brands. These strategies were understood by retailers to fall within a "grey area". While several co-operated willingly because it was financially advantageous, others expressed growing ambivalence or distaste regarding their continuing relationship with tobacco companies. **CONCLUSIONS:** Even in an ever darkening market, tobacco companies are devising strategies for continued product promotion. Grey areas in the legislation have been identified which require addressing. Retailer negativity regarding engagement with tobacco companies could be encouraged and harnessed to support a move away from tobacco.

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POS2-109

THE EFFECT OF MPOWER SCORES ON SMOKING PREVALENCE AND CIGARETTE CONSUMPTION

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BACKGROUND: In order to assist the implementation of Framework Convention on Tobacco Control (FCTC) policies in party countries, the World Health Organization (WHO) has introduced the MPOWER measures to evaluate the progress. This study aims to examine the effect of MPOWER policies, measured using a composite score on smoking prevalence and cigarette consumption in a global context. **METHODS:** Data from WHO's Reports on the Global Tobacco Epidemic, 2007-2008, 2010, 2012, and 2014 was linked to Euromonitor International data using country and year identifiers to analyze the effect of MPOWER score on smoking prevalence and cigarette consumption. Fractional logit regressions were employed to examine the effect of MPOWER scores on smoking prevalence and OLS regressions were employed to examine the effect on cigarette consumption. All analyses were clustered at the country level and controlled for other covariates such as price, country-level GDP per capita, population aged 15-64, time fixed effects, and country fixed effects. **RESULTS:** The results suggest that countries with higher MPOWER composite scores experienced greater decreases in smoking prevalence and cigarette consumption during the years 2007-2014 and that this association was seen in both genders. The prevalence of smoking decreased 1.1 percentage point ($p < 0.05$), 1.3 percentage points for males ($p < 0.05$), and 1.4 percentage points for females ($p < 0.05$) with each unit increase in the composite MPOWER score. Cigarette consumption decreased 58 sticks (approximately 3 packs of cigarette; $p < 0.05$) per capita per year for each unit increase in the composite score. **CONCLUSIONS:** The study provides evidence to support the implementation of the MPOWER measures and the WHO FCTC guidelines.

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POS2-110

EFFECTS OF CIGARETTE PACK GRAPHIC WARNING LABELS ON SMOKING BEHAVIORS, QUITTING INTENTIONS, BELIEFS, AND ATTITUDES

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Population-based studies and a recent randomized trial have shown that cigarette pack graphic warning labels (GWLs) increase self-reported quit intentions, attempts, and success. There is little research, however, evaluating how GWLs affect smoking behaviors (e.g., cigarette consumption, puffing behavior). We examined the effects of cigarette pack GWLs on smoking behaviors, and quitting intentions, beliefs, and attitudes. We also explored potential subgroups of interest by examining differences in these effects by gender, education, race, and nicotine dependence. 246 daily, non-treatment-seeking smokers (57.5% male, 57.1% Black) enrolled in a 10-day randomized, parallel design laboratory study and were provided with their preferred brand cigarettes affixed with one of the nine court-defeated FDA-proposed GWLs. Smokers reported their daily cigarette consumption (verified via filter collection) throughout the study, and completed

four laboratory visits to provide assessments of carbon monoxide (CO), puffing behavior, and quitting intentions, attitudes, and beliefs. Mixed effects regression models examined outcome changes over time by GWL type, gender, education, race, and dependence. Relative to baseline, smokers' quitting intentions, beliefs, and attitudes improved ($p \leq .001$), yet daily cigarette consumption increased ($p < .001$). Total puff volume and CO boost initially decreased but returned to baseline levels at the third and last visits, respectively ($p < .05$). Outcomes did not differ by GWL type; there were, however, overall gender differences in quitting beliefs ($p < .05$), educational differences in beliefs and intentions ($p < .05$), and dependence differences in nearly all outcomes ($p < .01$). Additionally, race and education interacted with time to affect daily cigarette consumption ($p < .05$): White and less educated smokers' daily consumption increased more sharply throughout the study compared to Black and more educated smokers. Findings highlight the need to rigorously assess behavioral, along with self-report, outcomes to provide a strong evidence base to guide regulatory actions regarding GWLs. Additionally, GWL research should consider subgroups of interest that may uniquely respond to policy change.

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POS2-111

THE SMOKING HISTORY GENERATOR POLICY MODULE: PROJECTING THE EFFECTS OF TOBACCO CONTROL POLICIES THROUGH MICROSIMULATION

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BACKGROUND: The Cancer Intervention Surveillance Network (CISNET) Smoking History Generator (SHG) simulates individual life histories of US smoking and mortality, and has been used in multiple, validated computational models to project long-term smoking and lung cancer outcomes. The SHG provides data by age, year and cohort from 1964 through 2012, and can be used to evaluate changes in smoking behavior due to tobacco control policies. **OBJECTIVES:** Extend the CISNET SHG to evaluate the effects of smoke-free air laws and cigarette taxes on U.S. smoking and mortality outcomes by applying policy and age-specific effect sizes to smoking initiation and cessation rates by year. **METHODS:** For each policy, SHG smoking initiation and cessation rates were modified by age, birth cohort, gender, and year since implementation. Initiation and cessation rate modifiers adjusted for differences across age groups and the level of existing policy coverage. Cigarette taxes are modeled as a one-time federal tax increase, assuming higher price elasticities at younger ages. The smoke-free air laws module applies the relative effects of bans on smoking to workplaces (2/3), restaurants (2/9), and/or bars (1/9), with effects moderated based on existing smoke-free air law coverage for these venues across the U.S. Smoking prevalence and the number of population deaths avoided were calculated for each policy scenario. **RESULTS:** Based on existing levels of smoke-free air law coverage in the US, if a complete 100% smoke-free air law was applied to the entire US population in 2016, the SHG policy module estimates that by 2060 more than 720,000 deaths would be avoided. Given a \$6 price per pack of cigarettes at baseline, a \$1.00 federal tax increase implemented in 2016 would lead to 1.5 million deaths avoided by 2060 and 4.1% reduction in adult smoking prevalence. A \$2.00 tax increase in 2016 would translate into 2.55 million total deaths avoided by 2060. **CONCLUSIONS:** The SHG policy module is a tool that can support public health decision-making. Future work will consider other types of tobacco control policies, policy interactions, and varying effects by state.

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POS2-112

THE PROBLEM OF NON-STANDARD CIGARETTE PACKS: A 14 COUNTRY STUDY

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Cigarette packs are an important tool for communicating information to smokers. Cigarette packaging offers producers a means to attract consumers with alluring designs and communicate by branding the available surfaces. Studies have found that packaging size and shape foster misperceptions about the harmfulness of cigarettes. Standardized packaging is one way to manage the allure of innovative cigarette packs. Tobacco companies are increasingly focusing their marketing efforts in low- and middle-income countries (LMICs) where smoking prevalence is high. This study examines a variety of pack design features in 14 LMICs. The Tobacco Pack Surveillance System project systematically collects unique cigarette packs sold in LMICs with high tobacco use. In 2013, TPACKSS collected 3240 packs from 14 LMICs from five of the six WHO regions. Packs were assessed by two independent coders for a wide variety of design features, which include pack type, opening style, and pack shape. Data analysis was conducted using Stata14. 2468 packs were collected that displayed a health warning label from the country in which it was purchased. Pack types included boxes, sachets, and cylindrical tins. More than one hard pack opening style was found in ten of the countries (71%). Seven opening styles were found in China and Russia. Flip-top, cigar-box, push-pack, slide-pack, and sliding lid pack opening styles were found in both countries. China and Indonesia had the greatest variety of pack shapes (5) collected. Both countries featured traditional, wide, extra-wide, and lipstick (narrow with traditional depth) pack shapes, while a split traditional pack and cone-shaped pack were found in China and Indonesia, respectively. Almost half (43%) of the packs collected in Ukraine were slim packs. Packs with a rounded edge were most prevalent (62%) in Turkey, while packs with a flattened edge were often (26%) found in India. The number of cigarette pack design options on the market is quite variable. New designs can increase the amount of brandable space on cigarette packaging. Until there are restrictions, the cigarette consumer is faced with a variety of potentially alluring design features.

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POS2-113

VAPE SHOP MARKETING PRACTICES AND IMPLICATIONS FOR FUTURE MONITORING AND REGULATION

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Vape shops have small budgets for marketing their products so they must find creative low cost ways to communicate and develop relationships with their customers. These marketing strategies often incorporate marketing techniques now banned for cigarette companies, and make use of channels not currently covered by tobacco marketing regulations. These strategies challenge the boundaries of what tobacco marketing regulators can limit, monitor, and enforce. Individual interviews were conducted with Oklahoma vape shop owners (n=33) recruited from electronic postings and local advertisements. A content analysis of their social media posts, and follow up interviews with local vape shop owners on marketing practices will be discussed and compared to current regulated and banned forms of marketing for tobacco companies and how the tobacco industry is promoting electronic cigarettes. Vape shop owners often utilize social media because they are familiar with it, they have the skills to do it themselves, it can be updated quickly, and it can provide a platform for personal interactions with customers outside of the vape shop. Vape shop owners engage customers through social media using relationship marketing techniques, which are marketing strategies to encourage customer interactions with vape shop staff resulting in strong connections between the store and customers which promotes loyalty and long-term relationships. Vape shop owners and staff interact with customers through Facebook, Instagram, Pinterest, Twitter, and YouTube to showcase their store and vaff vapor tricks, share personal testimonies, and provide advice to customers on vaping. Vape shop owners also create blogs or pay bloggers to promote products, provide personal testimonies, or spread information about vaping to customers and potential customers. Most vape shops base a large part of their marketing on e-liquid flavors unique to



their store. Owners consider these flavors as one of the main reasons for customer loyalty. How local vape shops are responding to new e-liquid regulations and how these are being incorporated into marketing communications will be discussed.

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POS2-114

ENVIRONMENTAL ASSESSMENT OF HEALTH CLAIMS IN VAPE SHOPS

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BACKGROUND: Electronic nicotine delivery systems (ENDS) have been unlawfully promoted online, on TV and in print media as smoking cessation aids and as products approved by the Food and Drug Administration (FDA). However, very little is known about ENDS marketing in vape shops. We sought to assess and characterize claims advertised in these specialty retailers. **METHODS:** A list of vape shops in North Carolina (NC) was created by searching ReferenceUSA and the top four Internet search engines. Four cities with at least 10 vape shops were selected for audits. Between November 2015 and February 2016, two trained data collectors conducted unannounced retail audits using wearable imaging technology that captured photos at a rate of 1 photo/second. Photos were categorized as having a potential claim if they included images and/or text that conveyed ENDS information. A coding guide was used to code the type of claim as cessation, product substitution, drug effect, modified risk tobacco product (MRTP), false and misleading, or FDA-approved/endorsed. Photos were double coded and reviewed by an expert panel. **RESULTS:** A total of 44 vape shop in 4 NC cities were audited. We captured 14,574 photos; of these, 460 included advertising with a potential claim and were included in the analysis. Of those, 103 photos were coded as having at least 1 ENDS-related claim. Almost half (48%) of retailers displayed at least one claim, with a range of 0-22 claims displayed per retailer. All claim types were found; 43% of claims were categorized as cessation; 38% as substitution; 11% as MRTP; 2% as drug effect; 2% as false and misleading; and 1% as FDA-approved/endorsed. **CONCLUSIONS:** Vape shops displayed many potentially prohibited claims, with cessation claims being most prevalent. Prohibited claims have the potential to mislead consumers and influence consumer behavior; therefore, research on consumer perceptions of advertising claims and beliefs about ENDS is critically needed. Findings also highlight the need for continued FDA surveillance, for retailer education about FDA regulations, and for FDA enforcement of restrictions on vape shop marketing.

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POS2-115

STANDARDIZED TOBACCO ASSESSMENT FOR RETAIL SETTINGS-VAPE SHOPS (VSTARS): DISSEMINATION AND IMPLEMENTATION RESEARCH

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The Standardized Tobacco Assessment for Retail Settings: Vape Shops (vSTARS) was designed to characterize vape store product availability, health messaging, brand identity, promotions, and store policies on the sampling and mixing of e-liquids. The instrument specifically aims to understand vaping products at brick and mortar retail outlets that focus on e-cigarettes with a goal of assessing their sales and marketing practices in order for state and local practitioners to develop future

policies and regulations. vSTARS was developed through a process engaging over two dozen tobacco control program staff, attorneys, and researchers, and was based upon the Standardized Tobacco Assessment for Retail Settings (STARS) used in the majority of states for assessments at conventional tobacco product retailers. vSTARS is a 2-page instrument that takes approximately 12-15 minutes to complete. This presentation describes the process used to develop the vSTARS instrument and training materials. vSTARS was pilot tested and implemented in Minnesota, New Hampshire, Oklahoma, North Carolina, and Texas. A summary of key findings from the pilot will be presented. As vape shops continue to proliferate, vSTARS will be a useful surveillance tool for local and state programs.

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POS2-116

MAPPING SMOKING STATUS IN TRIBALLY OWNED CASINOS IN THE UNITED STATES

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BACKGROUND: The number of tribal casinos has increased substantially over recent years as a means for tribes to generate revenues and employment. At least 781 state-regulated gaming facilities are required to be smoke-free (ANR, July 2016), however tribal sovereignty means that tribal gaming facilities are not subject to state smoke-free regulations. No research has been done to assess the smoke-free status of tribal casinos. **METHODS:** The list of tribal gaming facilities in the U.S. was obtained from the National Indian Gaming Commission. Between October 2015 and May 2016, research assistants phoned all 485 facilities listed to conduct a brief survey asking whether each casino had any non-smoking areas and if so, what parts of it were non-smoking. Data was summarized by frequency counts and percentages. Tribal gaming facilities were classified as stand-alone casino, bingo room, poker room, restaurant/bar, gas station/travel center, miscellaneous retailer, or "casino plus" consisting of standalone casinos plus casinos combined with one of the other types of facilities. Each facility was coded as 100% smoking, 100% smoke-free, or partially smoking, which was further stratified into six sub-categories. **RESULTS:** The survey yielded a 94.85% response rate (N=460). Only 3.0% of the 398 gaming facilities in the "casino plus" category were completely smoke-free and 51.0% allowed smoking anywhere on their premises. The remaining 46% had some provision for smoke-free gaming, although in one-third (33.9%) of these it was simply a designated no-smoking area of an open gaming floor. **Discussion:** Almost all of the employees and patrons of tribal casinos in the U.S. are exposed to deadly secondhand smoke. Ongoing surveillance of smoke-free policies in tribal casinos is necessary to identify those that have gone smoke-free so that further research can be done on why and how they managed to successfully implement 100% smoke-free policies.

FUNDING: National Cancer Institute

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POS2-117

ATTITUDES AND OPINIONS OF TRIBAL GAMING STAKEHOLDERS ON SMOKING IN TRIBALLY OWNED CASINOS

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BACKGROUND: Nearly 400 casinos in the U.S. are owned by American Indian tribes and due to tribal sovereignty are not subject to state smoke-free regulations; nearly all allow smoking. The National Indian Gaming Association (NIGA) is the primary trade association for the tribal gaming industry and it hosts a large conference each year attended by industry stakeholders. **METHODS:** A survey was administered to attendees at the NIGA conference in March 2016, to assess their beliefs about risks associated with secondhand smoke (SHS) exposure and their opinions about smoke-free policies in gaming facilities. **RESULTS:** 80% of



participants (N=103) believed SHS causes heart disease and 86% believed it causes cancer. Additionally, 76% recognized that the air is not safe to breathe in a smoking casino if it does not smell of smoke. 46.6% of the participants would support their tribal gaming facility(-ies) going completely non-smoking if revenues would not go down and 42.7% would support the move to smoke-free gaming if research showed that smoke in gaming facilities definitely harms employees and customers. 75.2% responded that they were interested in learning about the best ways for making gaming facilities completely smoke-free. Discussion: While a strong majority of attendees surveyed at the NIGA conference recognize that SHS exposure leads to serious diseases, our findings suggest that more education is needed to inform industry stakeholders about the dangers of SHS exposure to its employees and patrons. That nearly half of participants would be willing to support their gaming facilities going smoke-free if revenues would not go down and over 75% were interested in learning more about making their gaming facilities smoke-free suggests the potential for research and education to make a sizeable inroad in efforts to make tribal casinos a safe place to work and play.

FUNDING: National Cancer Institute

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POS2-118

SIMILAR PACKS, DISSIMILAR PRICES: MARLBORO CIGARETTE PRICING WITHIN AND ACROSS COUNTRIES

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Marlboro is the world's top-selling cigarette brand, and has been for over two decades. Despite price being a powerful determinant of cigarette demand, little is known about multinational tobacco company pricing strategies. Although it has been documented that Marlboro sells at different prices, previous studies have not examined within country variation. We investigated the variation in the purchase price of the iconic Marlboro Red cigarettes within and between five middle income countries across four WHO regions. Hard packs of Marlboro Red cigarettes were systematically purchased in 5 middle income countries in 2015-16: Brazil, Indonesia, Russian Federation, Thailand, and Viet Nam. In each country, one vendor in each of 36 low, middle, and high socioeconomic (SES) areas across 3 major cities was sampled. The price paid (without any price promotions) was recorded. Local prices were converted to US dollars using exchange rates from the date of collection. Analyses were conducted using Stata14. We collected 133 Marlboro packs, ranging from 16 in Thailand to 34 in Indonesia. Mean purchase price was highest in Thailand (US\$ 2.63) and lowest in Viet Nam (US\$ 1.03). The same rank order held for median price. The range between the most expensive and the cheapest Marlboro Red packs purchased was the largest in Brazil (US\$1.09) and the smallest in Thailand (US\$0.05). The correlation between mean price and country GDP (World Bank, 2015) was 0.30. The correlation between mean price and absolute value of cigarette tax in a country was 0.83. Overall, average price increased from low- to middle- to high-SES neighborhoods, but the differences were not statistically significant. Except Thailand, where pricing was essentially uniform, price differences for Marlboro Red within countries reflected geographic variation. Marlboro Red hard packs are highly standardized internationally, reflecting Philip Morris International's standardized global branding strategy, but are priced dissimilarly. Across the five countries, price differences correlated strongly to the absolute value of cigarette tax, and varied by city, possibly reflecting cost of living differences.

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POS2-119

POLITICIANS' REFERENCES TO NEW ZEALAND'S SMOKEFREE 2025 GOAL: A BAROMETER OF POLITICAL WILL

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SIGNIFICANCE: In 2011, the New Zealand (NZ) Government adopted a goal of becoming Smokefree by 2025 (hence 'Smokefree goal'). We explored the salience

of NZ's Smokefree goal by analysing political discourse and identifying trends and patterns in goal references. METHODS: We analysed over 30,000 communications by NZ politicians between April 2010 and December 2015, sourced from two databases of political speeches and press releases. We tracked references to tobacco, the Smokefree goal, and a health service target for improving cessation support, and explored reference patterns by political party and individual politicians. RESULTS: References to the Smokefree goal averaged 0.4 per week, increasing to 0.5 to 0.7 per week during three periods of active tobacco control policy debate. Goal references increased in the six months following the Smokefree goal's adoption in March 2011, but were lower in the period after the 2014 election. Most references were made by a single Māori politician (the Associate Minister of Health responsible for tobacco control until the 2014 election), and almost two thirds were made by a minor party holding three or fewer seats in the 121 seat parliament. The senior Ministers of Health during the study period were much more likely to mention the health service cessation target than the Smokefree goal. CONCLUSIONS: Infrequent reference to the Smokefree 2025 goal suggests the goal has a low priority for most NZ politicians, though substantial imbalances exist across political parties and individual politicians. Other jurisdictions pursuing an endgame goal may find this a cost-effective approach to analyse and track political priority and commitment, guide advocacy strategies, and hold politicians to account for promulgation of public health goals.

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POS2-120

COUNTRY-SPECIFIC TOBACCO CONTROL COST AND WHO-FCCT SOURCES TO SUPPORT FULL IMPLEMENTATION OF WHO-FCCT

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BACKGROUND: One of the major obstacles to the full implementation of the Framework Convention of Tobacco Control (FCTC) tobacco control measures is the lack of sustainable resources. GOAL: To help policymakers establish sustainable mechanisms to fund and accelerate the comprehensive implementation of the FCTC. APPROACHES: we examined cigarette affordability and composite MPOWER scores to identify sustainable measures for implementing the FCTC. We imputed the affordability of popular or mid-priced brands and that of discount brands using 2014 MPOWER and Economist Intelligence Unit price data. The affordability measures were constructed as the percent of GDP per capita needed to purchase 100 packs of cigarettes, with each pack containing 20 sticks. The composite MPOWER was constructed by summing up the six scores for each domain, with the maximum score for a full implementation of FCTC being 29. FINDINGS: The average composite MPOWER score increased from 17.2 in 2007-2008 to 19.9 in 2014, showing that further effort is needed to fully implement FCTC. The affordability measures show that 0.13% of GDP per capita is needed to purchase 100 packs of discount cigarettes, whereas 0.18-0.24% is needed to purchase the same amount of popular or mid-priced cigarettes. CONCLUSIONS: The level of FCTC implementation increased moderately in recent years. Taxes and prices in many countries have room for further increases. Tax increases not only will decrease smoking rate and smoking-attributable non-communicable disease but also can be used to finance the implementation of FCTC in the country to gain further public health benefits.

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**POS2-121****NICOTINE AND POTENTIAL TOXICANTS IN ELECTRONIC CIGARETTE REFILL SOLUTIONS FROM GUATEMALA**

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SIGNIFICANCE: Although electronic cigarettes (e-cigarettes) are extensively studied in high-income countries, little is known about the quality and safety of these products sold in low/middle-income countries. The e-cigarette market in Guatemala is currently unregulated, leaving potential users at risk. Therefore we sought to evaluate the labeling, nicotine content, and possible toxicants in e-cigarette refill solutions available in Guatemala. **METHODS:** Fifty-seven e-cigarette refill solutions were purchased from retailers (malls, grocery stores, pharmacies, gas stations, and e-cigarette wholesale distributors) in Guatemala City. Nicotine content, ingredients, health warnings, flavorings, and expiration dates were recorded. Nicotine concentrations were measured using gas chromatography and full ingredient scans were qualitatively analyzed using mass spectrometry. **RESULTS:** Most products had labeled nicotine content and health warnings. The listed ingredients were not specific. Most labels only included solvents, nicotine, and "natural/artificial flavors." The labeled nicotine content was accurate (within 10%) in 31 (54%) of Guatemalan solutions, more than those found in the United States. Five solutions (9%) labeled as "nicotine-free" contained more than 10 mg/ml of nicotine, consistent with findings from the United States. On average, 22 compounds were detected, including inhalation toxicants or irritants (e.g., acetone). **CONCLUSIONS:** This study revealed the poor quality of e-cigarette products in Guatemala. Due to the lack of quality standards and regulation, e-cigarette users in low/middle-income countries are at a higher risk than consumers in high-income countries.

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POS2-122**SUPPORT FOR PLAIN CIGARETTE PACKAGING AND ITS RELATION WITH REACTIONS TO CURRENT GRAPHIC HEALTH WARNING: A POPULATION-BASED CROSS-SECTIONAL STUDY**

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BACKGROUND: Large graphic health warning (GHW) and plain packaging (PP) can effectively warn about the risk of smoking and reduce smoking. To counteract tobacco industry opposition against the PP legislation, governments need strong public support. However, such support has not been gauged in Asia and little is known about its associated factors elsewhere. We gauged the support for PP in Hong Kong, and explore how it varied with different reactions to the current GHW (covering 50% of the packaging) in Hong Kong. **METHODS:** We included 2,337 respondents (932 never smokers, 844 ex-smokers and 561 current smokers) from a two-stage random sampling telephone survey in 2015 in the analysis. Four reactions to the current GHW in the past 30 days including (i) noticing (all respondents), (ii) thinking of harms of smoking (all respondents), (iii) thinking of quitting (ex- and current smokers) and (vi) forgoing cigarettes (current smokers) were enquired. Also, all respondents were briefly introduced about PP, and asked if they supported it. In each smoking status, prevalence ratio (PR) was used to examine the association of support for PP with reactions to GHW and other factors in each group of smoking status. **RESULTS:** Over three-quarters of non-smokers (79.7% of never smokers, 76.4% of ex-smokers) and about half (50.7%) of current smokers supported PP. Socio-demographic factors, noticing current GHW and thinking of smoking harms due to GHW were not significantly associated with the support in never smokers. In ex-smokers, only thinking of quitting (PR=1.12, 95% CI 1.02-1.22) was associated with more support. In current smokers, adjusted for all covariates, thinking of smoking harms (PR=1.26, 95% CI 1.05-1.51), thinking of quitting (PR=1.31, 95% CI 1.08-1.59) and forgoing cigarettes due to GHW (PR=1.45, 95% CI 1.16-1.81) were associated with greater support for PP. **CONCLUSIONS:** Public support for PP is strong in Hong Kong, supporting the advocacy and legislation of PP. Thinking of smoking harms and quitting, and forgoing cigarettes due to current GHW were associated with greater support for PP

in current smokers, which suggest that strengthening current GHW could increase smokers' support for PP.

FUNDING: Hong Kong Council on Smoking and Health

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POS2-123**POLICY OPTIONS FOR REDUCING TOBACCO RETAIL AVAILABILITY IN NEW ZEALAND: A REVIEW AND ANALYSIS OF KEY INFORMANTS' PERCEPTIONS**

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SIGNIFICANCE: New Zealand (NZ) has a goal to become smokefree by 2025. To achieve that goal, regulation of the tobacco retail environment is needed. We identified international precedents for restricting tobacco retail availability, and explored NZ tobacco control experts' views towards such policies. **METHODS:** We conducted searches of academic and grey literature and summarised examples of international policies, along with evidence of the outcomes. Telephone interviews were conducted with 25 individuals in tobacco control roles (from academia, Non-Governmental Organisations, indigenous health, smoking cessation, local health authorities, and other public health organisations). Using semi-structured interviews, we explored the perceived importance of reducing tobacco retail supply, views on various policy options, and barriers to policy adoption. We used qualitative content analysis to interpret interview transcripts. **RESULTS:** Many overseas jurisdictions require negative or positive licensing of tobacco retailers, and some licensing schemes include restrictions on tobacco sales. Examples include: not allowing new tobacco retailers within a certain distance of schools, other youth-populated areas, other tobacco retailers or residential areas, or stipulating a maximum limit on licences per jurisdiction. Key informants within NZ believe that positive licensing of tobacco retailers is an important step in achieving the 2025 goal. They envisage tobacco being available only at pharmacies, tobacconists or adult-only stores in the long-term, and view a progressive reduction in outlet density as potentially feasible. Policies with a clear goal of restricting youth tobacco access were considered most likely to be acceptable to stakeholders. However, policies that disallow tobacco sales at specific venues (e.g. convenience stores, alcohol on-licensed premises) were seen as less likely to be acceptable. Perceived challenges to policy adoption included a lack of Government commitment, and the number of interventions that could be realistically adopted in the approach to 2025. **CONCLUSION:** NZ's tobacco control experts believe reducing tobacco availability is an important intervention that will help achieve the 2025 goal. International precedents support NZ's goal of reducing tobacco availability.

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POS2-124**SURVEY OF BILLING PRACTICES AMONG U.S. PROVIDERS OF TOBACCO DEPENDENCE TREATMENT**

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The Affordable Care Act (ACA) requires almost all health insurance plans to cover tobacco dependence treatment. Billing codes and other details are not specified, but the law is intended to ensure that all tobacco users receive evidence-based treatment. Barriers to providing tobacco dependence treatment include unclear or different coding requirements from different payors and the belief that services may not be easily reimbursed. We conducted an anonymous online survey of U.S.



tobacco dependence treatment providers in 2016. Participants (N = 131) were 87% female and M = 46.5 years old. They worked in inpatient and outpatient medical and behavioral health settings, and at worksites. They represented diverse professions including nurses, therapists, respiratory therapists, health educators, social workers, physicians, psychologists, pharmacists, and health coaches; 72% identified as Tobacco Treatment Specialists (TTS). They spent M = 13.4 hours/week seeing M = 11.5 patients/week. Mostly commonly provided services were brief counseling (5-15 min/session, 67%), intensive counseling (15-60 min/session, 71%), and group counseling (48%). Sixty percent (60%) reported that patients were not billed and 24% didn't know how much patients paid. Only 19% reported using CPT codes. Of those who had a billing manager/team, 68% rated them as having "no" or "a little" tobacco treatment coding/billing knowledge. Participants (n = 103) also responded to an open-ended question. Themes included concern about how to initiate and sustain adequate reimbursement, particularly those currently supported by time-limited grants, and experiences with billing not being "worth" the time or effort. Overall, results demonstrate a need for providers, administrators, and billing managers to work collaboratively with insurers to ensure correct coding and adequate reimbursement for brief and intensive treatment. Even with the ACA mandate, CPT codes and reimbursement rates may appear to apply primarily to brief interventions delivered in primary care settings. It remains unclear if intensive individual and/or group therapy that may be required is consistently and adequately reimbursed. Areas for advocacy include 1) recognizing that tobacco dependence treatment requires similar intensity, expertise, and reimbursement as other addictive disorders and chronic medical conditions, 2) giving TTS the ability to bill independently, and 3) improving coordination between intensive therapies validated in research settings and "real-world" logistics.

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POS2-125

IMPACT OF CREATING A SMOKE-FREE HOME ON SMOKERS

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Research has suggested that smokers who do not allow smoking in their home are more likely to quit smoking or smoke fewer cigarettes per day than those who do. The purpose of this study was to assess the effect of a brief, smoke-free homes intervention on secondary outcomes of cessation and reduction of cigarette smoking. Participants for this study were recruited through 2-1-1 contact centers in Atlanta (GA), North Carolina, or Houston (TX) in one of three randomized controlled trials aimed at creating smoke-free homes (SFHs). The intervention did not emphasize smoking cessation but provided quit line contact information. The current analyses pool smokers from intervention and control groups who provided follow-up data on their SFH status as well as their smoking behaviors (whether they now smoked everyday, some days, or not at all) 3 months and 6 months post-baseline. None of the participants had a SFH at baseline. Analyses adjusted for trial site and group assignment. Participants (N=941) were mostly female (84.1%) and African American (70.2%) and reported an annual household income ≤\$10,000 (52.6%). A large majority reported daily smoking (77.9%), and the mean number of cigarettes smoked per day was 12.8 (SD=8.5). At 3-month follow-up, more participants who reported a smoking ban had stopped smoking (15.6% versus 4.5%, aOR=4.03, 95% CI=[2.37, 6.79], p<.0001). At 6-month follow-up, the difference was even more pronounced, with 26.1% of those with a household smoking ban reporting they had ceased smoking compared to 5.1% of those who did not create a SFH (aOR = 6.37, 95%CI=[3.99, 10.16], p<.0001). When considering only those who consistently reported no smoking at 3 and 6 months, 9.6% (compared to 1.9%) of those who had a SFH had stopped smoking (aOR=5.01, 95%CI=[2.55, 9.83], p<.0001). Among those who did not stop smoking, the number of cigarettes smoked per day were significantly reduced by those who had created a SFH both at 3 months (M=-4.2 vs M=-1.5, p<.0001) and 6 months (M=-4.9 vs M=-2.5, p<.0001) compared to baseline. This study suggests that creating a SFH can facilitate cessation and reduce the number of cigarettes smoked per day.

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POS2-126

ONE YEAR FOLLOW-UP OF A RANDOMISED POLICY TRIAL OF E-CIGARETTES FOR SMOKING CESSATION AND HARM REDUCTION

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SIGNIFICANCE: This study provides evidence on a low intensity intervention of encouraging use of nicotine products (e-cigarettes or medicinal nicotine) as a short term quit aid or long-term substitute in a country that currently only allows medicinal nicotine for short term use. METHODS: We randomised 1,563 daily smokers to one of three conditions representing the current policy scenario (A: encouraging short-term use of medicinal nicotine for quitting) and two alternative policy options (B: encouraging short- or long-term use of medicinal nicotine; C: encouraging short- or long-term use of either medicinal nicotine or e-cigarettes). The policy context was introduced in the form of written information about the relative harms of nicotine products and provision of the nicotine products by ordering from the study website. In each condition, participants were permitted to choose which product (from the range available) to use and were given a free starter pack, and were able to purchase further products at reduced rates for six more months. The results presented here concern differences between conditions one year after receiving the intervention. RESULTS: There was no difference in abstinence rates between policy scenarios after one year. Access to, and experimentation with, nicotine containing e-cigarettes did not positively or negatively impact quit rates. CONCLUSIONS: A replicated policy incorporating minimal information on the harms of nicotine products and access to 'cigalike' e-cigarettes did not increase quit rates compared to the existing approach. More evidence is required to determine whether more efficient vaporising devices and more intensive public health messaging about the benefits of switching to vaping, compared to continuing to smoke, would result in more quitting or substitution.

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POS2-127

FLAVORING FRENZY: NICOTINE AND PH LEVELS IN LITTLE FILTERED CIGARS AND CIGARILLOS

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SIGNIFICANCE: Little filtered cigars and cigarillos (LCCs) have increased in popularity, potentially due to the multitude of available flavorings. Flavored tobacco products are used at a higher rate among youth than adults due to beliefs of less harm and lower potential for addiction. There is little understanding of what effect these flavorings have on the characteristics of LCCs. The aim of this study was to quantify nicotine and pH levels in a selection of LCCs, comparing results between flavored and non-flavored products. METHODS: A convenience sample of LCCs was used. Nicotine analyses used CORESTA Method N° 62 for determination of nicotine in tobacco by gas chromatography (GC). pH analyses were adapted from existing methods and performed using a Mettler Toledo Seven Compact pH meter. Conventional cigarettes and research cigarettes served as controls. SPSS was used for all analyses; ANOVA was used to analyze differences among type of product, brands (Swisher Sweets, Cheyenne, Black & Mild), and presence of flavorings. RESULTS: Nicotine content in LCCs ranged from 7.3mg/g to 13.6mg/g. Nicotine levels differed significantly (p<0.001) among cigarettes (n=13; mean=15.2; std dev=1.14), cigarillos (n=22; mean=13.4; std dev=0.17), and little cigars (n=42; mean=8.7; std dev=1.06). There were no differences in nicotine content between flavored and non-flavored products among products of the same brand (Cheyenne: p=0.50; Swisher Sweets: p=0.61). The pH of Marlboro cigarettes was 5.37, while LCCs ranged from 5.28 to 6.93, and were marginally insignificantly differ-



ent between flavored (pH=6.34) vs. non-flavored (pH=6.22) products ($p=0.065$). **CONCLUSIONS:** Significant differences in nicotine content and pH levels were observed among little cigars, cigarillos, and cigarettes. However, among products of the same brand, LCCs did not differ in nicotine content or pH between flavored and non-flavored products. Little filtered cigars, which have greater appeal among youth, have lower nicotine levels than cigarettes but at a higher pH, suggesting the user may receive more nicotine absorption in the mouth without needing to inhale to the lungs.

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POS2-128

COMPLIANCE WITH THE GEORGIA SMOKEFREE AIR ACT OF 2005 AND HOSPITALITY WORKER EXPOSURE TO SECONDHAND SMOKE, 2005-2016

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SIGNIFICANCE: The objectives of this study are to assess compliance with the Georgia Smokefree Air Act of 2005 (the Act) and to evaluate the impact of the "adult only" exemption. **METHODS:** We followed a panel of 37 restaurants located in Atlanta City. All allowed smoking prior to enactment of the Act. Ten control restaurants were located in Decatur, a nearby city that had completely banned smoking prior to enactment of the Act. Each establishment was checked at baseline and at six follow-ups over 11 years. Teams of trained volunteers monitored respirable suspended particle levels (PM_{2.5}), checked for signs, counted patrons and lit cigarettes, and looked for ashtrays at each wave. Compliance was measured by the percentage of establishments with appropriate signs. Worker exposure to secondhand smoke was measured by levels of PM_{2.5}. **RESULTS:** At baseline, we observed lit cigarettes in 97% of the Atlanta sites and in none of the control sites. At 6 month follow-up, the percentage of lit cigarette establishments in Atlanta had decreased to 50%. Also at 6 months, 22% of the Atlanta sites had posted legal signs. At one year follow-up, lit cigarettes were observed in 53% of Atlanta establishments and 22% of Atlanta sites had posted legal signs. Because of the slow compliance rate during the 1st year of the Act, we decided to carry out additional follow-ups. At four year follow-up, we observed lit cigarettes or ashtrays in 44% of the Atlanta City establishments. Four sites (12%) had posted legal signs. PM_{2.5} levels in most establishments with lit cigarettes were generally higher than at baseline. At the final follow-up in 2016, lit cigarettes were observed in 22% of Atlanta establishments and 39% had posted legal signs. **CONCLUSIONS:** The "adult only" exemption provided hospitality venues a legal way to avoid going smokefree. In addition, many establishments continued to allow smoking without posting the required "adult only" signs. Strong enforcement and prior education about the advantages of going smoke-free might have resulted in a faster reduction in the level of exposure to secondhand smoke.

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POS2-129

ELECTRONIC CIGARETTE USE: DOES PRICE AND SMOKE-FREE AIR POLICIES MATTER?

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BACKGROUND: While a number of studies have demonstrated that higher e-cigarette prices reduce aggregated e-cigarette sales, little is known about how e-cigarette price influences individual use behavior, and whether its impact is on participation or consumption. In addition, very little is known about the impact of smoke-free air policies on e-cigarette use behaviors. This study aims to address these critical gaps in the literature. **METHODS:** A nationally representative survey on e-cigarette use was conducted in 2015 among U.S. adults, which was linked with e-cigarette retail prices obtained from a commercial store scanner database. Weighted survey logistic regression models were applied to examine relationships between e-cigarette use outcomes (ever use, current use) and e-cigarette prices,

cigarette price, demographics, and socioeconomic variables. Local level smoke-free air policies were linked to e-cigarette sales data; fixed effect models were used to estimate the effects of smoke-free air policies on e-cigarette sales. **RESULTS:** Higher disposable e-cigarette prices were correlated with lower odds of ever use; estimated own price elasticity ranges from -0.81 to -0.98, indicating a 10% increase in disposable e-cigarette price would reduce ever use by about 8.1% to 9.8%. Neither reusable e-cigarette price nor combustible cigarette price was found associated with e-cigarette ever use. No significant interactions were discovered between e-cigarette or cigarette prices and e-cigarette current use. The existence of comprehensive smoke-free air policies reduced the sales of e-cigarettes. **CONCLUSIONS:** These findings suggest that higher prices on disposable e-cigarettes could potentially reduce e-cigarette initiation and participation. Consequently, policies imposing taxes on disposable e-cigarettes have the potential to reduce e-cigarette ever use. Better measures of e-cigarette costs, which distinguish initial fixed costs on devices and recurring costs on e-juices, are needed. In addition, adopting comprehensive smoke-free air policies, even if they are not specific to e-cigarettes, will likely reduce e-cigarette use as well. The results from this study can inform tax/price and smoke-free air policy planning and practice related to e-cigarettes in the U.S.

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POS2-130

LARGE SCALE SURVEY IN DELHI REVEALS IMPACT OF GOVERNMENT'S POLICY OF BAN ON GUTKA (HIGHLY POPULAR SMOKELESS TOBACCO PRODUCT) ON EPIDEMIOLOGY OF TOBACCO USE AND SECOND HAND SMOKE EXPOSURE

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BACKGROUND: Smokeless tobacco (SLT) use is major public health issue in India with over 200 million SLT users. Gutka and Khaini are most popular products. Supreme Court of India observed that gutka and pan masala are food products. Beginning in 2012, almost all state governments in India banned gutka and pan masala containing tobacco. **APPREHENSIONS WERE** raised that ban on an SLT product will cause switching to smoking, harming not only users but also non-users via second hand smoke (SHS). However, no study has yet evaluated impact of this ban on epidemiology of use of different tobacco products, quitting and SHS exposure. Through this large community based survey in Delhi, we have tried to fill this gap. Findings are expected to be strategically significant to inform future policies. **METHODS:** Adults living in Delhi municipal area were interviewed during Mar-Jun, 2016 comprehensively on their tobacco-use currently & before gutka-ban. Suitable changes were made in questionnaire of Global Adult Tobacco Survey-India (2010), developed by CDC, WHO and Govt. of India to accommodate retrospective-cohort study design. Sample of 500 households was drawn from NCT of Delhi using a 2-step randomization process. Inbuilt mechanisms in standardized questionnaire cross-validated self-report and minimized recall bias. Data was entered into SPSS and statistically analyzed. **RESULTS:** Refusal rate from participation in study was only 6%. Delhi banned all ST products in 2015, but except pre-mixed gutka, all SLT products are freely available and consumed. 73.4% of pre-ban gutka-users switched to twin-sachet (pan-masala & chewing-tobacco sold separately by gutka-manufacturers to circumvent law). 21.8% switched to khaini or other ST products. Another major shift is in unit size from singledose sachets earlier to multidose sachet. Interestingly, though 96.2% respondents believed tobacco as harmful, only 18.6% gutka users attempted quitting after ban. 4.8% successfully quit. Noone in our sample switched to smoking due to ban. On being inquired about exposure to SHS in government buildings, hospitals, restaurants, & public transport, 87% respondents said that seeing/smelling smoking is similar or less. Interestingly, maximum exposure was reported in hospitals, but it has not increased. **CONCLUSION:** If only selective SLT products are banned, most of their users simply switch the product. Though few try quitting, success rate is low. There is no tendency to shift to smoking. Comprehensive ban on all SLT products coupled with strong quitting program is the requirement.

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POS2-131

PUBLIC SUPPORT FOR E-CIGARETTE REGULATION AND ITS CORRELATES IN HONG KONG: A POPULATION-BASED CROSS-SECTIONAL STUDY

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BACKGROUND: E-cigarette regulation has been proposed to reduce the harms of e-cigarettes in youth and non-e-cigarette users. Public support is needed for successful legislation. We found no population-based studies on public support towards e-cigarette regulation in Asian countries. This study aimed to gauge the Hong Kong general public's support towards e-cigarette regulation, and identified factors associated with the support. **METHODS:** A telephone survey on 5,252 randomly selected Hong Kong residents (1,706 current smokers, 1,712 ex-smokers and 1,834 never-smokers) was conducted in 2015 to enquire if they supported banning of e-cigarette promotion and advertisement, banning its use in smoke-free venues, banning the sales to people aged under 18, and restricting the sales of nicotine-free e-cigarettes. Prevalence ratio (PR) was used to examine the factors associated with the support. Data were weighted by sex, age group, and smoking status of the general population. **RESULTS:** A great majority of respondents supported banning of e-cigarette use in smoke-free areas (81.5%, 95% CI 79.8%-83.1%), banning of e-cigarette sales to minors (93.9%, 95% CI 92.7%-94.8%), and sales restriction of nicotine-free e-cigarettes (80.9%, 79.2%-82.5%), but the support for banning of e-cigarette promotion and advertisement (71.7%, 95% CI 69.7%-73.6%) was slightly lower. Being a current smoker was associated with a lower level of support (PR ranged from 0.77 to 0.96, $p < 0.01$, reference group: never smokers), while perceiving e-cigarettes are as harmful as (PR ranged from 1.08 to 1.34, $p < 0.01$, reference group: don't know) or more harmful than conventional cigarettes (PR ranged from 1.07 to 1.41, $p < 0.01$, reference group: don't know) was associated with a greater level of support. **CONCLUSIONS:** The Hong Kong general public favored imposing legislative measures on e-cigarette sales, marketing and use in smoke-free areas. To increase the public support for e-cigarette regulation, we recommend more advocacy on the regulation through the mass media, conveying the adverse impact of e-cigarette marketing towards youth and the potential health hazard of e-cigarettes.

FUNDING: Hong Kong Council on Smoking and Health

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POS2-132

HEALTH EFFECTS OF ELECTRONIC CIGARETTES: A SYSTEMATIC REVIEW OF THE LITERATURE

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BACKGROUND: The awareness and use of e-cigarettes has increased in recent years; however, their associated health effects remain unclear. This review aimed to evaluate the existing literature investigating the safety and health effects of e-cigarette use and exposure. **METHODS:** A systematic literature search of academic databases and grey literature was conducted to identify relevant studies published up to February, 2016. Original research published in peer-reviewed journals in English was initially included. **RESULTS:** Forty-eight peer-reviewed articles were included. Using the GRADE system, the overall quality of evidence was assessed as low. Findings suggested the levels of toxicants measured in e-cigarette liquid and vapor are low. Moreover, levels of toxicants in e-cigarette vapor were often reported to be significantly lower than those measured in cigarette smoke. Exposure to e-cigarette liquid and vapor was associated with some cytotoxicity. Several clinical studies reported respiratory and cardiovascular effects such as increased airway resistance and increased heart rate; however, findings were equivocal. Adverse effects reported during e-cigarette use were mild and often attributable to nicotine. Elevated levels of nicotine, metals, and particulate matter were released into the environment during e-cigarette use, suggesting potential passive exposure. Current studies only investigated the effects of acute exposure and are often limited by small sample sizes and large variability in products and

use patterns. **CONCLUSIONS:** Limited information is currently available on the safety and health effects of e-cigarette use and exposure. While e-cigarette vapor contains lower levels of toxicants compared to cigarette smoke, current findings from studies assessing the human health effects of active and passive e-cigarette exposure reflect short-term exposure. As such, studies on the health effects of long-term exposure are needed. Future research should empirically evaluate and quantify the health effects and toxicity associated with acute and prolonged e-cigarette use and exposure so that government policies regarding e-cigarettes can be evidence-based.

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POS2-133

BEYOND LESS HARM DESCRIPTORS: HOW CIGARETTE PACKS IN CHINA CONNOTE HEALTH

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The FTC calls for banning tobacco product packaging and labeling that promotes false, misleading, deceptive impressions about a product's characteristics, health effects, hazards or emissions or creates the false impression that a particular tobacco product is less harmful than others. China's packaging and labeling requirements specifically bans terms such as "health care", "treatment functions", "safe", "environmental protection", "low harms" and misleading descriptors such as "light", "ultra light" and "mild". But do packs convey health in other ways? We describe the range and types of potential health messages communicated by cigarette packs in China. Cigarette packs were systematically purchased in Beijing, Shanghai, Guangzhou, Kunming and Chengdu. We purchased one of every unique cigarette pack from a sample of vendors in 44 low, middle, and high socioeconomic areas from the five cities. Two independent coders assessed whether there were words and/or imagery on the packs conveying less harm or health/life promotion. Descriptive statistics were conducted using Stata14. 453 cigarette packs were purchased and coded. Mentions of "natural or organic" (1%) and nature terms (28%), including "ecological pure," were used to describe the product. Some packs used cultural health references. For example, 14% of the sample had non-tobacco plant imagery including images of plants used for traditional Chinese medicine, like the ginseng plant and root, and tea and bamboo leaves. We found instances of packs using terms suggesting health and life promotion including "long life", "herb with beauty/health uses", and "nature gifted the inhabitants of Bama with long lives". Our analysis shows that cigarette packs in China used health promotion cultural references not covered in a misleading descriptor ban. It is important for public health groups and regulators to be aware of the health promoting cultural references tobacco companies might use to circumvent requirements.

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POS2-134

INFLUENCE OF METALS ON SHELF STABILITY OF ELECTRONIC VAPOR PRODUCTS

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Unlike traditional tobacco cigarettes, electronic vapor products pose a somewhat unfamiliar shelf life challenge for tobacco product manufacturers. The liquid formulations that make up the core of an e-vapor product can undergo chemical reactions over time to form unintended byproducts. Various components of common electronic vapor devices can be comprised of transition metals, including iron, chromium, nickel, copper, and zinc. The presence of trace levels of metals in the formulation can accelerate or catalyze unwanted chemical reactions. We studied the influence of specific levels of metals in solution on the degradation of a propylene glycol, glycerol, water, nicotine formulation designed to be representative



of common e-vapor products. We employed isothermal microcalorimetry to determine the degree of influence from the different metals, with copper showing the strongest influence among the metals analyzed. Further studies with copper in solution, at concentrations ranging from 0.5 to 50 parts per million and at temperatures ranging from three to sixty degrees Celsius, confirmed the catalytic nature of copper ions toward the degradation of glycols. We used ion chromatography to follow the formation of the glycol degradation products lactic and formic acid. The reactions follow zero order kinetics, and the rate of reaction increases by a factor of approximately two for every ten degree rise in temperature. Our results were consistent for all concentrations studied (0.5 parts per million copper was the lowest concentration analyzed). This research reinforces the need for tobacco product manufacturers to consider material interactions when designing electronic vapor products and to use only those materials that do not adversely affect long-term product stability.

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POS2-135

SMOKING UPTAKE AND PREVALENCE IN GHANA

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BACKGROUND: Developing countries are at high risk of epidemic increases in tobacco smoking, but the extent of this problem is not clearly defined because few collect detailed smoking data. We have surveyed tobacco smoking in the Ashanti region of Ghana, a rapidly developing African country with a long-established tobacco industry. METHODS: We took a random sample of 30 regional census enumeration areas, each comprising about 100 households, and a systematic sample of 20 households from each. These were visited, a complete listing of residents obtained and questionnaire interviews on current and past smoking, age at smoking uptake, sources of cigarettes and other variables carried out in all consenting residents aged 14 or over. RESULTS: Of 7096 eligible individuals resident in the sampled households, 6258 (88%; median age 31 (range 14–105) years; 64% female) participated. The prevalence of self-reported current smoking (weighted for gender differences in response) was 3.8% (males 8.9%, females 0.3%) and of ever smoking 9.7% (males 22.0%, females 1.2%). Smoking was more common in older people, those of Traditionalist belief, those of low educational level, the unemployed and the less affluent. Smokers were more likely to drink alcohol and to have friends who smoke. About 10% of cigarettes were smuggled brands. About a third of smokers were highly or very highly dependent. CONCLUSIONS: Despite rapid economic growth and a sustained tobacco industry presence, smoking prevalence in Ghana is low, particularly among younger people. This suggests that progression of an epidemic increase in smoking has to date been avoided.

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POS2-136

RESURRECTING A GIANT: GETTING CALIFORNIA BACK ON TRACK AS A LEADER IN TOBACCO CONTROL IN THE WORLD

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California's Tobacco Tax and Health Protection Act of 1988 (Proposition 99) gave birth to one of the largest public health gains in tobacco control worldwide, resulting in: reductions in cigarette consumption by 65% (1988-2013); decreases in adult smoking prevalence by 51%; greatly decreased lung cancer rates (1999-2010); reduced ischemic heart disease mortality by 22% and emphysema mortality by 37%. California saved over 1 million lives (1989-2014); averting over \$134 billion dollars in healthcare costs (1989-2008). Although much was gained, California's tobacco control spending fell far below (18%) the Centers for Disease Control and Prevention recommended levels, earning an F on the American Lung Association's 2013 Report Card. Adult males, ages 25-44 (21.0%), and low socioeconomic-status American Indians (38.8%) have the highest smoking prevalence

among any group. Over 3.6 million smokers still need to quit. Over 195,000 homosexual/bisexuals smoke. Fourteen percent of male children in 9th-12th grade smoke. Over 200,000 children are still exposed to secondhand smoke in their homes. There are over 36,000 licensed tobacco retailers in California, one for every 254 children. Illegal sales to minors are on the rise. Flavored tobacco, hookah and e-cigarette use have become prevalent. California's Tobacco Education and Research Oversight Committee (TEROC) produced evidence-based actions to get California back on track as a leader in tobacco control around the world (The 2015-2017 Master Plan). This presentation focuses on the latest data from the California Tobacco Control Program, the challenges and opportunities of implementing evidence-based strategies to resurrect California's program. These include: raising tobacco tax; strengthening its infrastructure; achieving equity among diverse populations; regulating sales, marketing and distribution of tobacco products and e-cigarettes; minimizing the impact of tobacco use on people, and tobacco waste on the environment; preventing initiation; increasing quit rates; and minimizing the tobacco industry's influences to avoid loss of precious lives and redirecting resources to counter new threats in tobacco control.

FUNDING: California Tobacco Control Program

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POS2-137

AWARENESS, ATTITUDES AND COMPLIANCE OF CIGARETTE SMOKERS TO THE STATE REGULATION OF SMOKING LAW IN LAGOS STATE, NIGERIA

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SIGNIFICANCE: The Lagos State Regulation Of Smoking Law was passed in February 2014 and stipulates restriction of tobacco smoking in listed public places. This study was aimed at determining the awareness, attitudes and self-reported compliance of smokers to the State Regulation of Smoking Law one year after the law was passed. METHODS: A cross-sectional descriptive study among 430 patrons of restaurants, bars and nightclubs registered with the Lagos State Ministry of Tourism, one year after the law was passed. A list of hospitality centers i.e bars, nightclubs, restaurants and hotels was obtained from the district headquarters. Twenty-nine centres were systematically selected and all consenting and eligible smokers present at the venue were approached and interviewed. Data was collected using semi structured questionnaires administered by trained interviewers. Data was analysed with SPSS 20.0. RESULTS: Majority (66.9%) of the respondents were unaware of the law. The major source of information being by word of mouth (56.6%) followed by radio (26.5%). Majority (95%) of the respondents were in agreement with most of the stipulations of the law and agreed that restrictions of smoking in public places should not include night clubs, bars and hotels however 41.7% felt tertiary institutions should be included in the list of places where smoking is restricted. Majority (58.8%) of respondents were of the opinion that penalty for first time offenders should be a caution (warning) and a monetary fine for repeat offenders (55.8%). Many (73.6%) reported to have never complied with the law. Of those who complied, majority (78.4%) did so because of a fear of facing the penalties for breaking the law, health concerns for others (62%) and for social desirability (58%). CONCLUSIONS: Many smokers are unaware of the existence of state regulation of smoking law and self reported compliance is poor. Efforts to increase awareness and enforcement of the law should be prioritized.

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**POS2-138****PRIMARY CARE PATIENTS WHO QUIT SMOKING PERCEIVED PATIENT NAVIGATION TO BE MORE HELPFUL THAN FINANCIAL INCENTIVES IN PROMOTING SMOKING CESSATION**

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SIGNIFICANCE: In an ongoing randomized controlled trial of patient navigation and financial incentives to promote smoking cessation among 352 primary care patients at an urban safety-net hospital, the relative benefit of the intervention components is unknown. Our objective was to conduct an interim qualitative study to assess participants' perspectives on the relative value of each intervention. We also explored how participants spent financial incentives, an area that to our knowledge has not been previously explored. **METHODS:** We conducted semi-structured interviews via telephone with 16 patients (all patients in the intervention arm who had quit smoking midway through the trial) who had received up to 4 hours of patient navigation over 6 months and \$250 for biochemically confirmed cessation at 6 months. Fourteen of 16 participants were not aware of the exact dollar amount until they received it. The sample included 13 women and 3 men; 14 were African-American, 1 Hispanic, and 1 white. We recorded, transcribed, and coded the interviews. One coder identified major themes, which were reviewed with the research team. **RESULTS:** We identified three major themes: 1) Participants attributed their successful cessation to patient navigation more than financial incentives ("I would've given up the money if I could've kept her [patient navigator] as a coach"). 2) Participants felt they were "alone" during previous cessation attempts, and that the patient navigator helped provide the missing support ("I wasn't by myself. I had someone to hold my hand"). 3) Participants spent the financial incentive treating their families to various items such as meals, gifts, or clothing ("At least I didn't use it toward cigarettes, I used it toward my granddaughter and me"). **CONCLUSIONS:** People who quit smoking reported that patient navigation was more powerful than financial incentives in helping them to quit, often by providing support and guidance. Financial incentives did not produce unintended consequences such as a relapse in smoking. Further research could explore how to integrate navigation with financial incentives to maximize the effects of both intervention modalities.

FUNDING: American Cancer Society

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POS2-139**LUNG CANCER SCREENING DISCUSSIONS: A MISSED OPPORTUNITY TO PROMOTE SMOKING CESSATION**

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BACKGROUND: Low-dose computed tomography (LDCT) screening for lung cancer is an opportunity to reach smokers who otherwise may not seek tobacco treatment. We explored physicians' (primary care provider [PCP] and pulmonologist) perspectives regarding barriers to and facilitators of providing smoking cessation counseling before and after lung cancer screening. **METHODS:** We conducted in-depth semi-structured interviews with 11 PCPs and 9 pulmonologists at an urban safety-net hospital. Physicians described the process by which they refer smokers for LDCT, and to what extent they counsel patients about smoking cessation. We audiotaped, transcribed, and coded interviews. Two coders identified major themes, and reviewed themes with the research team. **RESULTS:** Physicians cited a lack of electronic health record (EHR) reminders to screen (not "on my radar screen") as a barrier to screening, and reported difficulty remembering to screen former smokers. Physicians reported ordering LDCT when patients had symptoms (e.g. cough from emphysema). Themes unique to PCPs included: 1) not screening for lung cancer due to competing priorities ("there's too many things to talk about at every single encounter"); 2) lung cancer screening and smoking cessation discussions occurred separately. PCPs discussed smoking cessation at nearly every visit, though not in the context of lung cancer screening, even when delivering screening results. Some PCPs worried that the stress caused by hearing abnormal screening results would make patients smoke more. PCPs welcomed a team-based approach to address both lung cancer screening and smoking cessation.

CONCLUSIONS: Physicians fail to screen smokers for lung cancer, and when they do order LDCT they do so in symptomatic patients, and therefore may not truly be performing screening. PCPs do not routinely link smoking cessation to LDCT screening results. Interventions to improve lung cancer screening rates and promote smoking cessation will need to address provider-level barriers including lack of a recommendation for screening and a sense of too many competing priorities, as well as systems-level barriers including a lack of reminders in the EHR.

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POS2-140**AN EVALUATION OF COMPLIANCE, KNOWLEDGE, AND ATTITUDES RELATED TO THE 100% SMOKE-FREE LAW IN BARS AND RESTAURANTS IN KAMPALA UGANDA**

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SIGNIFICANCE: There is significant second-hand smoke exposure in Ugandan hospitality venues. In July 2015, Uganda passed the *Tobacco Control Act 2015*, a comprehensive set of regulations that included a 100% smoke-free (SF) law prohibiting smoking within 50 meters of public spaces. This study assessed: (1) the level of compliance with the SF law in bars and restaurants; and (2) knowledge and attitudes towards the SF law among venue staff and owners. **METHODS:** Cross-sectional analysis measuring compliance with the new SF law in 222 bars and restaurants in Kampala, collected via: (1) a quantitative checklist of compliance indicators through systematic observations of smoking behavior and signage; and (2) interviews with venue employers and employees regarding attitudes and knowledge about the SF law. Data were collected 2 months after law implementation (July 2016), but prior to enforcement being mandatory. **RESULTS:** Of the 222 establishments, 56.8% allowed tobacco to be smoked on the premises, 35.6% had a designated smoking area, and indoor smoking was observed in 17.8% of venues. Only 30.8% had "no smoking" signage, which did not meet regulations in nearly all of those venues. Among the 222 interviewed respondents, only 28.8% believed that they had been adequately informed about the SF law; however, 90% were in support of the SF law. Nearly all respondents (97%) agreed that the SF law is needed to protect the health of hospitality venue workers, but half of those interviewed (54.9%) disagreed that the SF law will encourage people to quit. The majority of respondents (68%) disagreed that the law will cause financial losses at their own establishment. **CONCLUSIONS:** In the early phase of Uganda's SF law, the majority of hospitality owners and employees support the law. However, our findings indicate the majority of premises still allowed smoking on-site; active smoking was observed in nearly a fifth of the visited venues, and most signage did not meet the law's regulations. Civil society must play a key role in supporting compliance with the law, and a coordinated enforcement system must be implemented to inform hospitality venues and smokers of the SF law requirements.

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POS2-141

HEALTH KNOWLEDGE, TOBACCO PRODUCT RISK PERCEPTIONS AND COGNITIVE QUIT REACTIONS AMONG INDIAN SMOKELESS TOBACCO USERS IN FOUR STATES OF INDIA: FINDINGS FROM THE TCP INDIA SURVEY

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SIGNIFICANCE: There has been a lack of strong tobacco control aimed at reducing smokeless tobacco (SLT) use in India, despite having the highest prevalence of SLT use in the world. Since 2009, health warnings (HWs) on SLT packages were small (40%) with a symbolic image (scorpion) on the front of the package only. In an effort to increase knowledge about adverse SLT health risks, in 2011, the scorpion was replaced by 4 graphic images of cancer and a national mass media campaign on SLT was conducted in 2 phases between 2009 and 2011. Thus this study aimed to examine if knowledge of SLT health effects, perceptions of harm, and quit cognitions improved following the change from symbolic (pre-policy) to graphic HWs, and after the 2011 SLT media campaign (post-policy). **METHODS:** Data were from a cohort of 6862 SLT users (age15+) of the Tobacco Control Project from 4 states in India, surveyed in 2010-11 (pre-policy) and 2012-13 (post-policy). **RESULTS:** Knowledge that SLT is *not good for your health* was high at pre-(87%) and post-policy (86%). There were no significant changes in knowledge of SLT health risks; awareness of mouth cancer was the highest (84% to 87%) and the risk of heart disease was the lowest (61% to 63%). Knowledge that SLT contains nicotine was very low (26% to 29%), and there was a significant decrease in the belief that *nicotine is addictive* (93% to 83%, $p=0.015$). There was a decrease in the perception that SLT is either more or less harmful than smoked tobacco, with more users believing post-policy that SLT is equally as harmful as cigarettes (41% to 61%, $p=0.001$) and bidis (39% to 61%, $p=0.001$). There was no change in *having thoughts about the harms of SLT* (44% to 47%), *having seriously considered quitting* (34% to 35%), or *any intention to quit* (16.3% to 12.2%). **CONCLUSIONS:** Despite strong awareness that SLT is *bad for health* and causes cancer, most users do not consider the harms associated with their SLT use. Moreover, India's weak HWs and national media campaign were not effective in enhancing thoughts of harm, or increasing serious cognitions about quitting. These findings underpin the need for stronger and more comprehensive SLT policies in India.

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POS2-142

CLOUDS AND THROAT HIT: EFFECTS OF LIQUID COMPOSITION ON NICOTINE EMISSIONS AND PHYSICAL CHARACTERISTICS OF ELECTRONIC CIGARETTE AEROSOLS

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Electronic cigarettes (ECIGs) produce an inhalable nicotine-carrying aerosol by heating and vaporizing a flavored liquid containing propylene glycol (PG), vegetable glycerin (VG), and nicotine. In social media and marketing literature, users are commonly advised to use liquids with greater PG concentrations for greater "throat hit", a sensation commonly experienced by tobacco cigarette users which has been linked to the effects of vapor-phase nicotine. On the other hand, they are advised to use liquids with greater VG concentrations when more visible exhaled plumes are desired. Given the wide variability in plasma nicotine levels reported in the literature, in this study we sought to investigate how PG/VG liquid ratio influences variables that relate to nicotine delivery and plume visibility. In particular, using a standardized puffing protocol, we examined the effect of PG/VG ratio on total particulate matter (TPM) and nicotine yields, particle size distribution (PSD), and light-scattering characteristics of ECIG aerosols. PSD was measured using a setup incorporating fast electrical mobility spectrometry (TSI EEPs) with tightly

controlled dilution and sampling biases. Light scattering efficiency was determined using Mie theory. We found that liquid composition had a significant impact on nicotine and TPM yields, with greater PG content resulting in up to 4 times greater nicotine and TPM. Differences in PSD with varied PG/VG ratio were significant but likely not large enough to impact aerosol delivery, with count median diameters ranging between 29 and 62 nm. Interestingly, despite their lower mass concentrations, VG-containing aerosols exhibited order of magnitude larger light scattering coefficients than PG-based aerosols, largely due to differences in PSD. While these results suggest that the larger plumes reported by users may result entirely from optical effects, it is also worth noting that their lower vapor pressure causes exhaled VG mists to evaporate more slowly than PG mists. Taken together, these findings support the notion that liquid PG/VG ratio is an important factor in both ECIG nicotine delivery and user sensory experience.

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POS2-150

DEVELOPMENT OF A COMPUTER-BASED PERSONALIZED FEEDBACK INTERVENTION FOR SMOKING AND ANALGESIC MISUSE AMONG OLDER ADULTS WITH HIV AND CHRONIC PAIN

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Tobacco smoking, chronic pain, and prescription analgesic misuse are all highly prevalent among older adults with HIV. Computer-based personalized feedback interventions (PFI) offer promise as an approach to increasing motivation to quit smoking and reducing medication misuse because they are portable, adaptable, and cost-efficient. We developed a brief, integrated, computer-based PFI for older adults with comorbid HIV and chronic pain aimed at (1) increasing motivation, confidence, and intention to quit smoking; and (2) decreasing positive attitudes and intentions toward the misuse of prescription analgesic medications. Intervention development was informed by extant theories of health behavior change, clinical practice guidelines, and an emerging empirical literature on complex interrelations between pain and substance use. Consistent with motivational enhancement approaches, a primary goal of the PFI was to develop discrepancy between both continued smoking and prescription analgesic misuse and self-reported goals for pain and HIV symptom management. PFI content incorporated psychoeducation and personalized feedback regarding normative vs. perceived use of tobacco and prescription pain medications, and assessment of expectancies regarding the potential risks and benefits of continued smoking and analgesic misuse in the context and course of chronic pain, aging, and HIV. Three participants were recruited from the target population to provide qualitative feedback on a draft version of the PFI. These participants indicated that the intervention was acceptable and that they appreciated receiving personalized feedback throughout the intervention. Specific adjustments made in response to participant suggestions included increased font size, lowered reading level to fifth grade, and the addition of audible voice tracks to accompany written content. The next phase of this research will employ a randomized experimental design to pilot test the brief computer-based PFI among 76 older tobacco smokers with comorbid HIV and chronic pain.

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**POS2-151****RACIAL DIFFERENCES IN ATTENTIONAL BIAS AND CUE REACTIVITY TO SMOKING-RELATED CUES AMONG SMOKERS.**

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SIGNIFICANCE: Significant health and cessation disparities exist between Black and White tobacco smokers, with Black smokers experiencing higher craving, lower cessation rates, and increased health complications related to tobacco use. Increased cue reactivity to smoking-related cues might be one important mechanism that helps to explain Blacks' increased difficulty maintaining abstinence from tobacco use. Although little research to date has examined racial differences in the cognitive processing and associated physiological processes of tobacco-related stimuli, several studies suggest there might be significant differences. This study examines psychophysiological and behavioral differences in cue reactivity between Black and White cigarette smokers. **METHODS:** Study participants consist of 20 Black and 20 White cigarette smokers. All participants completed a modified Eriksen flanker task with neutral, positive, negative, and cigarette smoking-related images while psychophysiological indicators of cognitive processing and behavioral measures are collected. Primary outcome measures include the P300 ERP, brain wave amplitude, and reaction time. Similar to previous research on White smokers, we expect that alterations in cue reactivity develop early in cue processing and that this finding will be heightened in Blacks compared to Whites, explaining heightened subjective craving and less successful quit attempts in Blacks. **RESULTS:** Planned analyses examining differences between Black and White cigarette smokers to smoking-related versus non-smoking related stimuli will be presented. **CONCLUSIONS:** Results will help to clarify the exact temporal relationship between cues, attentional capture, and the experience of craving and could have important implications for tobacco control treatment and prevention programs.

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POS2-152**INTENTION TO USE THE TOBACCO HEATING SYSTEM, ASSOCIATED WITH VARIATIONS OF A POTENTIAL PRODUCT BROCHURE**

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BACKGROUND: The Tobacco Heating System (THS) is a candidate Modified Risk Tobacco Product (MRTP). A premarket assessment of the public health impact of the commercial introduction of an MRTP must consider projected patterns of use, associated with marketing material, within different smoking status groups. **METHODS:** Data on *Intention to Use THS* from three separate US studies associated with different potential versions of a THS Brochure. These studies were five-arm parallel group experiments, with the five arms corresponding to different versions of THS communication material. For each study, two of the five arms were associated with a potential THS Brochure, one arm including a health warning developed by PMI, and the other arm including the Surgeon General's health warnings. "Intention to Use" was assessed as part of a novel, validated questionnaire, which asked "If you try iQOS and like it, and taking into consideration the prices that are shown on the material, how likely or unlikely are you to use iQOS regularly?" (Note, 'iQOS' was the commercial brand name used for THS presented to subjects). There were six possible responses from *Definitely not* to *Definitely*. "Positive Intention to Use THS" was operationalized as the sum of %*Very Likely* and %*Definitely* responses.

Each study assessed five smoking status groups:

1. Smokers with no Intention to Quit CC (S-NITQ)
2. Smokers with the Intention to Quit CC (S-ITQ)
3. Former Smokers (FS)

4. Never Smokers (NS)

5. Never Smokers from the legal smoking age to 25 years (oversample) (LA-25 NS)

Study 1 (THS-PBA-05-RRC1), n=470:

This study assessed a potential THS Brochure including a claim that "Switching completely from conventional cigarettes to the iQOS system can reduce the risks of tobacco-related diseases".

Study 2 (THS-PBA-05-RRC2), n=467:

This study assessed a potential THS Brochure including a claim that "Switching completely to iQOS presents less risk of harm than continuing to smoke cigarettes".

Study 3 (THS-PBA-05-REC), n=481:

This study assessed a potential THS Brochure including a claim that "Scientific studies have shown that switching completely from conventional cigarettes to the iQOS system significantly reduces your body's exposure to harmful and potentially harmful chemicals". **RESULTS:** Across the three studies, Intention to Use THS was substantial within S-NITQ, S-ITQ and low or very low within FS, NS and LA-25 NS.

CONCLUSIONS: The different potential versions of the THS Brochure tested associated with satisfactory profiles in terms of Intention to Use, consistent with a positive impact on public health.

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POS2-153**ELECTRONIC CIGARETTE USE AMONG SMOKERS RECENTLY DIAGNOSED WITH CANCER**

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INTRODUCTION: An increasing number of patients with cancer are using electronic cigarettes (e-cigarettes), yet little is known about how and why. Using enrollment data from a multi-site randomized controlled trial of smokers newly diagnosed cancer, we aimed to describe (1) patterns of e-cigarette use, (2) reasons for e-cigarette use and (3) characteristics associated with e-cigarette use across patients with different cancer types. **METHODS:** We conducted a secondary cross-sectional analysis of enrollment data from smokers recently diagnosed with cancer (within approximately 3 months of initial visit with oncologist) recruited from two academic medical centers: Massachusetts General Hospital in Boston, MA and Memorial Sloan Kettering Cancer Center in New York, NY. Cancer patients (n=189) were asked about ever and current e-cigarette use, reasons for use, sociodemographics, smoking history and beliefs, nicotine dependence, medical history, physical symptoms, emotions, and environmental factors. We compared cancer patients who reported ever e-cigarette use to those reporting never use, and, among ever users, current e-cigarette users (within the past 30 days) were compared to former e-cigarette users (not within the past 30 days). **RESULTS:** Half of smokers recently diagnosed with cancer (n=95) reported ever using an e-cigarette, 21% (n=39) reported current use, and 5% (n=10) reported daily use. The most common reason for current e-cigarette use was to help quit smoking (77%). Ever and never e-cigarette users did not differ by smoking history, medical history, cancer type, perceived risk of continued smoking, physical symptoms, emotions, or environment. More former e-cigarette users reporting making a quit attempt in the past year than current e-cigarette users (100% vs 76%, p=.001). There was no significant difference in quit attempts between current and never e-cigarette users. **CONCLUSION:** Half of smokers recently diagnosed with cancer report ever use of e-cigarettes and nearly 20% reported current use of e-cigarettes. Most cancer patients report e-cigarette use as a quitting strategy. High perceived health benefits of quitting cigarettes may influence e-cigarette use in this population. Future longitudinal research is needed to determine whether e-cigarette use deters or facilitates smoking abstinence.

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POS2-154

SUBJECTIVE RATINGS OF REDUCED NICOTINE CONTENT CIGARETTES IN SMOKERS OF LOWER SOCIOECONOMIC STATUS: PRELIMINARY RESULTS

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SIGNIFICANCE: Based on the Family Smoking Prevention and Tobacco Control Act strategy to reduce the public health burden from tobacco, researchers have been testing the feasibility of reduced nicotine content (RNC) cigarettes in various populations. Previously researchers have reported between subject acceptability ratings of RNC cigarettes as part of a short term (i.e. 6 weeks) randomized controlled trial. The success of RNC cigarettes will depend on their favorability among smokers. **METHODS:** At baseline all smokers consumed their usual brand cigarettes for one week after which they switched to usual nicotine content (UNC) (nicotine yield = 0.8) cigarettes for two weeks. Smokers were then randomized to either the UNC or RNC cigarette group for a total of 18 weeks. Smokers in the RNC cigarette group gradually stepped down their nicotine levels (nicotine yields = 0.6-0.7, 0.26, 0.12, 0.07, and 0.03 mg) in five, three week increments. Smokers in the RNC cigarette group smoked the 0.03 mg cigarettes for an extra three weeks. Subjective cigarette evaluation measures using the Cigarette Evaluation Scale were given at each study contact. **RESULTS:** There was a slight trend in reduction of satisfaction in the RNC cigarette group, but the difference between the satisfaction rating for the UNC and RNC cigarette groups remained non-significant at each nicotine reduction level. With a 96% drop in nicotine yield from the UNC cigarettes, the reduction in satisfaction from baseline was only 30%. Smokers' rating of the cigarettes immediately relieving a craving for another cigarette was similar for both the UNC and RNC cigarette groups at all nicotine reduction stages (all p-values non-significant). Interestingly, both the UNC and RNC cigarette groups reported the study cigarettes had less nicotine than their usual brand cigarettes during the 18 week treatment period. **CONCLUSIONS:** According to these preliminary results of subjective responses to RNC cigarettes, smokers in the RNC cigarette group found the cigarettes to be comparable to the UNC cigarette group in acceptability.

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POS2-155

APPLYING ITEM RESPONSE THEORY TO IMPROVE MEASUREMENT OF PROVIDER-REPORTED 5AS TOBACCO USE TREATMENT DELIVERY

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SIGNIFICANCE: Health care providers are expected to adhere to the 5As model (ask, advise, assess, assist and arrange) of tobacco use treatment (TUT). Yet, provider adherence to TUT guidelines is variable and measurement is fraught with methodological concerns. We used Item Response Theory (IRT) to analyze the utility of each 5A item in predicting provider propensity to deliver TUT. **METHODS:** As part of a cluster randomized trial testing system-level strategies for implementing TUT guidelines in dental clinics, we conducted surveys of dental care providers in New York City. Providers (n=303) were asked about frequency of adherence (<20%, 21-40%, 41-60%, 61-80%, >80% of patients) to each of the 5As using an 11-item survey. An Item Response Partial Credit model was used to calculate: 1) the propensity in logits of each of the TUT behaviors, 2) usefulness of the items in determining adherence, and 3) adequacy of the response scale. **RESULTS:** To facilitate interpretation of 5As delivery, we focused on routine delivery (defined as >80% patients). The IRT-derived propensity measure was mapped onto a logit scale for ease of gauging magnitude (e.g. 50% delivery yields logit=0, 20% yields -1.4, and 80% yields +1.4). The propensity was highest for ask (logit=3.7, or 98%) and document use (3.3); also relatively common was advise (1.3) and assess (0.6). Documenting TUT (-0.1) was comparatively less common. Other IRT indices showed that the six assist behaviors provided the most useful information in

estimating overall provider adherence to TUT, with Quitline referral being the most informative indicator. IRT indices also showed that the 5-point response scale can be simplified to a 3-point scale without the loss of model adequacy. **CONCLUSIONS:** These findings provide potential methodological advancement in tobacco treatment trials for measurement of provider behavior. The results suggest that items measuring "assist" variables provide the most useful information on providers' underlying propensity to offer TUT. Accurate assessment of TUT delivery is essential for monitoring the quality of TUT in clinical settings.

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POS2-156

NEUROPSYCHIATRIC SYMPTOM REDUCTION AMONG SMOKERS WITH AND WITHOUT A PSYCHIATRIC DIAGNOSIS USING PHARMACOTHERAPY

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SIGNIFICANCE: Concerns regarding the safety and tolerance of pharmacotherapy for smoking cessation have arisen. Few studies have investigated neuropsychiatric symptoms of patients with psychiatric disorders during a quit attempt using pharmacotherapy. We compared the neuropsychiatric symptoms reported by smokers with and without psychiatric illness participating in a RCT which evaluated NRT (standard 10-week treatment; NRT), extended duration, combined formulations of NRT (NRT+; up to 22 weeks), and varenicline (VR; up to 24 weeks). **METHODS:** Smokers (N=737; M age = 48.6 years; 53.6% male; 59% with lifetime psychiatric illness) were assessed for the presence of a lifetime psychiatric diagnosis using the MINI 6.0; completed baseline questionnaires measuring depression (BDI-2), anxiety (STAI) and withdrawal symptoms (MNWS); then, were randomly assigned to the above conditions. Questionnaires were re-administered at weeks 1, 3, 5, 10, 22 and 52 post target quit date. CO-confirmed continuous abstinence from weeks 5-10, 5-22, and 5-52 were obtained. Repeated-measures mixed models were conducted for main effects and interaction terms with treatment group, psychiatric status, and time, controlling for smoking status. **RESULTS:** Main effects for time and psychiatric status (ps <.01), but not treatment condition (ps = .33-.85), were observed for all outcomes. Scores improved over time; however, those with a psychiatric diagnosis had poorer scores than those without a diagnosis. Interactions were observed for psychiatric status x time for depression and anxiety (ps<.01) and x group for nicotine withdrawal and anxiety (p<.05): scores of smokers without a diagnosis decreased significantly, while those with a lifetime diagnosis reported statistically insignificant reductions; and, smokers with a psychiatric diagnosis taking VR reported significantly larger decreases in withdrawal symptoms. **CONCLUSIONS:** Results demonstrate a reduction in neuropsychiatric symptoms over the year following a quit attempt; no differences were observed by treatment condition. Smokers with a psychiatric diagnosis may be offered pharmacotherapy similar to the general population.

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POS2-157

EFFECT OF EXERCISE ON SELF-INITIATED QUIT ATTEMPTS

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Exercise is known to significantly reduce cigarette cravings and is also thought to have the most beneficial effect on cessation outcomes when implemented prior to a pre-set quit date. However, evidence regarding the effect of exercise on the decision to initiate a quit attempt is very limited. The goal of this pilot study was to explore the effect of initiating an exercise intervention on self-initiated quit attempts and proximal outcomes (e.g., motivation to quit). We recruited a convenience sample of healthy smokers between the ages of 18 and 40 who were motivated to start exercising and also smoked at least 5 cigarettes per day. Once enrolled into the study, participants were randomly assigned into one of three groups: (1) High



Intensity Interval Training (HIIT), (2) Moderate Intensity (MI), and (3) delay control. Participants in the HIIT and MI groups met with a personal trainer weekly. All participants wore a Fitbit Flex® daily for the 12-week follow-up period and attended monthly clinic visits to self-report smoking behavior and physical activity levels, as well as a series of validated questionnaires to assess proximal outcomes. Participants ($n=33$, 58% female) were, on average, 31.6 ± 1.2 years old and smoked 13.4 ± 1.2 cigarettes per day at baseline. Based on preliminary data at four weeks after baseline, depressive symptoms decreased among participants in the exercise conditions (HIIT and MI; $n=11$) and increased among those in the control group ($n=8$; -1.2 ± 1.2 vs. 3.8 ± 1.5 , respectively; $p=0.048$). A trend suggested a decline in perceived stress in the exercise group (-0.9 ± 1.1) compared to an increase in the control group (1.3 ± 0.9 ; $p=0.07$). Finally, motivation to quit smoking increased in the exercise group and decreased in the control group; while this was not statistically significant the same pattern was observed on two different measures of motivation to quit. These preliminary data suggest that exercise may decrease depressive symptoms and stress while increasing motivation to quit. Future work will examine the effect of exercise on quit attempts and quit outcomes.

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POS2-158

THE END PERIOPERATIVE SMOKING PILOT STUDY: A RANDOMIZED TRIAL COMPARING E-CIGARETTES VERSUS NICOTINE PATCH FOR PERIOPERATIVE SMOKING CESSATION IN VETERANS

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BACKGROUND: Cigarette smoking by surgical patients is associated with increased complications. E-cigarettes have recently emerged as a potential tool for smoking cessation, although none are currently FDA-approved for such use. In this pilot study, we sought to determine the feasibility and acceptability of e-cigarettes, compared to nicotine patch, for perioperative smoking cessation in veterans. **METHODS:** This pilot randomized controlled trial was conducted at the San Francisco Veterans Affairs Medical Center. Patients seen in the anesthesia preoperative clinic at least 3 days preoperatively were randomized to either the nicotine patch group (NRT - 10 patients) or the e-cigarette group (END - 20 patients). Both the NRT and END groups were given a free 6-week supply in a tapering dose. All patients also received brief counseling, a brochure, and a referral to the California Smokers' Helpline. The primary outcome was the rate of smoking cessation on the day of surgery as confirmed by exhaled carbon monoxide breath test. Secondary outcomes included smoking habits and pulmonary function on the day of surgery and at 8-weeks. Smoking status was assessed by phone at 6-months. **RESULTS:** Between August 2015 and March 2016, 30 patients were recruited. Biochemically verified smoking cessation on the day of surgery was similar in both groups and occurred in 2 patients (20%) in the NRT group and 3 patients (15%) in the END group ($p=0.73$). At both 8-week and 6-month follow-up, smoking cessation was reported in 1 patient (10%) in the NRT group and 5 patients (25%) in the END group ($p=0.63$). At 8-weeks, improvements in spirometry were noted in the END group: change in FEV1 was 592ml greater in the END group (95% CI 153-1031ml, $p=0.01$) and change in FEV1/FVC ratio was 40.1% greater in the END group (95% CI 18.2%-78.4%, $p=0.04$). **CONCLUSIONS:** E-cigarettes are a feasible tool for perioperative smoking cessation with quit rates comparable to nicotine replacement patch. Spirometry appears to be improved 8-weeks after initiating e-cigarettes compared to nicotine patch. A large adequately powered study is recommended to determine if the results from this pilot study can be duplicated.

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POS2-159

PERCEIVED HEALTH RISK OF THE TOBACCO HEATING SYSTEM AND COMPARATORS, ASSOCIATED WITH VARIANTS OF A POTENTIAL PRODUCT BROCHURE

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BACKGROUND: The Tobacco Heating System (THS) is a candidate Modified Risk Tobacco Product (MRTTP). A premarket assessment of the public health impact of the commercial introduction of an MRTTP must consider risk perceptions associated with marketing material, because risk perceptions are likely to influence patterns of use. **METHODS:** Data on *Perceived Health Risk* from three separate US studies associated with different potential versions of a THS Brochure. These studies were five-arm parallel group experiments, with the five arms corresponding to different versions of THS communication material. For each study, two of the five arms were associated with a potential THS Brochure, one arm including a health warning developed by PMI, and the other arm including the Surgeon General's health warnings. Perceived Health Risk was assessed as part of a novel, validated measurement scale, which assesses subjects' perceptions of the personal risks of THS and comparators (conventional cigarettes (CC), nicotine replacement therapy products (NRTs), E-cigarettes and Cessation).

Each study assessed five smoking status groups:

1. Smokers with no Intention to Quit CC
2. Smokers with the Intention to Quit CC
3. Former Smokers
4. Never Smokers
5. Never Smokers from the legal smoking age to 25 years (oversample)

Study 1 (THS-PBA-05-RRC1), n=473:

This study assessed a potential THS Brochure including a claim that "Switching completely from conventional cigarettes to the iQOS system can reduce the risks of tobacco-related diseases" (Note, 'iQOS' was the commercial brand name used for THS presented to subjects).

Study 2 (THS-PBA-05-RRC2), n=467:

This study assessed a potential THS Brochure including a claim that "Switching completely to iQOS presents less risk of harm than continuing to smoke cigarettes".

Study 3 (THS-PBA-05-REC), n=480:

This study assessed a potential THS Brochure including a claim that "Scientific studies have shown that switching completely from conventional cigarettes to the iQOS system significantly reduces your body's exposure to harmful and potentially harmful chemicals".

RESULTS: Across the three studies, Perceived Health Risk for THS tended to be to lower than for CC and higher than for the lowest comparator (either smoking Cessation or NRTs), within the different smoking status groups.

CONCLUSIONS: The different potential versions of the THS Brochure were associated with a consistent overall pattern of Perceived Health Risk, i.e. whether the claims were on reduced disease risk/ harm or on reduced exposure to harmful and potentially harmful chemicals.

FUNDING: Philip Morris International S.A., Lausanne, Switzerland

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POS2-160

EXAMINING THE INFLUENCE OF MENTHOLATION ON THE REINFORCING EFFECTS OF USUAL BRAND AND RESEARCH CIGARETTES OF VARYING NICOTINE CONTENT IN VULNERABLE POPULATIONS

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SIGNIFICANCE: Menthol is the only cigarette flavoring allowed by the U.S. Food and Drug Administration. Currently, research is being conducted to evaluate the effects of cigarettes varying in nicotine content as part of a potential policy to lower nicotine content levels in cigarettes. The present study examines differences in effects of cigarette menthol status on reinforcing efficacy and acceptability of usual brand and research cigarettes varying in nicotine content. **METHODS:** Participants were 26 current smokers from one of three populations (economically disadvantaged women, opioid-dependent individuals, individuals with affective disorders) dichotomized as menthol ($n=11$) or non-menthol ($n=15$) smokers. Across sessions, participants smoked four research cigarettes (Spectrum, 22nd Century Group; mentholated or non-mentholated congruent to usual brand) varying in nicotine content (0.4mg/g, 2.4 mg/g, 5.2 mg/g, 15.8 mg/g) or their usual brand cigarette during acute abstinence ($CO<50\%$ baseline level). After smoking, participants completed the Cigarette Purchase Task (CPT) to assess relative reinforcing effects of cigarettes by measuring sensitivity of demand to variations in price, and the modified Cigarette Evaluation Questionnaire (mCEQ) to assess subjective effects. Repeated Measures Analysis of Variance ($p<.05$) used in all analyses. **RESULTS:** Significant interactions of dose and menthol status ($ps<.05$) were noted across three of the five CPT indices (Elasticity, Omax, Breakpoint) and three of the five mCEQ subscales (Smoking Satisfaction, Taste, and Psychological Reward). Usual brand mentholated cigarettes produced a profile of equal or greater relative reinforcing effects than non-mentholated cigarettes, while mentholated research cigarettes produced a profile of effects in the opposite direction (i.e., lower relative reinforcing effects compared to non-mentholated cigarettes). **CONCLUSIONS:** These results suggest a potentially important difference in the subjective and reinforcing effects of mentholated and non-mentholated reduced-nicotine cigarettes in vulnerable populations, which may need to be considered in efforts to evaluate a policy of lowering the nicotine content of cigarettes.

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POS2-161

CHANGES IN RISK AND PROTECTIVE FACTORS FOR SMOKING OVER ADOLESCENCE AND YOUNG ADULTHOOD IN A LARGE BIRACIAL COHORT

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SIGNIFICANCE: Literally hundreds of studies have identified the variables that serve as risk or protective factors for cigarette smoking among adolescents and young adults. However, the typical study uses these factors to predict onset for a limited length of time, and race is rarely taken into account. Given that African Americans tend to have a later age of onset, one might expect that risk factor exposure might occur for them considerably later than it does in Caucasian youth. To date, no research has been conducted on how risk and protective factors change over the course of adolescence and young adulthood. This study investigates this issue separately for African American and Caucasian adolescents. **METHOD:** Data were derived from the Memphis Health Project, a longitudinal study of risk and protective factors for smoking. A total of 6,967 seventh graders were recruited in school and then surveyed annually for the next 10 years, with strong retention. Approximately 80% of the teens were African American and 20% Caucasian. Risk and protective variables assessed included modeling (parental smoking, peer tobacco use), perceived parental objections to tobacco use, perceived prevalence of smoking, religious objections to smoking, rebelliousness, social support, weight, dietary restraint, beliefs about the instrumental value of smoking, performance in

school, ease of access to tobacco, ownership of logo material, stress, and sadness. **RESULTS:** Our data were modeled to reflect changes over time in each risk/protective factor, with ethnicity entered as a potential interaction with time. The results demonstrate a complex pattern of rising and falling risks, with differences between ethnic groups often significant. For example, perceived parental objections to smoking were high early on for both groups. For Caucasian teens, perceived parental objections then fell quickly, so that by late high school most such adolescents had few concerns about parental reactions to smoking. However, African American youth indicated that their parents would object strongly to their smoking throughout the end of high school. **CONCLUSIONS:** These results provide a unique picture of changing exposure to risk and protective factors over the course of adolescence and young adulthood. Further, they demonstrate that African Americans experience special protective factors that may help explain their later typical age of onset for tobacco use. These findings will help identify critical periods for prevention programming for each group of teens.

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POS2-162

EXPLORING CIGARETTE SCAVENGING BEHAVIORS IN A GENERAL POPULATION OF ADULT SMOKERS

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SIGNIFICANCE: Cigarette scavenging is a behavior that involves smoking shared or previously used cigarettes. Studies examining this behavior have focused primarily on homeless and incarcerated populations. This study assessed whether cigarette scavenging is present in a general population of adult smokers, and whether this behavior is associated with certain demographics, smoking related variables or impulsivity. **METHODS:** Participants were 101 men and 126 women adult smokers participating in a randomized clinical trial for smoking cessation. Cigarette scavenging behaviors, assessed at baseline, focused on three behaviors: a) sharing a cigarette with a stranger (Sc1), b) smoking a "found" cigarette (Sc2), and c) smoking a previously used cigarette "butt" (Sc3). Participants who endorsed at least one of three statements were categorized as scavengers. **RESULTS:** 72 participants (32%) endorsed engaging in at least one scavenging behavior. Men (Sc1: 23.8%, Sc2: 30.7%, Sc3: 30.7%) were significantly more likely to engage each of the three scavenging behaviors than women (Sc1: 8.7%, Sc2: 12.7%, Sc3: 17.5%) (Sc1; $p=.002$, Sc2; $p=.001$, Sc3; $p=.019$). There were no gender differences with respect to baseline impulsivity score, income or education ($p>.05$), however, men reported higher mean smoking rates (18.91 vs. 15.42, $p=.001$). Gender, impulsivity score, smoking rate and income ($<35k/year$) were significant predictors of scavenging ($p's<.05$). Predictors of scavenging differed by gender. Specifically, among men, there was a significant positive association between scavenging and both impulsivity scores ($OR=1.06$, $p=.02$), and smoking rate ($OR=0.94$, $p=.04$) with the odds of scavenging higher among those with higher impulsivity scores and lower smoking rates. Among women, impulsivity and smoking rates were not associated with scavenging, however, those with lower incomes ($<35k$) were more likely to endorse scavenging ($OR=2.97$, $p=.04$). There was no association between scavenging and education among the sample as a whole. **CONCLUSIONS:** Cigarette scavenging rates differ between men and women, as do the factors that potentially drive this behavior such as income, smoking rates and impulsivity.

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POS2-163

CESSATION SUPPORT FOR SMOKERS WITH MENTAL HEALTH PROBLEMS: RESOURCES AND TRAINING NEEDS

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AIMS: Thirty percent of smokers in the UK have a mental health problem. Smoking cessation has been associated with improvements in mental health, however the general decline in smoking prevalence has not been seen among smokers with mental health problems. This study aimed to assess stop smoking practitioners' knowledge, practice, and training needs when supporting smokers who have mental health problems. **METHODS:** UK stop smoking practitioners ($n=1,056$) recruited via a national smoking cessation training provider in June 2016 completed an online survey, which included questions on available resources, knowledge, confidence, and training needs related to smoking cessation and mental health. Responses were described and then compared between practitioners whose service had team members dedicated to working with smokers who have mental health problems and those without such a lead. **RESULTS:** Two thirds of all practitioners (65.9%) reported that they believed smoking helps those with mental health problems feel better and almost half (48%) that smoking cessation is detrimental to mental health. Only 17.5% had access to a treatment manual that addressed support for smokers with mental health problems, and 11.8% said their service had designated funding for this client group. Confidence in their ability to support smokers with mental health problems was moderate. Practitioners in services with a mental health lead (27.3%) were less likely to agree that cessation was detrimental ($p=0.001$) and more confident in providing cessation support to smokers with mental health problems (all $p<0.001$). The vast majority of practitioners were interested in additional training, particularly about effects of smoking cessation on psychoactive medication (84.6%) and mental health (77.7%), the relationship between smoking and mental health (77.2%), and how to tailor cessation support for smokers with mental health problems (82.4%). **CONCLUSION:** Practitioners who support smoking cessation have limited knowledge on mental health and smoking cessation but are willing to learn and improve. However, they are hindered by a lack of resources.

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POS2-164

CASH TO QUIT FOR IMPOVERISHED SMOKERS? TREATMENT WITH INCENTIVES FOR SMOKING CESSATION AMONG MEDICAID RECIPIENTS WITH MENTAL ILLNESS

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BACKGROUND: Financially disadvantaged populations such as Medicaid recipients have high rates of smoking and are less responsive to cessation treatments. Incentives may be especially relevant for those with low income. We evaluated the effectiveness of incentivized smoking cessation programs for Medicaid beneficiaries receiving community mental health services in a state with Medicaid eligibility at the poverty level (yearly income less than \$12,000/year). **METHODS:** 1500 daily smoking Medicaid recipients with mental illnesses received web-based motivational education about smoking and cessation treatment; 661 (55% of those eligible) decided to participate in a tobacco treatment program. Using equipoise stratification, participants were randomly assigned to Prescriber Visit (*PV only*), Prescriber Visit and facilitated Quitline (*PV+Quitline*), or Prescriber Visit and 12 sessions of Telephone Cognitive-Behavioral Cessation Treatment (*PV+CBT*) available over one year. Participants were also randomly assigned to receive Cash Incentives (*Incent*) for biologically verified abstinence (up to \$400 over one 4-week period) or no abstinence incentives. They were assessed quarterly for 1 year. **RESULTS:** The main effect of intervention on biologically confirmed abstinence did not differ significantly among groups across timepoints. However, post hoc pairwise comparisons between groups at each timepoint showed that participants in the *PV+CBT* group were more likely to be abstinent at the 6-month assessment point than participants in the *PV+Quitline* group (18% vs. 11%; $aOR=1.94$, $p=0.04$). In adjusted models, those assigned to receive incentives were more likely to be abstinent over time ($aOR=1.57$, $p=0.04$), although the effect of incentives did not differ significantly by treatment program. Post-hoc comparisons of programs and reward groups at each timepoint indicate that participants receiving *PV+Quitline+Incent* were more likely to be abstinent compared to those receiving *PV+Quitline* without *Incent* (20% vs. 5% at 12 months, $aOR=3.40$, $p=0.02$). **CONCLUSIONS:** This study indicates that financial incentives positively influenced abstinence outcomes in financially disadvantaged smokers with mental illness regardless of intervention type over 1 year. Future research should confirm and expand on strategies to use abstinence incentives for enhancing currently scaled interventions such as Quitline among Medicaid recipients with mental illness.

FUNDING: Centers for Medicaid and Medicare Services

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POS2-165

WHAT'S E-CIG GOT TO DO WITH IT? ELECTRONIC CIGARETTES IN SMOKERS WITH SERIOUS MENTAL ILLNESS

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BACKGROUND: People with serious mental illness (SMI) smoke at high rates and have trouble quitting. Electronic cigarettes (e-cigs) are controversial, but their use among smokers has increased dramatically over the past several years. Debate continues about whether use of e-cigs impedes or facilitates cessation, an especially relevant question among disadvantaged populations that experience increased morbidity and mortality due to smoking. **METHODS:** We evaluated 661 Medicaid recipients with SMI enrolled in a statewide incentivized cessation program. Using longitudinal models, we examined the impact of e-cig use on biologically-verified abstinence over one year. **RESULTS:** Participants were mostly female (64%). White (92%) high school graduates (83%) in middle age (45±10.9 years), and had the following psychiatric diagnoses: schizophrenia-spectrum (22%), bipolar disorders (23%), major depression (24%), anxiety/other diagnoses (31%). At baseline, participants averaged 17 (±10.5) cigarettes/day. Most (80%) used pre-rolled cigarettes, 30% used multiple products, and 14.4% had used e-cigs. E-cig use was more common among women compared to men ($p=.03$), people with bipolar and anxiety/other diagnoses compared to schizophrenia and major depression ($p=.01$), and was inversely related to age ($p=.004$), but was not associated with education, race, or readiness to quit at baseline. Over the 12-month study period, 32.5% of subjects reported using e-cigs. When e-cig use was added to our adjusted logistic regression model predicting abstinence over the year during and after cessation treatment, the interaction was not significant, indicating that e-cig use did not impact cessation outcomes. **CONCLUSIONS:** Use of e-cigs among smokers with SMI equals or exceeds use in the general population of smokers. Similar to previous research, (1) naturalistic e-cig use in smokers with SMI did not appear to hamper nor facilitate achieving abstinence with treatment. E-cigs may be a harm-reduction strategy for highly addicted smokers in between quit attempts. A recently funded R01 study of e-cig appeal and health impact in smokers with SMI will be presented in addition to findings of the current trial. (1) Prochaska, J. J., & Grana, R. A. (2014). E-cigarette use among smokers with serious mental illness, *PLoS One*, 9(11), e113013. doi: 10.1371/journal.pone.0113013.

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POS2-166

DO SOCIAL CONTEXT AND SOCIAL SUPPORT HELP FINANCIALLY DISADVANTAGED SMOKERS WITH SEVERE MENTAL ILLNESS QUIT?

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BACKGROUND: People with severe mental illness (SMI) smoke at very high rates (50-80%). Social context and social support impact smoking cessation in the general population, but little is known about how these social factors impact efforts to quit and maintain abstinence among financially disadvantaged smokers with SMI. **METHODS:** Using data from a state-wide cessation study of 661 Medicaid



recipients in public mental health treatment, general linear models were used to model two outcomes over one year (at six and twelve month assessments): biologically confirmed abstinence and quit attempts (self-report of quit >24 hours). Variables assessing social context domains include: living with a smoker, contact with other smokers, smoking status of closest social contact, spending time with nonsmokers, knowing someone who quit, believing people close to you want you to quit, and the positive and negative social effect subscales of the Self Efficacy Questionnaire. Variables assessing social support include: talking to friends/family about quitting, reporting receipt of social support to quit. RESULTS: In the overall model predicting quit attempts, spending time with more than 5 people who smoke per day ($p=.02$) and living with a smoker ($p=.01$) were independently, negatively related to quit attempts. Likewise, positive social expectancies about smoking were negatively related to quit attempts ($p=.004$). People who had talked with friends/family about quitting were more likely to report quit attempts ($p=.03$) but they were less likely to achieve abstinence ($p=.005$). CONCLUSIONS: In this large study of cessation treatment among smokers with SMI, social context and social support predicted both quit attempts and achieving abstinence during cessation treatment. This research adds to a growing body of evidence regarding social factors and cessation in this disadvantaged population, and supports previous findings in this area. Systematically measuring and addressing social context and improving social support with novel strategies are areas for further research that may improve treatment among smokers with SMI.

FUNDING: Center for Medicaid and Medicare Services

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POS2-167

ADOLESCENT AND YOUNG ADULT IN-LABORATORY SUBJECTIVE RESPONSE TO CIGARETTE SMOKING: A WITHIN-SUBJECTS APPROACH

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Subjective response to nicotine has been long been a source for study in both adolescents and adults (i.e. Henninfield 1986; Perkins et al 2003; Juliano et al 2011). However, much of the early work on the acute effects of nicotine administration were conducted using intravenous or insufflation methodology, and while these methods allow for greater control over dosing, recent literature suggests that the added chemical compounds in cigarettes may augment or suppress human response, including subjective ratings (Rabinoff et al 2007). In addition to these different mechanisms, smoking behavior (and its cues) have been shown to impact in-laboratory subjective and objective measures (Tiffany et al 2000; Upadhyaya et al 2006). The current study attempts to examine laboratory controlled, within-subject subjective response to cigarette smoking in both adolescents and young adults. While part of a larger study that longitudinally examines the social and emotional contexts of adolescents as they progress into young adulthood, this study consists of a subset of individuals ($n=95$ adolescents, and $n=79$ adults, with 17 of the adolescent participants returning as adults) that reported smoking cigarettes at least once in the past two weeks prior to enrollment and were eligible to participate in a laboratory psychophysiological study that included subjective measures of positive and negative affect as well as craving over time. Repeated measures ANOVAs were conducted for both groups, comparing pre-/post-smoking subjective ratings on the PANAS and Shiffman-Jarvik Withdrawal Scale. Adolescents reported less positive affect (PA change score (cs) = -1.88, $p=0.01$), less negative affect (NA cs = -1.38, $p<0.01$), and less craving (cs = -6.29, $p<0.01$). Adults reported significant decreases in NA (cs = -1.87, $p=0.01$) and craving (cs = -1.78, $p<0.01$), but not PA (cs = -.82). These findings suggest that cigarette smoking may directly impact the emotional context of younger, more inexperienced smokers compared to adults who may have progressed to higher levels of dependence. Future directions include examining the returning participants' subjective response using multilevel modeling.

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POS2-168

THE EFFECT OF REDUCED-NICOTINE CIGARETTES ON SELF-REPORTED POSITIVE AND NEGATIVE AFFECT IN A SAMPLE OF EMERGENT ADULTS

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Emergent adulthood represents an important developmental stage as related to nicotine dependence, as individuals between 18 and 25 continue to represent a large portion of today's smokers. Characterizing smoking in this population remains an important area of study, especially as smoking cessation before the age of 25 is preventative of associated long-term health consequences. This study examines the acute effects of smoking reduced-nicotine cigarettes (RNCs) on various smoking-related behavioral states. The analysis presented examines the effects of RNCs on self-reported positive and negative affect. Thirty-four participants, age 18-25, attended five laboratory-based sessions in which they completed a series of questionnaires both after overnight abstinence from smoking and after smoking either one of four RNCs with varying levels of nicotine yield (0.027, 0.110, 0.231, 0.763 mg) or their own preferred-brand of cigarette. On the Positive and Negative Affect Schedule (PANAS), participants reported an increase in positive affect after smoking RNCs with nicotine yields of 0.231 mg or 0.763 mg as well as for their preferred brand of cigarette. No increase was evident for RNCs with nicotine yields of 0.027 or 0.110mg. Further, there was a decrease in negative affect for nicotine yields of 0.110mg, 0.231mg, and for the participant's own brand cigarette, but not for nicotine yields of 0.027mg and 0.763mg. These results suggest that young adult smokers experience relief from symptoms of withdrawal as a result of smoking cigarettes with nicotine yields much lower than their preferred-brand cigarette. These preliminary results have important implications for policy related to nicotine content of cigarettes, especially in light of findings associating RNC use to reduction in nicotine dependence and use.

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POS2-169

REDUCED-NICOTINE CIGARETTES REDUCE SOME, BUT NOT ALL, WITHDRAWAL SYMPTOMS IN EMERGENT ADULTS

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Tobacco smoking is a leading preventable contributor to death and disease with an annual death toll of over 480,000 in the U.S. alone. In order to affect improvement on public health, the FDA aims to understand the behavioral effects of regulating levels of nicotine, the key addictive agent in cigarettes. To impact the prevalence of smoking, positive and negative mechanisms of reinforcement need to be evaluated. This study aimed to examine negative reinforcement of withdrawal symptoms measured by the Shiffman-Jarvik withdrawal scale (SJWS) as a function of nicotine dose. The versatility of this scale, while theoretically important, often goes unstudied, with major research projects focusing primarily on the "Craving" subscale. This current study attempts to fully explore the SJWS and its subscales in the context of the effects of smoking reduced-nicotine cigarettes (RNCs). Thirty-two emergent adults (average age = 22.6, $N=36$, 53% females) participated in five laboratory-based sessions over the course of two to three weeks wherein they smoked cigarettes with the following yields of nicotine: 0.027mg, 0.11mg, 0.231mg, 0.763mg, as well as their own preferred-brand of cigarette. Participants were randomized and counter-balanced across sessions. Pre- and post-smoking SJWS total and subscale scores (craving, psychological, physiological, stimulation/sedation, appetite) were obtained for each nicotine yield. Repeated measures ANOVAs were conducted to determine the effect of nicotine administration on each of the scales. Craving and psychological symptoms were significantly reduced after smoking any of the RNCs, total SJWS significantly decreased from pre- to post-smoking at each nicotine yield with inconsistent findings across the other subscales per dose. Future directions include using multilevel growth techniques to model dose and its impact on the amelioration of withdrawal.

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POS2-171

PSYCHOSOCIAL CORRELATES OF SMOKING ABSTINENCE EXPECTANCIES AND MOTIVATION TO QUIT SMOKING AMONG PERSONS LIVING WITH HIV

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BACKGROUND: Smoking abstinence expectancies are among the best predictors of cessation outcomes, and may be potential mechanisms underlying tobacco-related disparities among special populations. Persons living with HIV (PLHIV) are disproportionately affected by tobacco-related disease and mortality, yet little is known about psychosocial factors associated with smoking abstinence expectancies among PLHIV. **METHODS:** Participants in a smoking cessation trial (N = 71, Mage = 49.5, 79% Male, Mcpd = 13.8) completed baseline measures of smoking abstinence expectancies, anxiety and depression symptoms, smoking history, motivation to quit, and sociodemographics. **RESULTS:** Greater anxiety and depression were each positively associated with expectancies for somatic symptoms (ps < .05). We observed positive associations between anxiety and greater expectancies for both negative mood and harmful consequences (ps < .01). Younger age was also associated with greater expectancies for harmful consequences (p < .05). When anxiety and age were entered into the same model, only anxiety remained significantly associated with expectancies for harmful consequences (p < .05). Participants who self-identified as sexual minorities endorsed greater expectancies for positive consequences during smoking abstinence (p < .01). Motivation to quit was greater among participants who identified as non-Hispanic (p < .05), and was positively associated with greater expectancies for positive consequences during smoking abstinence (p < .05). **CONCLUSIONS:** Among PLHIV, negative affect may play a central role in abstinence expectancies, with consistent associations observed between anxiety and negative expectancies. Our findings also indicate that PLHIV may be more motivated to quit if they also hold positive abstinence expectancies. These findings suggest a need for integrated treatments that address both smoking cessation and negative affect management (particularly anxious affect) and can accommodate differing motivations to quit.

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POS2-172

EFFECTS OF A NOVEL INTERVENTION TO INCREASE CESSATION MOTIVATION AND TREATMENT ENGAGEMENT AMONG SMOKERS IN PAIN

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BACKGROUND: Tobacco smoking is a unique risk factor in the onset/progression of chronic pain, and pain has been shown to motivate smoking behavior. Smokers with co-occurring pain tend to experience greater difficulty quitting, and likely constitute a recalcitrant subgroup that faces unique cessation challenges. The goal of this study was to develop and test a tailored intervention to increase cessation motivation and treatment engagement among smokers with pain. This work was informed by an emerging literature on pain and smoking, extant theories of health behavior change, and clinical practice guidelines for the treatment of tobacco dependence. **METHODS:** Smokers with chronic pain (N = 76, 58% Female, 42% black, Mcpd = 17.64) were randomly assigned to active or control interventions. The active intervention incorporated personalized feedback, psychoeducation on pain-smoking interrelations, and the development of discrepancy between contin-

ued smoking and desired pain outcomes. The control intervention followed the 3As for smoking cessation. Outcomes were knowledge of pain-smoking interrelations, motivation to quit, acceptance of information about available cessation treatments, and stated intention to engage treatment. **RESULTS:** ANCOVA revealed that the active intervention (vs. control) increased knowledge of pain-smoking interrelations, contemplation ladder scores, desire to quit, and expected success in quitting (ps < .01). Logistic regression indicated that participants in the active intervention were 7 times more likely to accept information about cessation treatment (p < .05), and 5 times more likely to state intention to engage treatment in the next month (p < .01). Mediation analyses further revealed indirect effects on desire to quit (b = .84, SE = .45, 95% CI = .03–1.81) and willingness to learn about treatment (b = 2.66, SE = 1.46, 95% CI = .13–4.90) via increased knowledge of pain-smoking interrelations. **CONCLUSIONS:** These data suggest that smokers with co-occurring pain may benefit from tailored interventions that increase awareness of pain-smoking interrelations and develop discrepancy between continued smoking and desire to reduce pain/physical impairment.

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POS2-174

WHO SELECTS SMOKING REDUCTION VERSUS QUITTING IN PRIMARY CARE?

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Tobacco dependence is a chronic disease, and as such, opportunities to intervene can occur at multiple points, including when smokers are not motivated to quit. We conducted a study based on a chronic care model of tobacco treatment among primary care patients presenting for healthcare visits. Smokers, regardless of willingness to quit, were recruited by in-house medical assistants in 11 primary care clinics in southern Wisconsin. Smokers in primary care clinics were offered two different treatments: 1) quitting in the next 30 days, or, 2) cutting down on their smoking. The research goal was to identify variables that influenced the likelihood of selecting reduction versus cessation treatment. Little is known about smokers who select reduction treatment as an alternative to quitting; therefore, this study may help guide targeting and tailoring for such treatment. Once enrolled in reduction treatment, participants could choose to make an aided quit attempt. Thus, we also examined variables that influenced the likelihood of making an aided quit attempt during smoking reduction treatment. Of the 1699 participants enrolled in the study, 517 (30%) selected reduction treatment. Multivariable logistic regression was used to identify predictors of treatment selection (reduction vs quitting). Results showed that primary care patients who select reduction are more likely to report: smoking fewer cigarettes per day, lower motivation to quit, fewer smoking restrictions at home, a greater amount of time since their most recent quit attempt, and a history of anxiety (p's < .05). Of the 517 participants who received reduction treatment, 100 (19%) chose to make an aided quit attempt. Multivariable logistic regression showed that those deciding to make an aided quit attempt were more likely to report greater baseline motivation to quit and a smaller amount of time since their most recent quit attempt (p's < .05) than those who opted not to make a quit attempt after reduction treatment. Results suggest that offering smoking reduction as an alternative to quitting in a primary care setting is an effective means of providing smoking treatment to otherwise difficult to engage smokers.

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POS2-175

A RANDOMIZED CONTROLLED TRIAL OF AN OPTIMIZED SMOKING CESSATION INTERVENTION DELIVERED IN PRIMARY CARE

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The effectiveness of smoking cessation treatment is limited in real world use. This may be because we have not selected the components of such treatments optimally nor have treatments typically been developed for and evaluated in real-world clinical settings, thus eroding their effects when translated. The goal of this research was to validate an optimized smoking cessation treatment package that comprises intervention components identified as especially effective in factorial screening experiments conducted as per the Multiphase Optimization Strategy (MOST). Adult smokers motivated to quit were identified by primary care clinic staff during a healthcare visit and electronically referred to the study. Patients (N=624, 57% women, 69% white) were randomized to receive either Modern Usual Care (MUC; 10 minutes of in-person counseling, 8 weeks of nicotine patch, and referral to quitline services including a smartphone app and an interactive website; n=315) or Optimized Treatment (mini-lozenges for 3 weeks prequit, 26 weeks of combination nicotine patch + mini-lozenges, 3 in-person and 8 phone counseling sessions, and 7-11 automated calls to prompt medication use; n=309). Treatment was provided in the primary care clinic by research staff. Participants in the Optimized Treatment had significantly higher self-reported 7-day point-prevalent abstinence rates than MUC participants at 4, 8, 16 and 26 weeks (ORs: 1.91-3.05; p's<.001). Biochemically confirmed abstinence rates were lower than self-reported rates, but revealed a similar treatment effect size (OR=2.94, p<.001). There was no moderation of treatment effects on 26-week abstinence by demographic (gender, living with a smoker, race), psychiatric (history of depression, anxiety, any psychiatric comorbidity), or nicotine dependence (time to first cigarette) variables. These findings show that a smoking cessation treatment that is optimized via MOST development meaningfully enhances cessation rates beyond modern usual care smoking treatment in smokers seen in primary care.

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POS2-176

DESIGN AND IMPLEMENTATION OF DECISION SUPPORT FOR TOBACCO DEPENDENCE TREATMENT IN AN INPATIENT ELECTRONIC MEDICAL RECORD: A RANDOMIZED TRIAL

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BACKGROUND: Tobacco dependence treatment for hospitalized smokers results in long-term cessation if treatment continues at least 30 days post-discharge. Methods to leverage inpatient interventions into post-hospitalization care are unclear; health information technology may facilitate ongoing treatment. OBJECTIVE: To describe and report the use of a new decision support tool linked to an order set addressing tobacco dependence treatment for hospitalized smokers, embedded in an electronic health record (EHR). METHODS: In a cluster-randomized trial, 255 physicians were randomized (1:1) to either receive or not receive the decision support tool and order set, which were developed and embedded in the Epic (Madison, WI) EHR used at 2 hospitals in a single city. When an adult patient was admitted to a medical service, an electronic alert appeared if the patient was coded in the EHR as a smoker. For physicians randomized to the intervention, the alert offered to take the physician to an order set to prescribe tobacco treatment medications and refer the patient to the state tobacco quitline. Additionally, "tobacco use disorder" was added to the patient's problem list, and an email was sent to the patient's primary care provider (PCP). In the control arm, an alert fired with no screen visibility. Generalized estimating equations were used to model the data. RESULTS: From August 2013-August 2016, the alert has appeared for 12,184 patients (6035 intervention, 6149 control). Compared to control arm physicians, intervention physicians were more likely to order tobacco treatment medication (33% v. 28%, P<0.0001), populate the problem list with tobacco use disorder (41% v. 2%, P<0.0001), and make a referral to the state smokers' quitline (28% v. 0%, P<0.0001). In addition, intervention physicians sent an email to the patient's PCP 6018 (99%) times. CONCLUSION: Designing and implementing an order set and

alert for tobacco treatment in an EHR is feasible, and results in an increase in physician orders for tobacco treatment medication, referrals to the state smokers' quitline, and email to patients' PCP. Data on cessation outcomes will be available in November, 2017.

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POS2-178

EXPLORING ADOLESCENT PERSPECTIVES ON NICOTINE REPLACEMENT THERAPY FOR SMOKING CESSATION: A QUALITATIVE STUDY

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SIGNIFICANCE: Each day within the United States, 2,100 adolescents become daily cigarette smokers. Many of these young people will continue to smoke for decades, in part due to lack of best practice for cessation among this population. Nicotine replacement therapy (NRT) is widely recommended for adults, yet efficacy studies show limited success among adolescents. This study aimed to explore adolescent smokers' beliefs and interest in NRT for smoking cessation. METHODS: Eleven 18-19 year olds who smoked while in high school completed semi-structured, one-on-one, qualitative interviews in Florida in 2016. The interview guide contained probes related to smoking initiation, smoking likes and dislikes, past quit attempts, barriers to quitting, healthcare provider input, and electronic cigarettes for cessation. Adolescents were asked to reflect and respond based on their high school experiences. Interviews were recorded digitally, transcribed verbatim, and coded and analyzed using the constant comparative method. RESULTS: Ten participants were White (90.9%), four were Hispanic (36.3%), one was Black (9.1%), and five were male (45.5%). Qualitative results centered on three categories: smoking background, general cessation strategies, and NRT preferences. Most factors related to NRT use were individual preferences such as familiarity or concern about side effects, with some external factors, including access. Novel factors identified within this study include importance of NRT being discrete, familiar, and usable. This sample did not feel NRT in its current forms was applicable for adolescent smoking cessation. However, adolescents interviewed did offer suggestions for improvements and alternative cessation strategies. CONCLUSIONS: Adolescent smokers remain a priority target for cessation interventions. NRT was not applicable for this sample. These data can be used to inform future adolescent cessation approaches.

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POS2-179

WHAT DO PHARMACISTS RECOMMEND FOR ADOLESCENT SMOKING CESSATION? RESULTS FROM A DELPHI STUDY

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SIGNIFICANCE: While both pharmacological and behavioral treatments exist for smoking cessation, there are currently no best practices for helping adolescents quit smoking. Since most pharmacological treatments require prescription, access or pharmacist advice may play a role in adolescent use. This study aimed to reach consensus on pharmacist recommendations for adolescent smoking cessation. METHODS: A three-round Delphi technique was used to intensively survey pharmacists within the US. In Round 1, participants completed an open-ended item on recommendations for adolescent smoking cessation. In Round 2, participants rated Round 1 recommendations on a 7-point Likert scale. In Round 3, participants were provided their response alongside the group response for each recommendation. Participants retained or altered their scores, providing commentary as warranted. Consensus was reached if at least 66.7% of respondents were likely or very likely to recommend. RESULTS: 50 pharmacists were invited to participate. 40 completed Round 1, 37 completed Round 2, and 36 completed Round 3. About half of pharmacists (47.2%) had been previously approached by adolescents who



requested the patch (n=15), gum (n=14), lozenges (n=3), inhalers (n=2), or electronic cigarettes (n=1). In Round 1, 36 (90%) of responses included an over-the-counter nicotine replacement therapy product (patch, gum, or lozenge). Ten recommendations were identified in Round 1: nicotine patch, nicotine gum, nicotine lozenge, bupropion, Varenicline, quitline, smoking cessation program, counseling, behavioral approaches, and cold turkey. In Round 2, pharmacists were most likely to recommend smoking cessation program (median=6 of 6, Interquartile range [IQR]=1) and behavioral approaches (median=5, IQR=1), and least likely to recommend Varenicline (median=2, IQR=3). In Round 3, consensus to recommend was reached on 2 items: smoking cessation program (83.3% likely or very likely to recommend) and behavioral approaches (75% recommended). Qualitative results indicate pharmacists concerned about side effects, cost, and stigma. CONCLUSIONS: Despite initially recommending nicotine replacement therapy in Round 1, by Round 3 most pharmacists were more likely to recommend behavioral treatments than pharmacological interventions for this patient population. Such preferences by pharmacists could influence the accessibility of various treatments to adolescent smokers.

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POS2-180

RACE/ETHNICITY AND INTENTION TO QUIT CIGARETTE SMOKING

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SIGNIFICANCE: Intention to quit smoking is an important step in the smoking-cessation process, which precedes changes in smoking behaviors. The study examined racial/ethnic differences in smokers' intentions to quit smoking within the next 6 months. METHODS: The sample included 20,693 current non-occasional smokers in the U.S. who responded to the 2010-2011 Tobacco Use Supplement to the Current Population Survey. Results. The rates of intention to quit within 1 month were significantly higher for Non-Hispanic (NH) Black and Hispanic (21%) than for the NH Whites (NHW, 15%). The rates of intention to quit within 6 months were significantly higher for NH Blacks (46%) than for NH Whites (39%) and Hispanics (40%), and for NH Multiracial (53%) than for NH American Indians/Alaska Native (38%) and NH Asian (39%) smokers. Most disparities existed even after adjusting for smoking-related and sociodemographic factors. For each racial/ethnic group, having a longer quit attempt in the past 12 months was positively associated with the odds of intending to quit. For most racial/ethnic groups, non-daily smoking and doctor's advice to quit were also positively associated with the odds of intending to quit. For larger groups (NH Whites, NH Blacks and Hispanic), the specific differences between racial/ethnic groups also depended on getting a doctor's advice, education and survey mode. CONCLUSIONS: Although a smoker's intention to quit may not necessarily lead to immediate smoking cessation, the lack of intention may drastically delay smoking cessation. The study highlights importance of accounting for racial/ethnic disparities when designing and implementing interventions to motivate smokers to quit and aid smoking cessation.

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POS2-181

A DECOMPOSITION ANALYSIS OF CIGARETTE CONSUMPTION DIFFERENCES BETWEEN MALE TURKISH IMMIGRANTS AND GERMANS IN WEST GERMANY 2002-2012

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In this article, we investigate the differences in smoking behavior between male Turkish immigrants and male Germans, using data from the German Socio-Economic Panel (SOEP). More specifically, we use a Blinder-Oaxaca decomposition

method for count data models, and isolate differences in the number of cigarettes consumed daily between Turkish immigrants and Germans into a component reflecting differences in observed socio-economic characteristics and a component reflecting unobserved smoking behavior. Our empirical results confirm that adult male Turkish immigrants consume more cigarettes on average than native Germans in Germany. Our empirical results further show that about 50% of this difference can be explained by observable characteristics. Concerning the decision of whether to smoke or not, 49.2% of the male Turkish immigrant/ German differentials in the probability of being a smoker can be explained by differences in observable characteristics, whereas the remaining 50.8% are left unexplained. Conditional upon being a smoker, the differences in observable characteristics explain 92.5 % of the Turkish immigrant/German differences in the number of cigarettes consumed per day. Therefore, among smokers, the explaining portion is the element that accounts for most of differences in the number of cigarettes smoked per day between male Turkish immigrants and male Germans. Our results suggest that anti-smoking policies to reduce smoking prevalence may need to address male Turkish immigrants and male Germans differently, while anti-smoking policies to reduce the conditional demand for cigarettes may not need to address male Turkish immigrants and male Germans differently.

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POS2-182

THE RISK BEHAVIOUR DIAGNOSIS SCALE APPLIED TO INDIGENOUS AUSTRALIAN WOMEN WHO HAD EXPERIENCES OF SMOKING DURING PREGNANCY

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SIGNIFICANCE: Smoking prevalence among pregnant Indigenous Australian is high (47%) compared with the general pregnant population (13%). A Risk Behaviour Diagnosis (RBD) Scale based on the Extended Parallel Process Model measuring perceived efficacy to quit and perceived smoking threat was validated in Indigenous Australians, but not used before in pregnancy. AIM: To explore the RBD Scale adapted to pregnant or recently pregnant Aboriginal women, and assess the feasibility of using efficacy versus threat as constructs to understand maternal smoking. METHODS: An Aboriginal research assistant conducted face-to-face qualitative interviews with N=20 women. Women answered a short survey containing the RBD questions as a series of 12 Likert Scales, an intention to quit (danger control) scale, and protection response (to babies/others from smoke) and fear control responses (denial/refutation of risks). RBD constructs were assessed for internal consistency. Women's answers were plotted on a chart from low to high efficacy and low to high threat, assessed qualitatively. RESULTS: RBD Scales had moderate to good internal consistency (0.67-0.89 Cronbach's alpha). Nine women had quit and 11 were smoking; 6 currently pregnant and 14 recently pregnant. The mean efficacy level was 3.9 (SD=0.7), and mean threat was 4.3 (SD=0.7). On inspection, the scatter plot revealed a cluster of 12 women in the high efficacy-high threat quadrant – of these 11 had quit or had a high intention of quitting. Conversely a group with low threat-low efficacy comprised 5 women - all were still smoking, had high fear control responses, and 4/5 low protection responses. Three women had high threat-low efficacy. Pregnant women had a non-significant trend for higher threat and lower efficacy, than those recently pregnant. Typical quotes are given. DISCUSSION: Previously the Aboriginal smokers with high efficacy-high threat on the RBD Scale had significantly more intentions to quit smoking. These results, even though in a small sample, are consistent with this. However, some differences were noted which may be pregnancy-specific. A more robust study is planned to validate the RBD Scale in pregnancy.

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POS2-183

THE CAUSAL RELATIONSHIP BETWEEN WITHDRAWAL SYMPTOMS AND SMOKING RELAPSE: EVIDENCE FROM PHARMACOGENETICS OF NICOTINE ADDICTION TREATMENT (PNAT) DATA

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SIGNIFICANCE: Quitting smokers often attribute smoking relapse to negative affect, craving, and other nicotine withdrawal symptoms, but the potential bidirectional relationship between relapse and negative affect, in particular, has rarely been examined. **METHODS:** To address this issue, data were analyzed from an 11-week smoking cessation clinical trial in which smokers (n=1246) were randomized and stratified by nicotine metabolism to receive either nicotine replacement therapy (NRT), varenicline, or placebo, plus behavioral counseling. Using cross-lagged panel analyses, we examined the temporal bidirectional relationships between nicotine withdrawal symptom scores, including measures of affect, craving, and symptoms of withdrawal, and smoking abstinence. The relative strength of these temporal relationships were examined by comparing the explained variances of the models. **RESULTS:** The results suggest that withdrawal symptoms predict subsequent abstinence status, and that abstinence status predicts subsequent withdrawal symptoms. However, a comparison of the explained variances suggest that the temporal bidirectional relationships between withdrawal symptom scores and abstinence were not symmetric, such that the predictive relationship from an earlier withdrawal symptom to a later smoking behavior was stronger than the predictive relationship from an earlier smoking behavior to the later withdrawal symptom. **CONCLUSIONS:** These findings tentatively highlight the causal role that negative affect, craving, and other symptoms of nicotine withdrawal have on subsequent abstinence status.

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POS2-184

EFFECTS OF E-CIGARETTE FLAVORING, NICOTINE, AND VOLTAGE ON PRODUCT APPEAL AMONG YOUNG ADULT VAPERS

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SIGNIFICANCE: The independent and synergistic effects of e-cigarette product characteristics on product appeal need to be identified to formulate evidence-based regulatory policies. Smoking history may differentiate how product diversity affects the experience and appeal of vaping, particularly in young adult vapers who are constituted by a mix of current, past, and never smokers. This laboratory experiment tested the individual and interactive effects of flavoring, nicotine, and voltage setting on e-cigarette product appeal and sensory quality in young adult vapers. **METHODS:** Current (N=53), past (N=25), and never (N=22) cigarette smokers who currently vape (35% Female; age M=25.4, range: 18-35) self-administered 40 standardized e-cigarette doses with an experimenter-provided tank device. Participants rated the appeal (e.g., liking, willingness to use again) and desirable (e.g., sweetness, smoothness) and aversive (e.g., bitterness, harshness) sensory effects of each dose. Solutions and voltage setting were varied according to a Flavor (sweet vs. tobacco vs. menthol vs. flavorless) × Nicotine (6 vs. 0 mg/mL) × Voltage (3.3 vs. 4.3V) full factorial within-subject design, crossed with the between-subjects Smoking Status (current vs. past vs. never smoker) variable. **RESULTS:** E-cigarettes with (vs. without) nicotine produced lower appeal, lower desirable sensory effects, and higher aversive sensory effects. Nicotine's aversive effects were stronger in never (vs. ever) smokers. Nicotine × Flavor interactions were observed whereby nicotine's aversive qualities were suppressed with menthol and amplified with tobacco flavoring. Flavor-induced suppression of nicotine's aversive qualities was more robust in never (vs. ever) smokers. High (vs. low) voltage settings increased appeal and aversive and desirable sensory effects. **CONCLUSIONS:** Flavorings may modulate nicotine's aversive qualities in young adult vapers, particularly among never smokers.

ers. Voltage intensifies the desirable and aversive sensory qualities of vaping. Understanding how e-cigarette product characteristics operate in combination to alter product appeal warrants consideration in regulatory science and policy.

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POS2-185

CHARACTERIZATION OF THE ORAL AND GUT MICROBIOME IN TOBACCO SMOKERS AND ELECTRONIC CIGARETTE USERS COMPARED TO HEALTHY NON-SMOKERS

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SIGNIFICANCE: The human microbiome is associated with a diverse range of diseases and disorders. Existing evidence suggests that tobacco smoking (TS) can significantly alter the oral community, which may predispose smokers to cancers and periodontal disease. Mouse experiments further demonstrate tobacco smoke exposure can influence the gut microbiome and may increase risk of inflammatory-mediated conditions. Despite emerging evidence for TS, the effect of electronic cigarette (EC) use on the oral and gut microbiome has not been explored. **METHODS:** We recruited 30 individuals: 10 TSs, 10 ECs, and 10 non-smoker healthy controls (Con). Stool, saliva, and oral swabs were collected from all participants and both DNA and RNA were extracted from each sample. RNA was reverse transcribed to cDNA, and the DNA and cDNA underwent 16S rRNA gene sequencing to determine the total and viable bacterial populations, respectively. **RESULTS:** The Shannon diversity index showed the stool microbiome of Con had significantly increased diversity compared to TS and EC, with significantly reduced *Intestibacter* in TS and EC groups. The beta diversity of stool samples, assessed using weighted and unweighted UniFrac analysis, showed overall bacterial profiles of Con were distinct to that of EC and TS. We found no significant differences between TS, EC, and Con in the alpha- or beta diversity of the oral (saliva and swab) samples. **CONCLUSIONS:** While no effects were observed for the oral samples, EC and TS resulted in reduced diversity in the gut, which is widely regarded as negative to overall health. However, the overall bacterial profiles between groups (beta diversity) were comparable between EC and controls, suggesting EC vapor may have a less detrimental effect on overall microbiome well-being compared to TS. These results require validation in a large cohort, but the findings of this study demonstrate for the first time that EC vapor significantly alters the human gut microbiome. The consequence of this and influence on health warrants further investigation.

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POS2-186

THE ASSOCIATION BETWEEN TOBACCO CONTROL POLICY IMPLEMENTATION AT THE NATIONAL LEVEL AND DECLINES IN ADULT SMOKING PREVALENCE

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BACKGROUND: Research has documented that evidence-based tobacco control policy implementation is associated with declines in adult smoking prevalence. Even with such evidence, enactment of tobacco control policies has typically taken place without coordination, particularly at the national level. **METHODS:** Since 2009, the United States has implemented a more extensive and coordinated set of tobacco control policies at the national level. Early actions included a substantial increase in cigarette excise taxes (from \$0.39 to \$1.01 per pack) and the first-ever Food and Drug Administration regulation of tobacco products. In 2010, the United States Department of Health and Human Services published its first Tobacco Control Strategic Plan titled, *Ending the Tobacco Epidemic*. That strategic plan was followed in 2012 by an update, *Ending the Tobacco Epidemic – Progress Tobacco a Healthier Nation* and in 2014 by the 50th Anniversary Surgeon General's Report on the Health Consequences of Smoking. Between 2009 and 2016, a number of policy initiatives recommended in these reports were implemented (e.g., expanded



insurance coverage for evidence-based smoking cessation clinical treatments via the Affordable Care Act, mass media campaigns to discourage smoking such as *Tips from Former Smokers* and *The Real Cost*. **RESULTS:** The period 2009 to 2016 was marked by the implementation of a wide array of evidence-based policy initiatives to reduce smoking in the United States. These initiatives were also associated with about a 25% overall decline in age-adjusted adult smoking rates – decreasing from 20.6% in 2009 to 15.3 in 2015. While other temporal factors also occurred during this time (e.g., the emergence of e-cigarette use), tobacco control policies appear to have had an impact. **CONCLUSIONS:** The period 2009 to 2016 has been one of substantial tobacco control policy implementation in the United States. These policies initiatives were associated with a marked decline in adult smoking prevalence. The progress associated with these actions may provide guidance in achieving an overall goal of tobacco control – the total elimination of combustible tobacco use in the United States.

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POS2-187

ISSUES AND OPTIONS FOR PROGRESS TOWARDS A SMOKEFREE CITY: A CASE STUDY FOR SMOKEFREE OUTDOOR POLICIES

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SIGNIFICANCE: In New Zealand over 90% of the 67 local government authorities have some 'educational' outdoor smokefree policies, but these are not enforceable by law, and are usually only for playgrounds and parks. This may be an important deficit, given that effective smokefree outdoor policies can reduce the normalisation of smoking, and aid quitting. **METHODS:** Given these issues, we used a case study of New Zealand's capital city (Wellington), to explore the issues and options for progressing smokefree outdoor policies in pedestrian-dense urban outdoor public spaces. Official documents, 12 in-depth interviews, three small workshops and a day symposium were used to develop options. **RESULTS:** There was considerable survey and participant support for further smokefree areas, except from some businesses. There was strong survey support (75%) in a Wellington survey for moving to smokefree bylaws, rather than using the existing voluntary approach. Policy priorities that were found included secondhand smoke protection, protecting children, and the effective and positive communication of policies. The types of new outdoor places to be prioritised for new smokefree areas included: building entrances, transport waiting areas, areas with families, public seating and events. Smokefree outdoor policies for some areas could be achieved through licence and lease conditions (eg, for café pavement area leases). Smokefree outdoor policies would require sufficient investment in the communication of the policy and its rationale, even if the policy was backed by law. Enforcement of smokefree outdoor bylaws would largely be by verbal information and warnings by officials. **CONCLUSIONS:** There appeared to be substantial scope for progressing smokefree outdoor policies in this case study city. Potential new policies included a smokefree downtown area, which could send a powerful message about the values and image of the city. The use of smokefree bylaws appears legally and practically feasible. Nevertheless, national smokefree outdoors legislation may be preferable for many types of areas.

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POS2-188

CAN 15S-HETE BE USED AS A BIOMARKER FOR THE EARLY DETECTION OF SMOKING-INDUCED NON-SMALL CELL LUNG CANCER?

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One major factor that contributes to the high mortality of smoking-induced non-small cell lung carcinoma (NSCLC) is due to the failure to detect the tumor at the early stage, resulting in the tumor being unresectable by the time of diagnosis.

Therefore, there is an urgent need to develop a protocol for the early detection. The purpose of this study was to test whether 15-lipoxygenases (15-LOXs) and their metabolite 15(S)-hydroxy-eicosatetraenoic acid (15S-HETE) and 13(S)-hydroxyoctadecadienoic acid (13S-HODE) could be used as biomarkers for the detection of smoking-induced NSCLC. In this study, we determined the levels of 15-LOX-1, 15-LOX-2, 13S-HODE and 15S-HETE in 54 cases of NSCLC. We also monitored the levels of 13S-HODE and 15S-HETE in A/J mouse lung tumor model induced by cigarette smoking carcinogen 4-methylnitrosamino-1-3-pyridyl-1-butane (NNK). We found that the levels of 15-LOX-1, 15-LOX-2, 13S-HODE and 15S-HETE were significantly reduced in NSCLC cancer tissue samples. In the animal study, we confirmed that all tumors induced by NNK were pathologically confirmed to be NSCLC and that tumors were usually formed after 34 weeks of NNK treatment, and found that the reduction of 15S-HETE and 13S-HODE in tumor tissues predated the occurrence of lung tumors as the reduction usually occurred at 26 weeks of NNK treatment. We also measured the levels of 15S-HETE and 13S-HODE in serum samples obtained from NSCLC patients and observed that both biomarkers, 15S-HETE in particular, were markedly reduced in NSCLC, compared with normal healthy subjects. Importantly, we found that the concentrations of these two molecules in serum were positively correlated with their levels in the lung cancer tissues. Collectively, our data strongly suggest that serum 15S-HETE and 13S-HODE may serve as early biomarkers for the detection of smoking-related NSCLC. (This study was supported by a grant from the Research Grants Council of Hong Kong SAR, CUHK 462613 and CUHK direct grant 2014.1.092)

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POS2-189

WHERE SHOULD OUR RESEARCH PRIORITIES LIE? USING STAKEHOLDER ENGAGEMENT TO INFORM THE FUTURE OF TOBACCO CONTROL

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SIGNIFICANCE: The main driver of the objectives, methods, interpretation and dissemination of research is the researcher. However, including others in decisions about future directions would enable findings to: 1) be better applied to those who need them; 2) have higher global impact; and 3) provide value for money. The Cochrane Tobacco Addiction Group carried out a prioritisation project to identify areas where further tobacco control research is needed, involving a range of stakeholders. **METHODS:** The project had three stages: 1) an online survey asking stakeholders to identify unanswered questions in tobacco research; 2) a follow-up survey asking previous respondents to rank the identified questions in order of importance; and 3) a facilitated workshop where stakeholders discussed the research areas and questions prioritised in groups. Stakeholders were defined as anyone with an interest in tobacco research, including: health professionals and commissioners; current and ex-smokers; researchers; research funders; and policy makers. **RESULTS:** 304 stakeholders responded to the first survey, generating 681 research questions. Duplicates were removed, leaving 183 questions categorised as unanswered. These were split into 15 topical categories. For the second survey original respondents ranked these categories in order of importance. The top three (where 1 is most important) were: 1) E-cigarettes; 2) Addressing inequalities; 3) Mental health and other substance abuse. These categories were also deemed important at the workshop phase; however 'addressing inequalities' was deemed to be of most importance and 'treatment delivery' entered the top 3, taking the place of mental health. The reasons for these decisions and the specific questions deemed of most importance will be discussed. **CONCLUSIONS:** Consultation with individuals interested in tobacco control generated a wealth of unanswered research questions. The prioritisation of these, by stakeholders, provides a rich basis for researchers and research funders to commission and carry out research to generate useful findings, which will maximise the chances of utilisation by health services and the public.

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POSTER SESSION 3

POS3-1

SMOKE-FREE MULTITENANT HOUSING RESEARCH: A REVIEW OF THE SCIENTIFIC LITERATURE, EXISTING GAPS, AND FUTURE DIRECTIONS

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Multitenant housing (MUH) residents are susceptible to secondhand smoke exposure, which can infiltrate smoke-free living units from nearby living units and shared areas where smoking occurs. Public health concerns over secondhand smoke exposure in MUH, as well as the proliferation of smoke-free policies in government-subsidized and market rate MUH, have resulted in an increasing body of peer-reviewed literature on the issue. This review summarizes the current scientific evidence, discusses gaps in existing knowledge, and provides recommendations for future research. A systematic search of peer-reviewed articles was conducted using three databases: EBSCOhost CINAHL, PubMed, and Web of Science. Article titles, abstracts and text were reviewed to ascertain three inclusion criteria: (1) English language; (2) conducted in the United States; (3) reported on baseline data, development, implementation or evaluation of smoke-free MUH. A total of 50 articles published from January 2001 - August 2016 were identified and included based on the established criteria. Included articles were grouped based on broad themes: MUH resident (n=22); MUH operator (n=11); environmental monitoring and biomarkers (n=12); economic (n=2); legal (n=3); and implementation process and policy impact (n=9). Studies with multiple themes were included in all relevant groups. The findings reveal that the existing literature has focused on self-reported, cross-sectional studies of MUH residents and operators. Additionally, several studies of environmental markers and biomarkers have also been conducted, mostly using ultrafine particulate matter and cotinine as proxies for exposure. However, studies on the impact of smoke-free MUH policies on secondhand smoke exposure and tobacco use behaviors and health outcomes are limited. Future research on smoke-free MUH policy compliance and enforcement, and policy impact on tobacco use behaviors and health outcomes, could further inform public health planning, policy and practice related to smoke-free MUH. However, despite existing gaps, the current literature provides sufficient evidence for action to eliminate secondhand smoke exposure in MUH.

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POS3-2

PROCESSES, FACILITATORS AND BARRIERS TO ADOPTION AND IMPLEMENTATION OF SMOKE-FREE POLICIES IN PUBLIC HOUSING

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As public health and housing professionals build capacity for implementing smoke-free policies (SFP) in anticipation of a U.S. Department of Housing and Urban Development (HUD) rule that requires all public housing units to be smoke-free, it is important to understand considerations related to the comprehensiveness of such policies. While the proposed rule mandates smoke-free units and a minimum buffer zone of 25 feet, flexibility may remain in the final rule for decisions regarding outdoor areas and products covered, as well as how to facilitate compliance and manage enforcement. We conducted semi-structured interviews with decision-makers (n=23) and residents (n=16) from public housing authorities (PHAs) with SFP in Georgia and North Carolina. We asked these early adopters how they decided the details of their policies and to explain their implementation process, including resident involvement, compliance and enforcement. Two members of the study team coded each transcript independently and resolved coding discrepancies through consensus. Data were managed using NVivo 10. When deciding policy specifics, decision-makers described attempts to accommodate smokers, nonsmokers or both, and feasibility of compliance and enforcement. When deciding what tobacco products to prohibit, a majority of respondents did not include e-cigarettes, citing their limited prevalence and a lack of evidence or guidance at the time of policy adoption. While many PHAs expressed a willingness to expand their policy to include e-cigarettes, some require additional evidence or information

on e-cigarettes in order to reach a decision. Perceived facilitators of compliance and enforcement included structural characteristics of buildings and grounds, staffing, and resident support and awareness of rules and consequences. The findings of this study are especially timely as HUD's proposed rule is considered. It is essential to understand the decision-making, implementation and enforcement processes of early adopters so that public health professionals can assist PHAs as they implement SFP in accordance with the HUD rule.

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POS3-3

RESIDENTS AND MANAGERS' VIEWS REGARDING POLICY TO ELIMINATE SECONDHAND SMOKE IN AFFORDABLE MULTI-UNIT HOUSING IN MONTGOMERY COUNTY MARYLAND

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BACKGROUND: As awareness of the risks of exposure to secondhand smoke (SHS) and the additional costs of allowing smoking in multi-unit housing (MUH) increases, more communities are considering restrictions on all smoking in MUH. This shift toward smoke-free (SF) MUH is being accelerated by US Department of Housing and Urban Development (HUD) plans to prohibit all smoking in public housing. This study assesses views of residents and managers in MUH in Montgomery County regarding a policy to prohibit all smoking in buildings and effectively implementing such a policy, with emphasis on affordable housing. **METHODS:** Four interviews with MUH building managers and 6 resident focus groups were conducted. Groups included 2 with smokers and 4 with non-smokers to assess views of a policy to prohibit all smoking in and around their homes. Three focus groups and 2 manager interviews were conducted in affordable housing buildings, with most residents being seniors aged 62 or older. Data were managed using MaxQDA for qualitative data analysis. **RESULTS:** Managers of the 4 buildings generally supported a comprehensive SF policy and 2 had already successfully implemented such a policy. One manager of a market rate rental property sought assurance that the policy would be equally enforced across the county and that she could issue fines to enforce the policy. Residents also sought a SF environment in their homes and supported policy to accomplish this. Some private MUH residents endorsed the SF environment, but expressed strong views that they should be able to adopt a policy voluntarily, objecting to government intervention. The policy was also supported by smokers who specifically requested a clearly designated outdoor smoking area where they could smoke without being harassed by neighbors. **CONCLUSIONS:** Both managers and residents, including smokers and non-smokers, supported a policy to prohibit all smoking in and around MUH. Qualitative studies like these are important to inform the local policy-making process and will be instrumental in providing guidance regarding implementation of SF MUH policies, particularly as HUD implements its new rule in public housing, and perhaps later in other affordable housing venues.

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POS3-4

SIMULATING DEMAND FOR CIGARETTES AMONG PREGNANT WOMEN: A LOW-RISK EXPERIMENTAL METHOD FOR INVESTIGATING TOBACCO USE IN HIGHLY VULNERABLE POPULATIONS

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RATIONALE: Smoking among pregnant women is a leading cause of poor pregnancy outcomes. Smoking during pregnancy is also overrepresented among economically disadvantaged women and a contributor to health disparities. Hence, a great deal more needs to be learned about how to reduce smoking in this vulnerable population. A substantive obstacle to experimentally studying cigarette smok-



ing and use of other tobacco and nicotine delivery products in pregnant women is the risk of adverse effects on mother and fetus. The purpose of the present study is to investigate the possibility of bypassing that obstacle by using behavioral economic simulation tasks. **METHODS:** In the present study we used the Cigarette Purchase Task (CPT) to simulate changes in demand for hypothetical cigarettes as a function of varying cigarette prices. Participants were 95 pregnant women who completed the CPT prior to participation in a smoking cessation trial. **RESULTS:** Aggregate and individual participant demand varied as an orderly function of price and those changes were well fit by an exponential equation. Demand also varied in correspondence to two well-validated predictors of individual differences in smoking cessation among pregnant women (cigarettes smoked per day, history of pre-pregnancy quit attempts). Moreover, CPT indices were more effective than these two conventional variables in predicting individual differences in whether women had made a quit attempt during the current pregnancy. **CONCLUSIONS:** Overall, these results represent a promising step in demonstrating the validity and utility of the CPT for experimentally examining demand for tobacco and nicotine delivery products among pregnant women.

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POS3-5

COMPARING THE SMOKING TOPOGRAPHY OF USUAL BRAND CIGARETTES IN PREGNANT AND NON-PREGNANT SMOKERS

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AIMS: Most female smokers are unable to quit when they find out they are pregnant. Instead, most report reducing their cigarettes per day (CPD) by ~50% and making this reduction all at once shortly after learning of pregnancy. In the general population, similarly abrupt reductions in CPD are associated with compensatory smoking (i.e., changes in smoking intensity to maintain a desired blood-nicotine level). If pregnant women engage in compensatory smoking, they may expose themselves and their offspring to the same level of toxicants despite reporting reductions in CPD. To our knowledge, no studies have examined whether pregnant smokers engage in compensatory smoking. In the present study, smoking topography data were collected from pregnant smokers and compared to topography data from non-pregnant female smokers who previously participated in a parallel study in our lab. **METHOD:** All participants completed a screening session, including questions about their tobacco use. Pregnant smokers reported reducing their smoking by 43% (22.4 to 12.9 CPD) after learning of pregnancy. All participants presented to the experimental session with a >50% reduction in screening carbon monoxide (CO) levels and then smoked one of their usual brand cigarettes ad lib through a Borgwaldt © CReSS Desktop Smoking Topography device. This device assessed number of puffs, puff duration, inter-puff interval, puff volume and maximum flow rate. CO was also measured every 15 min for 60 min after smoking to calculate CO boost. **RESULTS:** The two groups did not differ on any demographic or smoking characteristics at screening. Preliminary analyses suggest that none of the smoking topography parameters differ between pregnant smokers (n = 17) and non-pregnant smokers (n = 91). However, pregnant smokers have a significantly smaller CO boost after smoking one cigarette compared to non-pregnant female smokers. **CONCLUSIONS:** Pregnant smokers appear to smoke cigarettes similarly to non-pregnant smokers. It does not seem that pregnant smokers are smoking cigarettes in a way that may cause more toxicant exposure per cigarette compared to non-pregnant female smokers.

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POS3-7

RACIAL/ETHNIC DIFFERENCES IN ELECTRONIC CIGARETTE USE AMONG U.S. HIGH SCHOOL STUDENTS

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Currently available estimates of electronic cigarette use are limited by their focus on regional samples. There is a need to examine both nationally representative estimates of electronic cigarette use among youth and to examine racial/ethnic differences in prevalence. Data for the present study came from 8th, 10th, and 12th grade participants in the Monitoring The Future study. In 2014, new questions about electronic cigarette use were included in the MTF survey for the first time. The present study examined the overall prevalence of electronic cigarette use in 2014 and tested for racial/ethnic differences in electronic cigarette use prevalence. Demographic and regression analyses were carried out adjusted for sampling weights. Slightly over 14.7% of the sample had ever used an electronic cigarette regularly. Controlling for the influence of grade in school at the time of the survey and level of mothers' and fathers' education, being male, smoking more tobacco cigarettes per day, having used alcohol in more occasions in past year and more occasions of marijuana use in past year increased the likelihood that individuals use e-cigarettes in the previous month. Individuals who were White or Hispanic were significantly more likely to be smoking e-cigarettes regularly when compared to African American youth. The profile that emerges is one where adolescents who are regular users of electronic cigarettes are male, are more likely to also use other substances including alcohol, marijuana and tobacco.

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POS3-8

ENGAGEMENT WITH TOBACCO PRODUCT WEBSITES IS ASSOCIATED WITH CIGARETTE SMOKING AND SUSCEPTIBILITY AMONG ADOLESCENTS

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Tobacco product websites vary in accessibility to youth, and they could influence youth tobacco use or susceptibility. We used the Population Assessment of Tobacco and Health (PATH) data to examine associations between tobacco website engagement and tobacco product use and susceptibility. Among 13,651 US adolescents ages 12-17, 2.4% had visited tobacco product websites. The most prevalent website visited was Blu, which has less stringent age verification. Those who visited websites were more likely to have tried cigarettes (39% vs. 13%, chi-square=187, p<.0001) and e-cigarettes (36% vs. 11%, chi-square=172, p<.0001), relative to those who had not visited websites. Among cigarette never-smokers, those who had visited tobacco websites were more likely to be susceptible to cigarette smoking (58% vs. 32%, chi-square=57, p<.0001). Among e-cigarette ever-users, those who had visited tobacco websites were more likely to be susceptible to e-cigarette use (39% vs. 27%, chi-square=24, p<.0001). Respondents rated their liking of pictures of tobacco websites. Liking scores were higher among cigarette ever-smokers (mean=2.2, range=1-4) than among cigarette never-smokers (mean=1.7, t=21.3, p<.0001). Among never-smokers, liking scores were higher among susceptible (mean=2.0) than nonsusceptible adolescents (mean=1.6, t=23.9, p<.0001). Similarly, e-cigarette ever-users liked tobacco websites more than e-cigarette never-users did (t=19.7, p<.0001), and adolescents who were susceptible to e-cigarettes liked tobacco websites more than nonsusceptible adolescents did (t=22.2, p<.0001). Although few adolescents visit tobacco product websites, these websites might increase their likelihood of cigarette and/or e-cigarette use. More stringent age restriction is needed.

FUNDING: No funding.

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POS3-9

DOES CIGARETTE SMOKING AMONG HISPANIC ADOLESCENTS PREDICT OTHER TOBACCO USE AMONG HISPANIC YOUNG ADULTS?

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Use of e-cigarettes, hookah, and menthol cigarettes has increased among U.S. Hispanic emerging adults. According to national estimates, 3.3 % of Hispanic young adults (18-24 years old) use e-cigarettes, 4.6% use hookah, and 42.4% use menthol cigarettes. This study examined how smoking behaviors in adolescence related to use of e-cigarettes, hookah, and menthol cigarettes in emerging adulthood. Data came from a longitudinal study Hispanic among adolescents and young adults in Southern California (N = 1919; 54% girls, 85% were 14 years old). High school students filled out surveys in 9th, 10th, and 11th grade. Young adults filled out surveys three years later. We first used Latent Class Analysis (LCA) to identify "types of smokers" in adolescence based on smoking behaviors and related risk factors (lifetime smoking, past 30 day smoking, number of cigarettes smoking, adult smoking, friend smoking). We identified three distinct "types of smokers" in 9th, 10th, and 11th grade: smokers 7.4%, 8.2%, 8.8%, respectively, never smokers (53.2%, 66.9%, 55%, respectively), and experimenters (39.5%, 24.8%, 26.4%, respectively). Then, we examined the association of "types of smokers" with use of e-cigarettes, menthol cigarettes, and hookah in young adulthood. Smokers and experimenters in 9th grade were more likely to use e-cigarettes and menthol cigarettes in young adulthood, compared to never smokers in 9th grade. Smokers and experimenters in 10th and 11th grade were more likely to use e-cigarettes, menthol cigarettes, and hookah in young adulthood, compared to never smokers. Findings suggest that smoking and experimenting with cigarettes in adolescence is associated with higher use of e-cigarettes, hookah, and menthol cigarettes among Hispanic emerging adults. Thus, efforts to prevent use of cigarette use among Hispanic adolescents may prevent use of other tobacco products and menthol cigarettes in young adulthood.

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POS3-10

HOW DO ADOLESCENTS CUSTOMIZE ELECTRONIC CIGARETTES? A CROSS-SECTIONAL ANALYSIS OF HIGH SCHOOL STUDENTS

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SIGNIFICANCE: Adult e-cigarette users often customize e-cigarette product features; however, it is largely unknown how adolescents use e-cigarettes. We examined the prevalence and predictors of customizing e-cigarette product features in a sample of high school students who reported lifetime e-cigarette use. METHODS: We analyzed cross-sectional data from an anonymous survey of students from 8 Connecticut high schools (n=7,045) in 2015. Students were asked "How do you customize your e-cigarette?" and customization was defined as choosing ≥ 1 of the response options (select all that apply: change the flavors, voltage, PG/VG levels, temperature, skin/tank color, other). We assessed prevalence of customizing e-cigarettes among lifetime e-cigarette users (n=1,868) and three subgroups: 1) experimenters (lifetime but not past 30-day users; n=1099, 58.8%), 2) past 30-day e-cigarette only users, (n=457; 24.5%), and 3) dual users (past 30-day cigarette and e-cigarette users; n=312; 16.7%). We used multivariable logistic regression to assess whether customization was associated with demographic variables (age, sex, race), number of other tobacco products ever used, e-cigarette subgroups, and device preference (cartridge/tank). RESULTS: Among lifetime e-cigarette users, 23.8 % customized e-cigarettes and types of customization included: flavors (64.7%), voltage (48.5%), the skin/tank color (37.3%), PG/VG (33.7%), temperature (22.7%), and other (13.2%). "More dual users customized e-cigarettes than e-cigarette only users and experimenters (52% vs. 29.4% vs. 14.1%; p < 0.001). Multivariable Logistic regression analyses indicated that customizing e-cigarettes was more likely among dual users compared to experimenters (OR 2.40; p < 0.001); among adolescents who used tanks versus cartridges (OR 2.40; p < 0.001), and among adolescents who used a greater number of other tobacco products (B=0.16 p=0.006). Demographic variables did not reach significance. CONCLUSIONS: Adolescents, like adults, customize e-cigarette flavors and volt-

age. Dual users, poly-tobacco users, and tank users are more likely to customize e-cigarettes. Our findings may inform regulation of product features to minimize appeal to adolescents while maximizing net population health benefit.

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POS3-11

VALIDATING A HEALTH COMMUNICATION CAMPAIGN FOR INFORMING AND CORRECTING RISK PERCEPTION

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SIGNIFICANCE: Young adults are dynamic, requiring innovative risk communication strategies. Recent trends point to an increase in alternative tobacco and nicotine product use, particularly among this population. Marketing distorts and reframes potential risks. The Food and Drug Administration (FDA) called for evidence-based strategies to communicate risk. The Texas Tobacco Centers of Regulatory Science (TCORS) responded by developing a rigorously tested health communication text messaging campaign to inform and correct risk perceptions for the heavily targeted young adult population. METHODS: Influenced by the Elaboration Likelihood Model and Prospect Theory, the conceptual framework of messages was divided into categories of depth (complex vs. simple), framing (gain vs. loss) and appeal (emotional vs. rational). This campaign is the first to test all three components simultaneously. A validation design was crafted to vet the framework. Threshold for validation was set at 70% for each category. Round 1 of the validation process consisted of 31 young adults (18-25 years old) from Houston Community College reviewing a subset of 25 text messages. RESULTS: Student review scores were depth 51%, framing 52% and appeal 57%, failing to meet the threshold for validation. A larger subset of 296 text messages were reviewed by 15 faculty reviewers, scoring depth 66%, framing 88% and appeal 62%. Messages were revised and retested. Round 2 consisted of 18 faculty experts from the fields of communication and/or tobacco science and 82 university students enrolled in communications programs. Reviewers read 976 text message pairs, representing their respective categories. To conduct this extensive validation process, 18 databases containing 5,856 individual answer choices were programmed. Results showed improvements in message design with a composite score of 96% of the message library validated by student reviewers and 93% validated by the faculty experts. CONCLUSION: Validation of the Texas TCORS message library ensures the integrity of the message design. Formal testing is underway among 640 Houston Community College students with a longitudinal randomized design. Students are receiving 1 of 8 message types, each representing a unique combination of characteristics based on a 23 factorial design. We will identify the most potent of eight message combinations. This research will inform the Food and Drug Administration (FDA) of effective communication strategies for delivering health messages among young adults.

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POS3-12

PSYCHOMETRIC PROPERTIES OF FAGERSTRÖM TEST FOR NICOTINE DEPENDENCE FOR SMOKELESS TOBACCO USERS (FTND-ST)

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INTRODUCTION: Fagerström Test for Nicotine Dependence (FTND) is the most commonly used measure of dependence among tobacco users. Psychometric properties of FTND have been validated among cigarette smokers, but the reliability and validity of its variant for smokeless tobacco (ST) users (FTND-ST) is not well documented. The objective of the present study is to evaluate reliability, concurrent validity, and structure model of FTND-ST. METHODS: Data from



95 exclusive ST users living in Oklahoma were used for this study. Participants completed a self-administered mail survey including FTNDST and other questionnaires. Measures of internal consistency, Cronbach's coefficient alpha and item-total correlation, were estimated to evaluate reliability of the FTND-ST. To ascertain the factor structure of the scale, exploratory factor analysis (EFA) was performed and the results obtained from EFA were verified by confirmatory factor analysis. We examined concurrent validity with correlation and regression analysis. Salivary cotinine concentration was used as a criterion variable. **RESULTS:** The FTND-ST demonstrated good reliability with acceptable Cronbach's coefficient ($\alpha = 0.72$) and significant item-total correlations. Study findings showed that FTND-ST had positive significant association with salivary cotinine concentration ($r = 0.61$, $p < 0.0001$) and Tobacco Dependence Screener ($r = 0.44$, $p < 0.0001$). Results of factor analysis support a unidimensional factor structure of FTND-ST. **CONCLUSIONS:** The FTND-ST demonstrated good psychometric properties. The unidimensional structure of the scale indicates that it measures single clearly defined aspect of dependence, physical dependence. Given its orientation as a continuous scale and unidimensional structure, FTND-ST is a useful measure of dependence among ST users.

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POS3-13

ASSOCIATIONS OF EARLY CHILDHOOD TOBACCO AND CANNABIS USE WITH SOCIAL COGNITION AND MENTAL HEALTH: FINDINGS FROM THE AVON LONGITUDINAL STUDY OF PARENTS AND CHILDREN

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Substance use is associated with impairments in social cognition (i.e. psychological processes including self-knowledge, perception of others, etc.). Experimental studies have shown that acute intoxication of tobacco, cannabis, and alcohol (among other drugs) lowers performance on non-verbal, social communication, and theory of mind tasks. Here we investigated the prospective association of current tobacco and cannabis use on later social cognition and mental health in a large, population-based birth cohort, to replicate experimental findings that acute substance use is associated with deficits in both social cognition and mental health. We used data from the Avon Longitudinal Study of Parents and Children, a UK birth cohort, to investigate prospective associations between early adolescent tobacco and cannabis use with social cognition and mental health. We used logistic regression with and without adjustment for potential confounders. Overall, there was moderate to strong statistical evidence that tobacco and cannabis was associated with poor social cognition and mental health. Tobacco and cannabis use were associated with increased odds of poor social communication (OR 2.05, 95% CI 1.61-2.61) (OR 1.38, 95% CI 1.07-1.77) and poor theory of mind (OR 1.97, 95% CI 1.63-2.39) (OR 1.54, 95% CI 1.27-1.86). In regards to mental health, tobacco and cannabis use were associated with depression (OR 2.25, 95% CI 1.78-3.01) (OR 1.78, 95% CI 1.33-2.38), anxiety (OR 1.94, 95% CI 1.49-2.52) (OR 1.50, 95% CI 1.15-1.98) antisocial behaviour (OR 3.37, 95% CI 2.68-4.24) (OR 4.80, 95% CI 3.87-4.96), and psychotic-like symptoms (OR 2.16, 95% CI 1.64-2.84) (OR 2.09, 95% CI 1.61-2.73). Current tobacco and cannabis use at 15 was associated with later impaired social cognition, internalizing, externalizing, and psychotic-like disorders. Taken together our results indicate early adolescent substance use is associated with later impaired social cognition and/or mental health.

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POS3-14

TOBACCO REGULATORY RESEARCH MEASURES IN THE PHENX TOOLKIT

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The Web-based PhenX Toolkit, <https://www.phenxtoolkit.org/>, is a catalog of freely-available standard measures to facilitate collaborative biomedical research. PhenX (consensus measures for Phenotypes and eXposures) measures help ensure that phenotypes and exposures from different studies are collected in a consistent format. This consistency improves data quality in general, and can also aid data comparability across studies, enable combining data to increase statistical power, or facilitate replication and validation of research findings. The PhenX Toolkit currently includes more than 475 measures addressing multiple scientific domains. The NIH Tobacco Regulatory Science Program and the FDA Center for Tobacco Products supplemented PhenX to provide a set of expert-recommended, prioritized common measures as a resource to investigators conducting Tobacco Regulatory Research (TRR). This newest collection, completed in August 2016, added 77 measures to the PhenX Toolkit. TRR measures are organized into 2 Cores, which are deemed relevant across all areas of TRR, and 5 Specialty Collections, based on the HAVE (Host, Agent, Vector, and Environment) model:

- Social/Cognitive (Host): intrapersonal factors influencing tobacco use
- Biobehavioral (Host): product use, exposure, and outcomes
- Agent: assessment of tobacco products
- Vector: industry and retailer activities
- Environment: environmental factors influencing tobacco use

The measures included in each Collection are chosen by domain experts who recommend measures for inclusion that are suitable for a variety of study designs, using a consensus-based process, which includes input from the scientific community. We present the rationale and results from the TRR Collections, as well as highlight additional measures across the PhenX Toolkit of particular relevance to nicotine and tobacco researchers. Recommended for use in 177 NIH Funding Opportunity Announcements to date, PhenX Toolkit measures are meant to serve the field as common data elements to allow for a standard of comparison across studies and to facilitate collaboration and data sharing.

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POS3-15

A MIXED-METHODS ECOLOGICAL MOMENTARY ASSESSMENT STUDY OF POLYTOBACCO-MARIJUANA CO-USERS: A GLIMPSE INTO PSYCHOSOCIAL CONTEXT

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The emergence of alternative tobacco products (ATPs) has increased the occurrence of polytobacco use and has coincided with increasing co-use of marijuana and tobacco in the US. Little is known about the patterns of use, how these products are used together, or cues that trigger or influence use. This mixed-methods study involved ecological momentary assessments (EMA) via texting, geotracking via an app, and a brief post-period phone-based interview in order to examine the

association of timing, location, affect, cravings, social contexts, and media exposure promoting ATPs and marijuana to reported use within and between tobacco users. We recruited a subset of 72 participants in a 2-year, 6-wave longitudinal cohort study of 3,418 college students aged 18-25 from 7 Georgia campuses who used tobacco in the past 30 days; 43 (59.7%) consented and participated. Our sample was 22.3 years on average (SD=1.9), 48.8% female, and 23.2% Black; 67.4% used cigarettes during the 21-day period, 39.5% cigar products, 55.8% e-cigarettes, 25.5% hookah, 60.4% marijuana, and 41.8% mixed tobacco/marijuana. Each day of the study period was divided into 4 4-hour windows. Momentary assessments assessed affect, cravings, and social context. A coverage approach was used to assess use of traditional and ATPs, marijuana, and alcohol at the end of each window. Media exposure promoting tobacco or marijuana and mode of marijuana use was assessed weekly. At the end, participants were emailed a map of their activity created by the geotracking app and were interviewed regarding social context, how products were accessed, modes of marijuana use, nature of media exposure and impact, and characteristics of locations. Preliminary findings indicated high levels of polytobacco and marijuana-tobacco co-use among some participants, with very diverse patterns of use in this sample. Cravings were largely associated with increased use. Mood states and sociocontextual factors differentially influenced use within and between participants. These pilot findings can inform sociocontextual frameworks and future interventions addressing polytobacco use and marijuana-tobacco co-use among young adults.

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POS3-16

CLOSING THE PRACTICE GAP: A RANDOMIZED CONTROLLED TRIAL EVALUATION OF TWO INTERVENTIONS FOR ENHANCING 5AS TOBACCO TREATMENT DELIVERY BY PRIMARY CARE PROVIDERS

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SIGNIFICANCE: Primary care providers are uniquely positioned to intervene with smokers and can play an important role in motivating patient quit-attempts and accelerating the quitting process. However, there is a well-documented practice gap in the rates at which smoking cessation is being addressed within the primary care setting. Many providers find it challenging to deliver evidence-based cessation treatment in the context of a busy primary care practice. We compare the incremental effectiveness of two multi-component interventions for increasing rates at which primary care providers deliver tobacco treatment assistance. **METHODS:** A matched-paired, pre-post, cluster-randomized controlled trial was undertaken. Family medicine practices were randomly assigned to one of the two intervention arms. The OMSC group received a multi-component intervention, which included an initial training session, EMR tools and real time prompts, outreach facilitation, and provider and patient tools. The intervention used an intra-disciplinary approach to tobacco treatment delivery. The Provider Coaching group received the same intervention and also received a 1.5 hour skills-based coaching session one month following the initial training session. From each of the participating practices, a cross-sectional sample of eligible tobacco users, were recruited pre- and post-intervention to assess provider performance in the delivery of smoking cessation intervention (5As: ask, advise, assess, assist, arrange). Multi-level modeling was used to analyze data. **RESULTS:** 166 primary care providers and 1,990 eligible patients (pre=1,123 post=867) were enrolled in the trial. Both intervention groups documented significant increases in 5As delivery. The Provider Coaching group documented a statistically greater performance in the rates of tobacco treatment "advice" (47.0% vs. 56.6%; OR 1.65 95%CI 1.1-2.49; p=0.017), "assistance" (42.8% vs. 53.9%; adjusted OR 1.64 95%CI 1.08-2.49; p=0.031), and "arranging" (13.4% vs. 22.5% adjusted OR 2.01 95%CI 1.22-3.31; p=0.006) follow-up support compared to the OMSC Group. **CONCLUSIONS:** A single provider coaching session when delivered alongside a multi-component intervention was effective in further increasing rates of tobacco treatment by primary care providers. Study findings should be used to inform the design of future interventions.

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POS3-17

INFLUENCE OF SMOKELESS TOBACCO USE ON DIET AND NUTRIENT INTAKE AMONG HOUSEHOLDS IN BANGLADESH

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Tobacco users on average have less adequate diet as compared to non-users. While the majority of the studies are from developed countries, less is known about the influence of tobacco on dietary composition in developing countries where malnutrition is a major public health challenge. Additionally, the effect of smokeless-tobacco use on dietary composition are unknown. We present a household-level analysis that compares diet using the nationally representative Household Income Expenditure Survey (HIES-2010) from Bangladesh. Overall, 71% of the households reported expenditure on tobacco (smoking and/or smokeless), and were considered tobacco users. Out of 12240 households, 2061 used smoking tobacco only (16.8%), 3284 used smokeless tobacco only (26.8%), and 3348 were dual-users (27.4%). After controlling for household expenditure, household size, place of residence, and education, smokeless-tobacco user households consumed significantly lower mean per capita daily total calories ($\beta = -342.88$; $p < 0.0001$) as compared to non-users. Dietary analysis revealed smokeless-tobacco users consumed significantly lower dietary mean per capita of vegetables ($\beta = -19.65$ g/day; $p < 0.0001$), milk and dairy ($\beta = -9.81$ g/day; $p < 0.0001$), fish ($\beta = -9.84$ g/day; $p < 0.0001$), meat ($\beta = -10.9360$ g/day; $p < 0.0001$), legumes ($\beta = -3.23$ g/day; $p < 0.0001$), eggs ($\beta = -1.60$ g/day; $p < 0.0001$) as compared to non-users. However, mean per capita daily intakes of cereal products ($\beta = 39.26$ g/day; $p < 0.0001$) was significantly higher among smokeless-tobacco users as compared to non-users. Corresponding to these profound dietary differences, the intake of total dietary protein ($\beta = -10.01$ g/day; $p < 0.0001$), dietary fat ($\beta = -27.55$ g/day; $p < 0.0001$) were significantly lower, and dietary carbohydrate ($\beta = 94.32$ g/day; $p < 0.0001$) was significantly higher among smokeless-tobacco users as compared to non-users. The study provides evidence to inform policy for addressing dietary inadequacy and malnutrition burden among smokeless-tobacco user households in Bangladesh.

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POS3-18

TRUTH LONGITUDINAL COHORT: A MODEL APPROACH TO POPULATION-BASED SAMPLES FOR TOBACCO RESEARCH

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Research on population-based youth tobacco control interventions presents challenges in recruiting and retaining youth and young adults in surveys over time. This study presents a novel methodology for recruiting and retaining probability-based youth and young adult samples for tobacco control research utilizing online technology. Address-based sampling (ABS) combined with online data collection was used to recruit a longitudinal panel of U.S. youth ages 15-21 years. The design specified 10,000 respondents at Wave 1 with surveys every 6 months for 3 years, and refreshment samples of 1,000 each recruited at Waves 2-5. Parents of youth aged 15-17 and adults aged 18-21 were sampled via mailings and directed online, where respondents were screened and consented prior to completing 20-25 minute surveys. Respondents were re-contacted via email, mail, text, and social media for online follow-up surveys. A national sample of 10,257 youth were recruited in approximately 4 months at baseline; follow-up waves were completed in approximately 3 months. The response rate for the baseline and refreshment samples was competitive with other national surveys at 52.4%, as were retention rates at 70% of baseline across waves. Unweighted estimates of demographic characteristics were nearly equivalent to U.S. census targets. This research leverages the representativeness of ABS sampling with the timeliness, efficiency, and cost effectiveness of online data collection. Efforts resulted in a representative sample of youth and young adults, which is the first of its kind at a national level. The methods and panel development strategies described in the paper can provide key information for research



efforts across the globe. Given the importance of population-level interventions for reducing tobacco use, efficient and rigorous methods such as those described here are critical for future tobacco control policy and program evaluation. This approach is particularly valuable for conducting research among youth and young adults as it capitalizes on their increasing access to and comfort with digital communication.

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POS3-19

MEASURES USED IN PICTORIAL CIGARETTE PACK WARNING EXPERIMENTS: A SYSTEMATIC REVIEW, 2000-2016

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BACKGROUND: The evidence base for pictorial cigarette pack warnings has expanded rapidly in the past decade and a half. In this systematic review, we sought to examine measures used in pictorial cigarette pack warning experiments to inform recommendations for future studies.

METHODS: We systematically reviewed measures in 68 experiments conducted from 2000 to 2016 in 22 countries. Two independent coders coded sample characteristics; theoretical framework; constructs assessed; and measurement characteristics, including construct, number of items, measure source, reliability, and validity. **RESULTS:** We identified 278 measures representing 61 unique constructs. Most studies reported findings about warning reactions (62%) or perceived warning effectiveness (60%). The most commonly assessed constructs were affective reactions (35% of measures), perceived likelihood of harm (22%) and quit intentions (22%). Constructs assessed in post-2013 studies (k=31) were similar to those pre-2013 (k=37), with the exception of new constructs (e.g., social interactions, information seeking) and additional assessments of smoking behavior (k=3). More than half (54%) of all measures were single items. For multi-item measures, studies reported reliability data 68% of the time. Studies reported sources for only 33% of measures and rarely reported construct validity data (e.g. convergent or discriminant validity). Fifty-four percent of studies cited theory as informing the study. A greater percentage of post-2013 studies reported reliability data for multi-item measures, sources of measures, and theoretical frameworks guiding their research. **CONCLUSIONS:** While the pictorial warning literature has matured, we continue to find great variability in constructs and measures used, and many measures used are single items with unknown psychometric properties. However, pictorial warning measures do appear to be improving. Recommendations include a greater emphasis on theoretically-informed measures, use of reliable and validated (preferably multi-item) measures, and better reporting of measure sources.

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POS3-20

PICTORIAL WARNING LABELS 2.0: AN EVALUATION OF NOVEL WARNINGS

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SIGNIFICANCE: On-pack warnings typically feature health risks of smoking; yet while these images may prompt behaviour change among older smokers, they have less impact on young adults, who discount and rationalise the risks smoking poses. The introduction of standardised packaging creates a unique opportunity to develop new warnings that deter initiation and relapse, and promote cessation, among this crucial demographic. **METHODS:** Using a discrete choice experiment, we estimated the effects of health, social, financial and cosmetic warning messages, identified following extensive formative work, on young adults aged between 16 and 30, the group where smoking prevalence peaks. Smokers (N= 474) identified the pack in each choice set

that they would be most and least likely to buy while non-smokers (N= 476) identified the pack most likely to encourage someone like them to turn down a cigarette. **RESULTS:** Among smokers, where a low OR indicated aversiveness, the most effective image featured a still born foetus (OR .05; CI 0.05-0.06) while images showing a dying smoker, animal testing, an ill baby and a tracheotomy scar (OR~.12; CI~.11-.19) were also very effective. Among non-smokers, where a high OR indicated effectiveness, images featuring the dying smoker (OR4.91; CI 4.37-5.51), tracheotomy scar (OR3.69; CI 3.28, 4.14) elicited the strongest responses. **CONCLUSIONS:** Our findings highlight the heterogeneity within smoker and susceptible smoker populations, even within a defined demographic. Standardised packaging offers policy makers a crucial opportunity to introduce more varied warnings that could stimulate cessation and deter initiation among young adults more effectively than health warnings alone.

FUNDING: Health Research Council of New Zealand (grant 13/062).

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POS3-21

THE EFFECTIVENESS OF VARENICLINE VERSUS NICOTINE REPLACEMENT THERAPY ON LONG-TERM SMOKING CESSATION IN PATIENTS WITH MENTAL DISORDERS IN PRIMARY CARE: A PROSPECTIVE COHORT STUDY OF ELECTRONIC MEDICAL RECORDS

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SIGNIFICANCE: People with mental disorders are about twice as likely to smoke as are the general population. Varenicline is the most effective medication for smoking cessation. There is only one randomized trial to date comparing varenicline to nicotine replacement therapy (NRT) in people with mental disorders; however this trial does not inform us about the long-term effects on smoking abstinence, or effectiveness in everyday clinical practice. We therefore estimated the effect of varenicline versus NRT on long-term smoking cessation in people with current mental disorders in primary care settings. **METHODS:** A prospective cohort study of electronic medical records from 654 general practices in England using three analytic methods: multivariable logistic regression, propensity score matching, and instrumental variable analysis. Exposure was prescription of varenicline versus NRT, outcome was point-prevalence smoking cessation at 2-year follow-up. Mental disorder was defined by diagnosis of any ICD-10 mental disorder or prescription of psychoactive medications as classified by the British National Formulary. **RESULTS:** A total of 220,136 patients aged >18 years were prescribed NRT (N=149,526) or varenicline (N=70,610) from 2006 to 2015. Of these 32.8% had a current mental disorder; and this group was 42% (95% CI: 41%, 43%) less likely to be prescribed varenicline than NRT, compared to those with no disorder. Patients with mental disorders who were prescribed varenicline were more likely to quit than those prescribed NRT, fully adjusted multivariable regression OR, 1.20 (95% CI: 1.15 to 1.25). The propensity score matched OR was similar, 1.22 (95% CI: 1.16 to 1.29). Instrumental variable analysis indicated that the risk difference per 100 patients treated was 5.61 (95% CI: 2.19 to 9.02). **CONCLUSIONS:** People with current mental disorders were less likely to be prescribed varenicline than those without current mental disorders. However, patients with mental disorders prescribed varenicline were more likely to quit than those prescribed NRT in primary care. Our results were consistent across three different analytical methods suggesting that these findings are unlikely to be due to residual confounding.

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POS3-22

DISPARITIES IN CIGARETTE SMOKING-RELATED MORTALITY BETWEEN U.S. AFRICAN AMERICANS AND WHITES, 1999-2011

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SIGNIFICANCE: This research investigates disparities in the excess risk due to smoking cigarettes between U.S. non-Hispanic African American and non-Hispanic white racial groups. **METHODS:** Data from 143,700 white and 29,005 African American sub-

jects in the U.S. National Health Interview Survey (NHIS) linked to the National Death Index (NDI) were used to estimate death rates, relative risks of death, and smoking attributable fractions for the smoking-related causes with the largest numbers of attributable deaths - lung cancer, ischemic heart disease (IHD), cerebrovascular disease (CVD), other heart disease, and chronic obstructive pulmonary disease (COPD). The NHIS was utilized to measure smoking and demographic information for respondents interviewed during survey years 1999-2009. Vital status and cause of death variables were obtained for NHIS survey participants from the NDI files for deaths occurring in 1999 - 2011. RESULTS: Current smoker prevalence was higher among African American men than white men over the 11-year study. Current smoker prevalence was higher among African American women in most years, although the difference was not as large. Relative risks of death from lung cancer were higher among African Americans, for both men and women. White subjects were associated with higher relative risks than African Americans for all other causes studied. Smoking-attributable fractions for African American men were higher than for white men for all causes of death studied. Smoking-attributable fractions for African American women were higher than those observed for white women for other heart disease and CVD, but not for lung cancer. CONCLUSIONS: During 1999-2011, African American smokers suffered more excess risk of death from lung cancer than white smokers. Due to higher smoking prevalences, the proportion of deaths caused by smoking is higher among African Americans for several other causes of death. Future studies should examine smoking-attributable mortality within other racial/ethnic populations.

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POS3-23

CLUSTERING AND PREDICTORS OF EMERGING TOBACCO PRODUCTS AND OTHER SUBSTANCE USE IN U.S. ADOLESCENTS BY SMOKING STATUS

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SIGNIFICANCE: Although cigarette use by US adolescents is declining, this decline is offset by the recent increase in use of emerging tobacco products, such as e-cigarettes and hookah. In the current study, we examined the clustering and predictors of emerging tobacco products and marijuana in a nationally representative sample of US high school students, grades 9-12. Marijuana was included because previous research suggests that almost a fifth of US high school students who have tried e-cigarettes use them to vaporize cannabis. METHODS: Data were from the 2015 National Youth Risk Behavior Survey (N = 15,624). Current 30 day use of each single product (e-cigarettes, smokeless tobacco, cigars/cigarillos, and marijuana) were coded as a binary variable. Use of smokeless tobacco or cigars/cigarillos were combined as 1 risk factor given low sample sizes. We defined clustering as an observed proportion of a combination of risk factors (e.g. only e-cigarette use) in excess of its expected proportions. There were 8 unique combinations. Polysubstance use was defined as the simultaneous combination of e-cigarettes, smokeless tobacco or cigars/cigarillos, and marijuana. The ratio of the observed over expected (O/E) proportions were used to assess the clustering of behavioral risk factors. Logistic regression assessed predictors of polysubstance use, controlling for sex, grade, sexual orientation, race/ethnicity and having mental/physical problems. Analyses were stratified by current cigarette smoker (no/yes) using SAS version 9.4 and cross-sectional weights. RESULTS: In the study population, 10.8% currently smoked conventional cigarettes. Polysubstance use showed the highest degree of clustering with a ratio of 2.34 (95% CI: 2.31, 2.37) for smokers and 11.03 (95% CI: 9.97, 12.99) for non-smokers, but the prevalence of polysubstance use was significantly higher in smokers than non-smokers (32.6% vs. 2.2%). Male gender and having mental/physical problems predicted polysubstance use for smokers. Among non-smokers, male gender and being in 10th, 11th, 12th grades were associated with polysubstance use. CONCLUSION: The current study adds to the research literature on adolescent substance use in the context of the popularity of emerging tobacco products. Noteworthy differences in the clustering and predictors of polysubstance use, stratified by smoking status, suggest that different interventions are needed to reduce emerging tobacco use in combination with marijuana for smokers and non-smokers, notably peer group norms for non-smokers.

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POS3-24

SMOKING AND WEIGHT STATUS IN THE UNITED STATES: UNDERSTANDING THE RELATIONSHIP OF CIGARETTE SMOKING TRAJECTORIES THROUGH ADOLESCENCE AND WEIGHT STATUS IN YOUNG ADULTHOOD

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SIGNIFICANCE: Adolescent cigarette smoking has steadily declined since 1999, while obesity rates have quadrupled since the 1980s. Few studies have looked at the longitudinal relationship of smoking and weight in youth and young adulthood. This study examines the relationship of smoking trajectory beginning in adolescence on weight status in young adulthood in a nationally representative US longitudinal sample. METHODS: The study sample was drawn from Add Health Waves I-IV (N=13,361). Four trajectories were generated through repeated-measures latent class analyses using current cigarette smoking status in Waves I-IV and age of initiation: nonsmokers (44%), early establishers (23%), late establishers (21%), and former smokers (12%). Wave IV weight status included self-reported body mass index (BMI) and measured waist circumference (WC). Bivariate analyses addressed associations between smoking trajectory and BMI at each wave. Multivariate linear regression models tested the relationship of smoking trajectory and weight status at Wave IV. RESULTS: Weight status increased over time for all trajectories. In bivariate analyses, early and late establishers had a significantly lower BMI at Wave III and all smoking trajectories had a significantly lower BMI at Wave IV compared to nonsmokers. All smoking trajectories had a significantly lower BMI than nonsmokers [early establishers: (B=-1.27, CI: -1.56, -0.98); late establishers: (B=-0.84, CI: -1.16, -0.52); & former smokers: (B=-0.63, CI: -0.93, -0.34); (p<0.05)] in an adjusted multivariate regression model predicting Wave IV BMI. Males reported a lower BMI (β = -0.28; CI: -0.53, -0.03) than females. Results predicting Wave IV WC showed a similar trend. DISCUSSION: Smoking during adolescence does not attenuate the risk of becoming obese in young adulthood, even though smoking trajectories had a lower BMI and WC than nonsmokers. These results have implications for interventions concerning cigarette smoking and weight control in youth and young adults. Both tobacco use and obesity need to be studied concurrently in order to better understand potential additive and/or synergistic effects among youth and young adults in the US.

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POS3-25

ARE ADOLESCENTS' IMPLICIT ATTITUDES TOWARD SMOKING INFLUENCED BY THEIR PARENTS' MAJOR HEALTH EVENTS AND HEALTH VALUES?

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SIGNIFICANCE: Midlife adults, especially those who smoke, are likely to experience adverse health events. Such a health event may influence the smoking attitudes of their adolescent children, whether or not the parent smokes. Moreover, the value that parents place on health may also affect their children's attitudes about smoking. The current study tested the effects of parental major health events (e.g., heart disease) and health values on their adolescent children's implicit attitudes toward smoking, over and above the effects of parents' smoking. Implicit attitudes towards smoking have been shown to be intergenerationally transmitted and to prospectively predict smoking onset. METHODS: Parent and adolescent child pairs were enrolled in a study that included mailed questionnaires and web-based data collection (N=749). Multivariate linear regression tested the effects of parental health events and health values on the adolescent child's implicit attitude toward smoking, after controlling for parental smoking status, parental educational attainment, sex of the parent, and the age of the child. RESULTS: There was a significant association between parent's health value and their adolescent child's implicit attitude toward smoking (Standardized Beta=.08, p=.03), such that a higher health value was related to a more negative implicit attitude toward smoking. There was no effect of parental health events on implicit attitudes. CONCLUSIONS: Parents' health value exerted a unique influence on their adolescent's implicit attitudes toward smoking, over and above the parents' cigarette smoking, parents' education, parent's sex, and child's age. These findings suggest that, even among smoking parents, placing a high value on health can be protective for their children in terms of attitudes that predict cigarette smoking onset.

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POS3-26

YOGA HELPS IN SUCCESSFULLY QUITTING TOBACCO USE - FINDINGS OF A COMMUNITY BASED RANDOMIZED CONTROLLED TRIAL

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BACKGROUND: Almost 47% smokers in India want to quit (GATS, 2010), if they are able to. Smokers have faced difficulty in quitting due to issues like anxiety, restlessness, insomnia, irritability, depression, anger, lack of concentration and difficulty in resisting craving. Yoga, an ancient science of well-being that developed in India, has long been known to bring peace, vitality and tranquillity on regular practice. Hence, it is expected that practicing yoga should help a smoker in quitting. To scientifically evaluate the proposition of yoga as an aid for smoking cessation, a randomized controlled trial was performed. **METHODS:** 124 'current smokers' expressing self-intent to quit were recruited into study from community through resident welfare organizations in Gurgaon, India. Participants were randomized to one of 2 intervention arms, 62 each. All participants were offered behavioral counseling at 0, 2, 4, 8 and 12 weeks. In addition to behavioral counseling, 62 participants were linked to a Yoga Ashram (Institute) for twice a week one-hour yoga classes. Yoga group participants were offered dhyana (meditation), pranayama (breathing exercises) and asanas (physical pose-based exercises) as a holistic wellness approach. Outcome measure included 7 day point-prevalence abstinence (as reported by the participants) at end of 4 weeks, 8 weeks and 12 weeks. **RESULTS:** A total of 106 participants completed study. Attendance in yoga classes varied from 64% to 100% in the Yoga group. At end of 4 weeks, participants in yoga group exhibited increased odds of 7 day point-prevalence abstinence as compared to those in 'only behavioral counseling' group [Odds Ratio: 4.2, 95% CI: 1.6 - 7.4]. Participants in yoga group continued to exhibit higher odds of being abstinent at end of 8 weeks [Odds Ratio: 3.1, 95% CI: 1.2 - 6.4] and 12 weeks [Odds Ratio: 2.9, 95% CI: 1.2 - 6.7]. **CONCLUSION:** Results of this study indicate that incorporating yoga as a component of smoking cessation programs has potential to significantly improve the outcome. With the world formally accepting Yoga and UN declaring 22 June as International Yoga Day, time is now even more appropriate for all countries to exploit the benefit offered by Yoga towards smoking cessation. Self-report can potentially introduce reporting bias and subject to availability of resources, saliva cotinine testing will yield more reliable data. More rigorous larger studies are recommended for further robust evaluation. Underlying biological mechanisms responsible for benefit with yoga also need to be investigated and understood.

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POS3-27

MEASURING NICOTINE DEPENDENCE AMONG YOUNG ADULTS WHO SMOKE CIGARILLOS

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SIGNIFICANCE: Use of cigarillos is increasing, particularly among young adults. Nicotine dependence (ND) is important for understanding smoking behavior and cessation, but measures of ND have been developed and validated for cigarette smokers. We evaluate the psychometric properties of new and adapted items designed to assess ND among young adults that smoke cigarillos. **METHODS:** Items were drawn from two sources. First, items from the PROMIS Nicotine Dependence Item Bank were adapted to be product neutral; specifically the word cigarette was replaced by tobacco product. Second, new items were developed based on findings from a qualitative study of 60 young adults and adolescents that derived patterns of cigarillo smoking and experiences of smoking and addiction. A total of 42 ND items (5 point response format) were included in a web-based survey and data were collected in August 2016. The target sample size was 120 and eligible participants included 18-28 year olds that smoke a minimum of 3 cigarillos per week. Item analysis included item factor analysis, item response theory analyses and reliability and

separation index are evaluated. **RESULTS:** A total of 179 young adults completed the survey. Participants had a mean age of 22 (std dev 2.7), with a majority being male (55%) and white (60%) or African American (27%). Median number of cigarillos smoked per week was 20; 63% of participants also smoked cigarettes. 39 items met the fit statistics criteria (infit and outfit between 0.5 and 1.5 and an item total correlation > 0.25) and are highly reliable 0.95. Of the new items, 8 of 10 performed equally well to the PROMIS items and are distributed across the content spectrum. The summary scores (mean= 78.5, std dev= 34.7) covered the full range of scores (0-156) and are approximately normally distributed with minimal missing data. **CONCLUSIONS:** This first test of the adapted and new items to measure ND among cigarillo smokers indicates that the items perform well and are suitable for use with individuals that smoke cigarillos or a combination of cigarettes and cigarillos.

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POS3-28

NOVEL ADDUCTS OF FLAVOR CHEMICALS IN E-CIGARETTE LIQUIDS ACT AS MODULATORS OF CHEMOSENSORY IRRITANT RECEPTORS

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The use of E-cigarettes is rapidly increasing world-wide, especially among high school students and young adults. The major ingredients of the liquids used in E-cigarettes are nicotine, the solvents propylene glycol (PG) and vegetable glycerin (VG), and flavorants. The large variety of available flavors has great appeal for adolescents. Flavorants include reactive aldehydes that may undergo chemical reactions with other E-liquid constituents under storage conditions or when heated in the E-cigarette device. The products of these reactions have not been systematically studied. We performed a chemical analysis by gas chromatography followed by mass spectrometry (GC-MS) of flavored E-cigarette liquids kept at room temperature conditions. In addition to the characterizing flavor aldehydes we identified aldehyde adducts with propylene glycol, the propylene glycol acetals (PG acetals), including vanillin, benzaldehyde and cinnamaldehyde PG acetals. PG acetal content was especially high in 100% PG E-liquids. Aldehydes cause respiratory irritation and pain through activation of Transient Receptor Potential (TRP) ion-channels such as TRPA1 and TRPV1 that are expressed in sensory neurons innervating the airways. It is unknown whether aldehyde PG acetals also activate these irritant pathways. Using calcium microfluorimetry in cultured HEK 293T cells transfected with cloned human TRPA1 or TRPV1, we observed that PG acetals triggered robust activation of these TRP channels, some more potently than their parent flavor aldehyde. In conclusion, our data demonstrates that E- liquids, even under normal storage conditions, are chemically unstable. Constituents react with each other and form compounds that engage known toxicological targets and require additional toxicological characterization.

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POS3-29

MEDIA CHANNEL CORRELATION WITH PERCEPTION OF TOBACCO RISK

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SIGNIFICANCE: The United States has historically been at the forefront of tobacco advertising regulation and public service messaging. The 1964 U.S. Surgeon General's Report led to laws restricting tobacco ads, which impacted smoking rates. The media landscape has evolved since then, affecting the sources of expo-



sure to tobacco and health messages. This research explored the effectiveness of media channels or technologies to convey key messages about the health effects of smoking. **METHODS:** We conducted 103 focus groups, wherein qualitative and quantitative data were collected from 664 participants in four race/ethnicity subgroups: 180 Hispanics/Latinos (Chicago, Bronx, Miami, San Diego); 212 African Americans and 78 Whites (Jackson, MS), and 200 Appalachian youth (rural Kentucky, North Carolina, New York). All audiences skewed lower SES. **RESULTS:** Print/outdoor messages are more effective among the 19-24 age group than older groups, significantly more than the 25-44 group ($p=0.045$). Radio is more effective among the 45-64 group than younger groups, particularly the 25-44 group ($p=0.002$). The internet is more effective among the 45-64 group than younger groups (19-24 $p=0.001$ and 25-44 $p=0.006$). Print/outdoor is more effective among the 11-13 age group than the 14-18 group ($p=0.004$). The same is true for effectiveness of internet messages ($p=0.27$). Females 11-18 are less affected by tobacco health messages in the print/outdoor channel, compared to males 11-18 ($p=0.45$). Educational level is the biggest driver of media effectiveness across channels, both traditional and new technologies (p values range 0.001 to 0.060). Both household income level ($p=0.031$) and having negative predispositions ($p=0.005$) towards overall cigarette risks enhance tobacco health message effectiveness on the internet. Whites are more effectively reached with tobacco health messages through print/outdoor channels than other segments ($p=0.001$). Regardless of media technology, tobacco health messages are less effective among African Americans compared with other segments. **CONCLUSIONS:** Tobacco anti-marketing appear to be more effective among two key adult age groups (19-24 and 45-64), but through different channels. Among youth, the earlier in life the messages are delivered, the greater potential for success. Lastly, the findings may suggest that noticing tobacco health message is boosted by negative attitudinal dispositions and socioeconomic advantages. This aspect should be explored in more depth in future research.

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POS3-30

EARLY AGE OF E-CIGARETTE ONSET MEDIATES RELATIONS BETWEEN IMPULSIVITY AND FREQUENCY OF E-CIGARETTE USE AMONG YOUTH

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SIGNIFICANCE: Impulsivity is a risk factor for e-cigarette experimentation among youth, and evidence suggests youth who try tobacco at an earlier age are at greater risk for long-term use. The current study extends prior research by examining whether early age of e-cigarette onset mediates relations between impulsivity and frequency of e-cigarette use among youth. **METHODS:** We analyzed cross-sectional survey data from 733 youth who reported e-cigarette onset across 8 high schools in southeastern Connecticut in 2015 (45.8% female, mean age 16.3 [SD=1.2], mean age of e-cigarette onset 14.8 [SD=1.6]). Two factors of impulsivity were assessed using a brief Barratt Impulsiveness Scale: lack of self-control (e.g., I plan what I have to do) and impulsive action (e.g., I do things without thinking). An open-ended response characterized e-cigarette use in the past month (range 0-30 days, 41.7% reported no use in the past month), and models specified a negative binomial distribution for e-cigarette frequency. Mediation was tested with Mplus using maximum likelihood estimation with robust standard errors, and models included school as a cluster variable and controlled for covariates (sex, race, socio-economic status, and total number of other tobacco products ever tried). **RESULTS:** The product of the path coefficients indicated significant indirect effects for both factors of impulsivity (lack of self-control $ab=.03$, 95% CI [.01, .05]; impulsive action $ab=.04$, 95% CI [.01, .07]). Specifically, both factors of impulsivity were significantly associated with an earlier age of e-cigarette onset (lack of self-control $B=-.25$, $SE=.04$, $p<.001$; impulsive action $B=-.28$, $SE=.10$, $p=.004$), and an earlier initiation was associated with more days of e-cigarette use in the past month ($B=.13$, $SE=.04$, $p=.002$). **CONCLUSIONS:** These findings suggest adolescents who endorse aspects of impulsivity, such as acting without thinking, are at greater risk for more frequent e-cigarette use through an early age of e-cigarette initiation. Further research is needed to evaluate these relations longitudinally and develop targeted interventions for impulsive youth to prevent e-cigarette use.

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POS3-31

ADULT TOBACCO USE: IMPACT OF LIFETIME USE THRESHOLDS ON NATIONAL PREVALENCE ESTIMATES

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SIGNIFICANCE: In adults, current cigarette use is typically defined by meeting a lifetime threshold of 100 cigarettes and now smoking every day or some days. A standard lifetime threshold is not available for non-cigarette products and impacts the interpretability of prevalence estimates for these products. The present study systematically evaluates the impact of lifetime threshold cut-offs on prevalence estimates across a range of ever and current use definitions for 10 tobacco products using Wave 1 of the Population Assessment on Tobacco and Health (PATH) Study. **METHODS:** Wave 1 (2013-2014) of the PATH Study included 32,320 U.S. adults. Use of 10 tobacco products was assessed: cigarettes, e-cigarettes, traditional cigars, cigarillos, filtered cigars, pipe tobacco, hookah, smokeless tobacco, snus, and dissolvable tobacco. Five different thresholds of lifetime use were employed: 100-units, 50-units, 20-units, 10-units, and 1-unit. Six mutually-exclusive use groups were investigated at each threshold: never, ever, former, experimental, some days, and every day use. All analyses were weighted to adjust for oversampling and nonresponse. **RESULTS:** For all products, the prevalence of former, some day and everyday use increased as the lifetime threshold was lowered from 100-units to 1-unit. Increases in everyday or some day product-specific prevalence ranged from <1% (pipe, smokeless, snus, and dissolvable tobacco) to 1.5% for filtered cigars, 2.8% for cigarettes, and 3.9% for cigarillos. The greatest increases in everyday or some day prevalence when comparing the highest to lowest lifetime thresholds were in e-cigarettes (4.8%), traditional cigars (5.2%), and hookah (5.2%). For example, an estimated 0.7% of adults reported everyday or some day use of hookah at the 100-unit lifetime threshold, which increased to 5.8% when the threshold was lowered to 1-unit. **CONCLUSIONS:** Lifetime use thresholds greatly impact the estimated prevalence of ever and current tobacco use. Appropriate lifetime thresholds for different tobacco products are needed to improve existing measures of established tobacco use and facilitate comparison of tobacco prevalence estimates across studies.

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POS3-32

MEASUREMENT OF YOUTH TOBACCO DEPENDENCE ACROSS MULTIPLE PRODUCTS

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The Population Assessment of Tobacco and Health (PATH) Study enabled comprehensive examination of multiple domains of dependence across multiple tobacco products in a nationally representative sample from the 13,651 Youth Wave 1 (Baseline) Interviews (all participants ages <18 years old). The primary aim of the current study was to examine the psychometric properties of tobacco dependence (TD) indicators with validity for cigarettes, across a range of tobacco products. **RESULTS:** Using methods based in item response theory we confirmed a single primary latent construct underlying responses to TD indicators for cigarettes, e-cigarettes, hookah, and poly tobacco products (CFI= 0.98-0.99; TLI=0.98; RMSEA=0.05-0.07). We established five mutually exclusive past 12-month tobacco-user groups: cigarette only users ($n=292$), e-cigarette only users ($n=367$), hookah only users ($n=153$), and cigarette plus e-cigarette users ($n=229$) and users of multiple tobacco products ($n=832$). Differential Item Functioning (DIF) analyses



supported an ability to capture a broad range of TD similarly for different tobacco product users. With cigarette only users as a standardized reference for comparison (mean=0.0, sd=1.0), multiple product users scored similarly (mean=0.01), e-cigarette only users (mean=-0.36) reported lower levels with cigarette plus e-cigarette users reporting the highest (mean=0.17) levels of TD. Regression models supported concurrent validity with significant associations of product use frequency among cigarettes ($F(1,92)=90.0$, $p<0.001$), hookah ($F(1,87)=12.8$, $p<0.001$), cigarette+e-cigarette ($F(1,92)=89.9$, $p<0.001$) and multiple product users ($F(1,92)=89.9$, $p<0.001$). However, TD was not related as strongly to more frequent e-cigarette use ($F(1,92)=2.05$, $p=0.15$). Further, sociodemographic factors are examined to assess correlates of TD. CONCLUSION: The PATH Study Youth Wave 1 (Baseline) Questionnaire provided reliable and valid measurement of a broad range of TD across several tobacco products that can be used to effectively characterize the impact of patterns of use. More work is needed to understand TD and youth use of new products.

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POS3-33

WATERPIPE TOBACCO USE, NORMS, RISK PERCEPTIONS AND EXPOSURE TO ADVERTISING AMONG ADOLESCENTS AND YOUNG ADULTS

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BACKGROUND: Despite declines in cigarette smoking, other forms of tobacco use, including waterpipe tobacco smoking (WTS), are on the rise. Adolescents and young adults are most vulnerable to this form of tobacco use. METHOD: In spring 2016, we conducted a nationally representative online survey of 1,297 adolescents (ages 13-17) and 2,214 young adults (ages 18-25) to assess prevalence of WTS, susceptibility, norms, risk perceptions, and exposure to advertising. RESULTS: The sample was 54.9% female, 74.2% white, 19.0% Hispanic with a mean age of 19.3 (SD=3.97). Young adults (23.0%) were much more likely than adolescents (3.8%) to have ever smoked tobacco in a waterpipe. Exposure to advertising also differed by age with almost a third of young adults (32.5%) reported advertisement exposure compared to 17.8% of adolescents. Exposure was most common on social media (69.7%), bars/restaurants (36.4%), billboards (27.1%), internet (23.3%), TV (20.6%), radio (20.4%) and magazines (19.2%). Few adolescents (13.3%) reported they had friends who smoked waterpipe compared to 42.3% of young adults. Most adolescents (80.9%) and over half of young adults (62.9%) reported that those important to them had negative views of WTS. Participants largely agreed (84.4%) that if they smoke tobacco in a waterpipe, they will inhale harmful chemicals and that WTS is bad for their health (85.4%). Yet, fewer young adults (62.9%) than adolescents (77.8%) believed that if they smoked tobacco in a waterpipe regularly, they would get addicted. Moreover, 15.7% of adolescents and 27.3% of young adults erroneously believed that WTS is less harmful than cigarette smoking. CONCLUSIONS: Young adults are particularly vulnerable to WTS, with almost a quarter reporting lifetime use and a third reporting exposure to advertising. Moreover, a third of young adults reported that regular WTS would not result in addiction and over a quarter incorrectly believed WTS is safer than cigarette smoking. Additionally, almost half had peers who smoke waterpipe. Prevention efforts targeting young adults, including health communication campaigns, warning labels, and advertising restrictions are critically needed.

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POS3-34

QUITLINE UTILIZATION AND OUTCOMES AMONG SMOKERS WHO USE MULTIPLE TOBACCO PRODUCTS

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SIGNIFICANCE: More than a third of cigarette smokers report using multiple tobacco products (MTP), including e-cigarettes, smokeless and other combustible tobacco. MTP users may be more addicted to nicotine and face unique challenges in their quit attempts. No studies have been published about the effectiveness of quitline services for smokers who use MTP. METHODS: This study examined 7-month point prevalence for abstinence from all tobacco among cigarette smokers who called the Oklahoma Tobacco Helpline from July 1, 2014 – June 30, 2015. An MTP user was defined as a current smoker who reported using at least one of the following products at quitline registration: smokeless tobacco, pipes, and cigars. Because previous research suggests smokers use e-cigarettes as a cessation aid, e-cigarette users were excluded. For this analysis, registration, utilization and follow-up data were available for 1604 exclusive cigarette smokers and 93 smokers who used MTP. RESULTS: MTP users were more likely to be male (78.5% vs. 37.2%, $p<0.0001$), younger (18.3% vs. 6.7% less than 25 years, $p<0.0001$), uninsured (48.9% vs. 34.9%, $p=.0078$), and non-daily cigarette smokers (15.3% vs. 5.3%, $p=.0001$). Compared to exclusive cigarette smokers, they had younger age of initiation (46.8% vs. 31.8% initiated before age 15, $p=.03$) and were more likely to use tobacco within the first five minutes after waking (57.1% vs. 50.4%, $p=.03$). MTP users received less intensive quitline intervention (fewer coaching calls, $p=.002$ and less NRT from the quitline, $p=.09$) than exclusive cigarette smokers, but their satisfaction and quit rates were similar. Among MTP users, 31.2% reported 30-day abstinence from all tobacco compared to 30.8% of exclusive cigarette smokers ($p=.93$). CONCLUSIONS: These results suggest state quitlines may be able to effectively serve smokers who use MTP. Despite the evolving tobacco product use landscape, state quitlines continue to be a robust population-based strategy for the treatment of nicotine dependence.

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POS3-35

RACIAL/ETHNIC DIFFERENCES IN SELF-REPORTED WITHDRAWAL SYMPTOMS AND QUITTING SMOKING THREE YEARS LATER: A PROSPECTIVE, LONGITUDINAL EXAMINATION OF U.S. ADULTS

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INTRODUCTION: Racial/ethnic groups appear to differ on quit success and withdrawal is a key factor in cessation failure, yet little is known about racial/ethnic differences in withdrawal symptoms. This study of U.S. adults examined racial/ethnic differences in current smokers' report of withdrawal symptoms and the relationship between withdrawal symptoms and quitting smoking three years later. METHODS: Using data from the National Epidemiologic Survey on Alcohol and Related Conditions (Wave 1, 2001-2001; Wave 2, 2004-2005), analyses were conducted on participants who identified as Non-Hispanic White, Non-Hispanic Black, or Hispanic; reported current cigarette smoking at Wave 1; and provided smoking status information at Wave 2 ($n=7,981$). Withdrawal symptoms during past quit attempts were assessed at Wave 1. RESULTS: Among Wave 1 current smoking adults, Non-Hispanic White respondents were more likely than Non-Hispanic Black and Hispanic respondents to report experiencing at least one withdrawal symptom, seven out of eight withdrawal symptoms, withdrawal-related discomfort, and withdrawal-related distress ($ps<0.0001$). While withdrawal symptoms were associated with a lower odds of quitting smoking for all groups, a stronger relationship between number of symptoms and lower odds of quitting was evident among Non-Hispanic White compared to Non-Hispanic Black respondents (interaction $\beta=0.065$, $p=0.0001$). For Non-Hispanic White participants, each additional withdrawal symptom was associated with a 6% decrease in the odds of quitting. CONCLUSIONS: Withdrawal symptoms were more commonly reported by Non-Hispanic White than Non-Hispanic Black and Hispanic adults and appeared to have a greater impact on failure to quit smoking for Non-Hispanic White compared to Non-Hispanic Black adults.



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POS3-36

LONGITUDINAL CHANGES IN NON-CIGARETTE TOBACCO PRODUCT PROMOTION NEAR NEW JERSEY HIGH SCHOOLS

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SIGNIFICANCE: Existing research on tobacco promotion at the point-of-sale focuses primarily on cigarette marketing. However, use of non-cigarette tobacco products, such as cigarillos, smokeless tobacco, and electronic cigarettes (e-cigs), exceeds rates of smoking among youth. This study examines longitudinal changes in the accessibility and promotion of these other tobacco products in a cohort of tobacco retailers near high schools in New Jersey. **METHODS:** In 2015, research staff visited all tobacco retailers within a half-mile of 26 randomly-sampled high schools in New Jersey (n=183 retailers). We documented product availability for cigarillos, smokeless tobacco, and e-cigs, as well as the presence of exterior and interior advertising. All stores were revisited one year later using an identical data collection instrument. Descriptive statistics and chi-square tests highlighted significant differences between years. **RESULTS:** Cigarillos were available in 89.6% of tobacco retailers in 2016, a slight increase from 84.2% one year prior. E-cigs experienced a large and significant decline in availability from 2015 to 2016 (58.5% to 47.0%, $p=0.03$). In total, 48 retailers stopped selling e-cigs between study years. Smokeless tobacco products were available in approximately 27% of retailers in both years. Although e-cigs were advertised on store exteriors more than any other non-cigarette tobacco product, the prevalence of exterior e-cig advertising fell from 31.2% in 2015 to 20.8% in 2016 ($p=0.02$). Interior cigarillo advertising increased substantially between years, from 15.3% to 23.5% of stores ($p=0.04$). **CONCLUSIONS:** Industry and retailer promotional activities at the point-of-sale reflect consumer preferences and may influence use. Cigarillos appear to be increasingly marketed in retailers near schools, while promotion of e-cigs seems to be declining. Future studies should examine the impact of point-of-sale advertising on youth use of non-cigarette tobacco products.

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POS3-37

MIXING TOBACCO AND CANNABIS: A CROSS SECTIONAL POPULATION STUDY

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INTRODUCTION: With many jurisdictions in the process of liberalizing marijuana laws, there is concern that increased marijuana use will maintain and increased tobacco use. The purpose of this study is to examine joint use of tobacco and cannabis among a representative sample of Ontario adults. **METHODS:** The CAMH-Monitor is a cross sectional survey of 1005 Ontario (18+) adults selected using random digit dialing. Univariate predictors of past year cannabis use, tobacco use, and joint tobacco and cannabis use ("In the past year have you ever used cannabis, marijuana or hash mixed with tobacco") were assessed. Logistic regression was used to examine likelihood of use, controlling for potential confounders. **RESULTS:** In 2015, 1.9% of Ontario adults used cannabis and tobacco together. In the past 12 months, 31% of cannabis users reported mixing cannabis with tobacco (16% of tobacco nonsmokers and 54% of current past month tobacco smokers). Adjusting for potential confounders, past year tobacco users who had also smoked cannabis were more likely to mix the two (OR: 6.1; 95% CI: 2.7, 14.3). 38% of current tobacco smokers used cannabis in the past year compared to 10% of tobacco nonsmokers (AOR: 5.0; 95% CI: 3.7, 6.6). Of current tobacco smokers, 14% used cannabis for medical purposes compared with 2% of tobacco nonsmokers (AOR: 2.0; 95% CI: 1.2, 3.5). 22% of cannabis users reported using an e-cigarette to smoke cannabis. **CONCLUSION:** Tobacco smokers are significantly more likely to use cannabis for both recreational and medicinal purposes. However, a significant number of tobacco nonsmokers are mixing tobacco with cannabis, without considering themselves to be smokers. The prevalence of tobacco use may be

underestimated if mixing with cannabis is not assessed. Future research should assess if dual use is associated with maintenance of tobacco use.

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POS3-38

USE OF WASTEWATER-BASED EPIDEMIOLOGY TO MONITOR NICOTINE CONSUMPTION IN AUSTRALIAN AND NEW ZEALAND COMMUNITIES

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SIGNIFICANCE: Nicotine use in the form of tobacco smoking is a substantial contributor to the disease burden in Australia and New Zealand. Population monitoring of tobacco use generally relies on self-report survey data. Wastewater-based epidemiology is an alternative method to estimate population level consumption of substances by analysing representative samples of wastewater collected from sewage treatment plants for drug target residues. Few studies have applied the method to measuring nicotine use in populations. This study used wastewater-based epidemiology to examine levels of nicotine use in Australia and New Zealand to demonstrate its feasibility to examine factors contributing to community level differences in nicotine use. **METHODS:** Wastewater samples were collected between March and May 2015 from 14 sewage treatment plant catchments in Australia (11 urban and three rural communities) and two urban catchments in New Zealand. These catchments covered ~40% of the Australian population and 32% of the New Zealand population. The metabolites of nicotine (cotinine and trans-3'-hydroxycotinine) and alcohol (ethyl sulfate) and were quantified using liquid chromatography coupled with tandem mass spectrometry. A multilevel model regression was used to examine factors influencing nicotine use. **RESULTS:** The mean daily consumption of nicotine was 2044 mg/1000 people in Australia and 1236 mg/1000 in NZ (difference not significant). Nicotine consumption was inversely related to catchment size ($p<.001$) and significant differences in nicotine levels between some jurisdictions were observed. Nicotine levels were highest in samples collected on Sundays and Mondays reflecting greater use on weekends. Community levels of nicotine and alcohol metabolites were highly correlated ($p<.01$). **CONCLUSIONS:** Wastewater-based epidemiology is a feasible method of monitoring population nicotine consumption. Future research that includes non-nicotine markers of tobacco use, could help monitor population level switching from smoking tobacco to vaping nicotine in addition to overall nicotine use.

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POS3-39

NICOTINE AND TAR REDUCTION EFFECT BY ADDITION OF A SILICEOUS CATALYST TO TOBACCO. COMPARATIVE STUDY OF COMPOSITION OF THE MAINSTREAM SMOKE OF FIVE OF RYO TOBACCOS BRANDS AND THEIR COUNTERPART CIGARETTE TOBACCO BRANDS

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A comprehensive analysis of the mainstream smoke (smoking under the of ISO conditions) both the gas fraction and the particulate matter from 5 brands of tobacco commercialized in Spain, both roll-your-own (RYO) and factory-made-cigarette (FMC) has been carried out. Tubes with no vent holes were used for both types of tobaccos. The results show that RYO tobaccos generate, in general, higher yields for the compounds analyzed in the condensed fraction than the counterpart cigarette tobaccos of the same brand. The average CO yield of the five RYO brands for is 27.5 mg/g smoked tobacco, whereas for cigarette tobaccos such average is 19.2 mg/g smoked tobacco. Average nicotine and tar in the traps (in mg/g smoked tobacco) is 2.42 and 19.92, respectively for the five RYO tobaccos and 1.78 and 14.47 for the five cigarette brands. Similar results are obtained for the rest of compounds and families considered. It can be concluded that RYO tobaccos yield much higher amounts of most compounds an-



alyzed than their counterpart FMC tobaccos, and cannot at all be considered as less harmful. The addition of a siliceous MCM-41 mesoporous type catalyst to the tobacco cuts yields significant reduction in the emission of nicotine, tar, carbon monoxide and most of the compounds analyzed, which may have consequences on the derived effect of the smoking of such mixtures. Nicotine reduction may have important effects on different aspects related to smoking habit addiction and smoking cessation. Additionally, tar and carbon monoxide reduction are expected to reduce the negative effects of smoking on public health and public health economy. Consequently, the addition of this type of catalyst to tobacco may be an interesting approach to reduce the negative tobacco effects until a better global solution is developed.

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POS3-40

RATES OF PARENTAL TOBACCO COUNSELING AND SCREENING AT PEDIATRIC VISITS

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SIGNIFICANCE: Within the last five decades, cigarette-smoking rates have declined more than two-fold, as a result of public policies, media campaigns, and increased advice and support from clinicians. Pediatric visits have been shown to be extremely important venues for intervention for parental smoking cessation and resultant reduction of children's exposure to secondhand smoke. To assess the potential change in rates of reported tobacco counseling from 1997-1999 to 2009-2011 using a national sample of clinicians who provide medical care to children. **METHODS:** Combined data from the ambulatory portions of the National Health Care Survey: National Hospital Ambulatory Care Survey (NHAMCS) and National Ambulatory Medical Care Survey (NAMCS) from 1997-1999 and 2009-2011 were analyzed to determine the frequency of pediatric visits that included clinician-reported tobacco counseling and how such counseling varied by child, family and clinician characteristics. Bivariate and multivariate analyses were performed. **RESULTS:** In 1997-1999, 1.5% of all medical visits for children under 19 years of age included tobacco counseling; this increased to 3.8% in 2009-2011 ($p<.001$). While 4.1% of well child visits included tobacco counseling in 1997-1999, it increased to 11.1% in 2009-2011 ($p<.001$). For children <1 year, rates were 0.7% in 1997-1999 vs. 5.3% in 2009-2011 ($p<.001$). Among those with ear infections, rates were 0.3 and 2.2% respectively ($p<.01$). In contrast, there was no change in rates of counseling for children with asthma (4.3 vs. 6.6%, $p=.22$). **CONCLUSION:** These results demonstrate the significant increase in tobacco counseling by pediatric providers within the last decade. They also highlight, however, that even though the American Academy of Pediatrics recommends pediatricians advise parents to quit smoking, and tobacco exposure is recognized as a "pediatric disease" with "no safe level of exposure," there is much room for improvement in this critically important service.

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POS3-41

E-CIGARETTE OUTCOME EXPECTATIONS AMONG A NATIONAL SAMPLE OF ADOLESCENTS AND YOUNG ADULTS

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BACKGROUND: Understanding the beliefs (i.e., outcome expectations) that underlie e-cigarette use is an important research goal. The objective of this research

was to 1) examine the structure of e-cigarette outcome expectations, and 2) examine how these expectations differ by demographic factors and user status. **METHOD:** In spring 2016, we conducted a nationally representative online survey of 3,517 adolescents (ages 13-17) and young adults (ages 18-25) to assess positive and negative outcome expectations of e-cigarette use. Twenty-one items were developed based on results from focus groups and the existing e-cigarette literature and incorporated into a larger tobacco use survey. **RESULTS:** The sample was 54.9% female, 74.2% white, 19.0% Hispanic and the mean age was 19.3 (SD=3.97). Using a weighted least squares exploratory factor analysis appropriate for Likert scaled items and an oblique rotation, our results revealed 3 positive factors (enjoyment, benefits relative to cigarettes, positive social expectations; RMSEA=0.078, CFI=0.997, SRMR=0.011) and 3 negative factors (health harms, smoking stigma, and negative social expectations; RMSEA=0.065, CFI=0.995, SRMR=0.014). As expected, ever e-cigarette users reported higher positive outcome expectations and lower negative outcome expectations on all dimensions, relative to never users (all $p<.01$). With the exception of positive social expectations, young adults (18-25) reported higher positive expectations and lower negative expectations, relative to adolescents (13-17; all $p<.01$). Males also reported higher positive expectations relative to females (all $p<.05$), and higher smoking stigma (negative outcome expectation; $p<.01$). **CONCLUSION:** Our findings suggest that the beliefs that underlie e-cigarette use are multi-dimensional, and include health, social, and cigarette-oriented elements. Our new scale can be used to monitor how beliefs about e-cigarettes change over time and predict use prospectively, as well as to inform the development of health communication and regulatory policies that prevent young people from nicotine addiction.

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POS3-42

TRENDS IN CANNABIS USE AND CIGARETTE SMOKING AMONG ADULTS WITH CHILDREN IN THE HOME IN THE UNITED STATES: 2002-2014

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INTRODUCTION: Recent data suggest secondhand smoke (SHS) from cannabis smoking similarly carries health risks to youth. The use of cannabis is strongly associated with cigarette smoking. The objectives of this study were to investigate the relationship between cigarette smoking and cannabis use among adults living in homes with children under age 18 in the United States, and to estimate changes in the prevalence of cannabis use among current, former and non-cigarette smokers living in homes with children from 2002-2014. **METHODS:** The National Survey on Drug Use and Health (NSDUH) is an annual, nationally representative cross-sectional study conducted from 2002-2014 in the United States. Logistic regression models estimated associations between past month cannabis use and past month cigarette smoking among adults with children under age 18 in the home. Heterogeneity of these associations by demographic characteristics and trends over time were also examined. **RESULTS:** The prevalence of current and former cigarette smoking among adults in homes with children under age 18 declined over the years 2002-2014, after adjusting for demographics. Among parents with children <18 in the home, the prevalence of ever having used cannabis declined over this time period; however the prevalence of past month (any) use (adjusted odds ratio (AOR)=1.03 (1.02, 1.04) $p<.00001$) and past month daily use (AOR=1.08 (1.06, 1.10), $p<.00001$) both increased significantly. In 2014, among parents with a child (under age 18) living in the home, past-month cannabis use was more common among those who were current (AOR=5.9 (4.5, 7.5)) and former (AOR=2.9 (2.0, 4.0)) cigarette smokers versus never cigarette smokers. The odds of current cannabis use were significantly higher among current than former smokers. After adjusting for demographic characteristics, the prevalence of any past month cannabis use among parents with children under age 18 in the household increased significantly in all smoking categories over the years 2002-2014. **CONCLUSIONS:** Despite the decline in cigarette use in the US, our findings suggest that cannabis use is increasing among parents with children under 18 in the home. Efforts to decrease exposure to secondhand smoke via cigarette smoking cessation may be complicated by use of other smoked products, such as cannabis. Further investigation into the level of exposure and efforts to minimize exposure are needed given these trends.



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POS3-43

THE EFFECT OF CIGALIKE E-CIGARETTE USE ON CIGARETTE SMOKING: AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY

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SIGNIFICANCE: This study presents main outcomes from the Moment Study (R21DA036472), an intensive longitudinal investigation of how cigalike e-cigarette (ECIG) use affects adult smokers' cigarette smoking frequency and intensity. A better understanding of the ECIG initiation process will help identify factors that may predict future patterns of ECIG and cigarette use. **METHODS:** The Moment Study is a mixed method intensive longitudinal study examining factors influencing ECIG initiation among ECIG naïve adult smokers. Methods include ecological momentary assessment (EMA), geotracking, biosamples, and qualitative interviews. In Week 1 (WK1), participants reported cigarette smoking and time-varying states (mood, craving, and satisfaction); in WK2 and WK3, participants were provided with NJoy King cigalike ECIGs and reported cigarette smoking, ECIG puffs, and time-varying states. Linear growth models were used to assess the within-person effect of ECIG use on cigarette smoking, moderated by intention to quit. **RESULTS:** The dataset consists of 9,596 reports of cigarette use and 2,990 reports of ECIG use over 2,296 study days from 107 individuals. Participants were majority women (53.0%), 41.2 years old (SD=12.3), and had made 1.4 quit attempts in the last year (SD=3.7). Participants smoked an average of 5.5 cigarettes per day (CPD), which decreased by -0.2 CPD after ECIGs were introduced, controlling for day-level ECIG consumption. Neither menthol preference nor gender moderated this relationship; however, intention to quit in the next 30 days (vs. not) was a significant moderator, with a significantly greater decrease in CPD among smokers with no intention to quit in the next 30 days ($p < 0.001$). Qualitative analyses echoed quantitative results, with smokers describing decreased smoking but insufficient satisfaction to justify complete substitution. Additional results concerning the effect of craving, mood, and satisfaction on ECIG use, as well as findings' sensitivity to reporting fatigue, will be presented. **CONCLUSIONS:** Provision of cigalike ECIGs initially decreased adult smokers' cigarette consumption; this change endured only among smokers without plans to quit.

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POS3-44

PROOF-OF-CONCEPT FOR A LOW-COST, MOBILE-DRIVEN AEROSOL CONCENTRATION ESTIMATOR

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Most real-time aerosol instruments utilize light scattering to estimate aerosol concentration, but are moderately expensive and therefore not widely available outside the environmental health fields. The purpose of this study was to develop a proof-of-concept aerosol measurement device using components similar to those incorporated in modern smart phones, i.e. a digital camera and low voltage power port. An aluminum tube was equipped with: loose fitting end caps to block light from entering, a small electric fan to draw e-Cig aerosol through the tube, a laser to provide polarized light, and a webcam to capture scattered light from the laser beam. The system was designed such that outside air was drawn into the tube and across the laser beam before encountering the fan. The fan and laser were powered by a laptop USB port. Scattered laser light was detected by the webcam. This

device was evaluated against a wide range of e-cigarette aerosol concentration in an exposure chamber. Pictures were analyzed by counting all pixels with light value above zero and plotted against results from a Grimm Aerosol Spectrometer (Grimm). The prototype system underestimated e-Cig aerosol concentration by 10%, had a modest $R^2 = 0.88$, relatively high LOQ = 1.3 mg/m^3 , and relatively high variability, $SD = \pm 13\%$, but was able to reliably detect e-Cig aerosol concentrations well below the OSHA exposure limit of 5 mg/m^3 for respirable particulate. Limitations of this proof-of-concept device were: incomplete isolation of outside light, large laser-to-camera distance, low camera resolution, single picture and manual pixel analysis. This prototype successfully demonstrates the capability to measure sub-occupational levels of e-Cig aerosol with components analogous to those found in smart phones. With further development a small mobile-driven device could be built that accurately measure occupational and ambient aerosol concentrations.

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POS3-45

MACHINE-LEARNING: A TOPIC MODELING APPROACH TO IDENTIFYING TOPICS IN E-CIGARETTE BRAND SOCIAL MEDIA MARKETING

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SIGNIFICANCE: E-cigarette marketing on social media has increased substantially in recent years, however the nature of industry-generated messages on social media is not well understood. Researchers have begun to use machine-learning to track trends, understand public opinions, and monitor health events on social media. This study utilized a machine-learning approach to explore topics commonly discussed by e-cigarette brands in social media. **METHODS:** Data were public posts from Facebook, Instagram and Pinterest brand pages for *Blu*, *Logic*, *Metro* & *NJoy* e-cigarette brands from February 3, 2012 to April 16, 2015. Unsupervised topic modeling was used to automatically identify topics in a large corpora of 5,022 brand-generated posts. Topic names were assigned based on the 20 most probable unigram words for each topic. A regression model was used to estimate the proportion of *Blu*, *Logic*, *Metro*, & *NJoy* posts categorized under each topic. **RESULTS:** 8 topics were identified: Cessation (common words included: bandwagon, freedom, switching), Devices & Use (battery, charger, kit), Events & Entertainment (arts, festival, hangout), Flavors (classic, vanilla, variety), Lifestyle (lounge, photobooth, vacation), Partying (friends, fun, party), Product Promotion (buy, coupon, free), and Sports & Health (happier, healthier, sports). The greatest proportions of *Blu* posts were lifestyle (.30) and sports & health (.16). *Logic* posts were largely comprised of cessation (.50) and devices & use (.10). *Metro* posts were comprised of partying (.20) and product promotion (.14). *NJoy* posts were comprised of events & fun (.20) and product promotion (.20). Flavors were discussed moderately by *Metro* (.09), *Blu* (.08), *NJoy* (.06), and *Logic* (.04). **CONCLUSION:** Our model identified meaningful topics in brand-generated social media messaging. Surveying and regulating tobacco and nicotine product marketing on the internet and social media is a challenge, but crucial to address the increasing popularity of alternative products among young people. Machine learning approaches may be used to better understand social media-based tobacco and nicotine product marketing, inexpensively and in real time.

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**POS3-46****PUBLIC UNDERSTANDING OF CIGARETTE SMOKE CONSTITUENTS: THREE UNITED STATES SURVEYS**

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SIGNIFICANCE: The Tobacco Control Act requires public disclosure of information about toxic constituents in cigarette smoke. To inform these efforts, we studied public understanding of cigarette smoke constituents. **METHODS:** We conducted phone surveys with national probability samples of adolescents ($n=1,125$) and adults ($n=5,014$) and an internet survey with a convenience sample of adults ($n=4,137$), all in the US. We assessed understanding of cigarette smoke constituents in general and of 24 specific constituents. **RESULTS:** Respondents commonly and incorrectly believed that harmful chemicals in cigarette smoke mostly originate in additives introduced by cigarette manufacturers (43%-72%). Almost all participants had heard that nicotine is in cigarette smoke, and many had also heard about carbon monoxide, ammonia, arsenic, and formaldehyde. Less than a quarter had heard of most other listed constituents being in cigarette smoke. Constituents most likely to discourage respondents from wanting to smoke were ammonia, arsenic, formaldehyde, hydrogen cyanide, lead, and uranium. Respondents more often reported being discouraged by constituents that they had heard are in cigarette smoke (all $p<.05$). Constituents with names that started with a number or ended in "ene" or "ine" were less likely to discourage people from wanting to smoke (all $p<.05$). **CONCLUSIONS:** Many people were unaware that burning the cigarette is the primary source of toxic constituents in cigarette smoke. Constituents that may most discourage cigarette smoking have familiar names, like arsenic and formaldehyde and do not start with a number or end in ene/ine. Our findings may help campaigns develop constituent messages that discourage smoking.

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POS3-47**REASONS FOR E-CIGARETTE USE AMONG ADULT DUAL USERS: RELATIONSHIP TO QUITTING/HARM REDUCTION BEHAVIOR IN WAVE 1 OF THE PATH STUDY**

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SIGNIFICANCE: The proliferation of e-cigarette (e-cig) use among US adults has ignited a public health debate over their potential to help people quit smoking cigarettes, or conversely as a gateway to use of combustible tobacco products. Previous research has found that smokers use e-cigs for reasons such as product appeal (i.e., comes in flavors or feels like a cigarette) as well as the perception that e-cigs are less harmful than cigarettes. This study examines predictors of using e-cigs to try to quit or cut down cigarette smoking. **METHODS:** The public use data file of the nationally representative Population Assessment of Tobacco and Health (PATH) Study Wave 1 adult cohort was used for this analysis. We examined the association between reasons for e-cig use and other tobacco use characteristics with smoking-specific quit/harm reduction outcomes among a subsample of cigarette smokers and e-cig users who reported smoking cigarettes every day or some days, and indicated they were a current or former (within the past 12 months) user of e-cigs ("dual users" $N=3,224$). **RESULTS:** Weighted multivariate logistic regression models were tested to examine if reasons for e-cig use, after controlling for demographic and product use characteristics, were associated with 1) trying to quit cigarettes, or 2) cutting down on cigarettes. Results revealed that reasons for use that suggest an interest in harm reduction ("E-cigs might be less harmful to me") were associated with increased odds of using e-cigs to cut down on smoking (AOR= 2.2, 95% CI= 1.7- 2.8), but not associated with trying to quit. The only reason for use associated with trying to quit in the adjusted model was using e-cigs because, "It comes in flavors I like," (AOR= 1.9, 95% CI= 1.4- 2.7). **CONCLU-**

SIONS: Among dual users, reasons for e-cig use that reflect an interest in harm reduction were associated with cutting down cigarette smoking, but not trying to quit cigarette smoking. Future longitudinal waves of the PATH Study will explore if these reasons predict changes in e-cig and cigarette use behavior, such as partial or complete substitution of e-cigs for cigarettes, or quitting all tobacco products.

FUNDING: This secondary analysis was funded by Westat. The PATH Study public use data files were obtained from the NAHDAP website: <http://doi.org/10.3886/ICPSR36498.v1>

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POS3-48**YOUTH EXPOSURE TO TOBACCO INDUSTRY BRANDED SWEEPSTAKES ADS AND COUPONS: PREVALENCE AND ASSOCIATIONS WITH SUSCEPTIBILITY AND TOBACCO PRODUCT USE IN WAVE 1 OF THE PATH STUDY**

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BACKGROUND: Tobacco marketing has been associated with smoking susceptibility and initiation among youth. Little is known about youth exposure to tobacco sweepstakes ads and coupons. **METHODS:** We examined the prevalence and correlates of past 6 month (6M) sweepstakes ad and coupon exposure in a nationally representative youth sample aged 12-17 in Wave 1 of the Population Assessment of Tobacco and Health (PATH) Study ($n=13,651$) public use file. We examined associations between sweepstakes ad exposure and coupon receipt with susceptibility to use tobacco products and with past 6M cigarette, e-cigarette (e-cig), and any tobacco use. Weighted logistic regression models adjusted for demographics, geographic region, living with a tobacco user, and secondhand smoke exposure. Use and susceptibility models included having a favorite tobacco ad. **RESULTS:** Nearly 28% of youth experienced past 6M sweepstakes ad or coupon exposure (27.9%, 95% CI (26.8, 28.9)), with 25% having seen a sweepstakes ad. About 8% of all youth and 14.7% of ever tobacco users received coupons. Among youth who had never used any tobacco product ("never users"), females (vs. males) had 1.5 times greater odds (CI, 1.2, 1.8) of coupon receipt. Having a parent with a college degree (vs. < high school) was associated with 20% lower odds of sweepstakes exposure. Living with a tobacco user and secondhand smoke exposure were associated with greater odds of both coupon and sweepstakes exposure. Among never users, coupon receipt (AOR 1.6 (CI, 1.3, 2.0)) and sweepstakes exposure (AOR 1.3 (CI, 1.2, 1.5)) were associated with greater odds of cigarette susceptibility, with similar associations for e-cig susceptibility. Among all youth, coupon receipt was associated with 56% greater odds of past 6M any tobacco use, past 6M e-cig use, and over twice the odds of past 6M cigarette use (AOR 2.3 (CI, 1.8, 2.9)). Sweepstakes exposure was not associated with use. **CONCLUSION:** About 28% of youth in the US are exposed to tobacco marketing through sweepstakes ads or coupons. Coupon receipt was associated with greater cigarette and e-cig susceptibility and past 6M any tobacco, cigarette, and e-cig use. Understanding whether coupon exposure leads to youth tobacco use could support wider policies to restrict coupon redemption, thereby preventing tobacco product price reduction.

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POS3-49**INTERNALIZED SMOKING STIGMA IN RELATION TO QUIT INTENTIONS, QUIT ATTEMPTS, AND CURRENT E-CIGARETTE USE**

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BACKGROUND: Reducing the social acceptability of smoking is associated with lowered smoking prevalence. However, denormalization strategies can also contribute to the stigmatization that some smokers may feel about their smoking.

Smoking stigma may be more acute if smokers are also members of other stigmatized groups, such as racial/ethnic minorities. This study examined correlates of smoking self- and felt-stigma and discrimination, among current smokers. **METHODS:** Participants were recruited via a nationally-representative commercial consumer panel to complete a cross-sectional, web-based survey. Participants were 1528 current cigarette smokers aged 14 and older. Measures included the Internalized Stigma of Smoking Inventory (ISSI), Heaviness of Smoking Index, quit intentions, past-year quit attempts, and current use of electronic cigarettes. **RESULTS:** Self-stigma was significantly associated with higher intent to quit in the next 6 months ($OR=2.47$, $p<0.01$), and in the next 30 days ($OR=4.21$, $p<0.01$), relative to no intention to quit, as well as having made 1 or 2 quit attempts in the past year ($OR=1.60$, $p<0.01$) or 3 or more quit attempts ($OR=1.74$, $p<0.01$), and with daily e-cigarette use ($OR = 1.73$, $p<0.05$). Felt-stigma was positively associated with intent to quit in the next 30 days ($OR=1.54$, $p<0.01$), having made 3 or more quit attempts in the past year ($OR=1.35$, $p<0.01$), and both daily ($OR=2.05$, $p<0.05$) and some-day ($OR=1.30$, $p<0.05$) e-cigarette use. Discrimination was associated only with increased odds of daily e-cigarette use ($OR=1.83$, $p<0.05$). **CONCLUSIONS:** Smokers' who reported greater feelings of stigmatization about their smoking were more likely to report having made recent quit attempts, report a stronger intention quit smoking in the future, and report use of an e-cigarettes suggesting that feelings of self-and felt stigmatization are related to greater motivation to stop smoking.

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POS3-50

SECONDHAND SMOKE EXPOSURE AND ILLNESS SEVERITY IN PEDIATRIC EMERGENCY DEPARTMENT PATIENTS WITH RESPIRATORY ILLNESSES

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BACKGROUND: Hospital-based data reveal that children who have secondhand smoke exposure (SHSe) experience more severe respiratory illnesses. **OBJECTIVE:** Our study purpose was to assess the relationship between SHSe and illness severity among children presenting to the pediatric emergency department (PED) with three common respiratory conditions – asthma, bronchiolitis and pneumonia – an association not previously described. **METHODS:** A retrospective review of a year-long consecutive sample of PED patients with SHSe status documentation and asthma, bronchiolitis, or pneumonia diagnoses was performed. Illness severity metrics included: evaluation/testing performed (influenza A & B, respiratory syncytial virus, chest x-ray); medications administered; and procedures/interventions received (intubation, BBG suctioning, supplemental oxygen). Logistic and linear regression models were conducted to determine differences between SHSe and illness severity measures in each diagnostic group while controlling for sociodemographics, medical history, and seasonality. **RESULTS:** Of the 3,229 PED patients with SHSe documentation, 41% were diagnosed with asthma, 36% were diagnosed with bronchiolitis and 23% were diagnosed with pneumonia. One-fourth had positive SHSe. Asthmatic children with SHSe were more likely to receive steroids ($OR=1.71$, $95\%CI=1.19$, 2.44 , $p<0.01$) and/or receive magnesium sulfate ($OR=1.66$, $95\%CI=1.14$, 2.40 , $p<0.01$). Children with SHSe and bronchiolitis were more likely to receive racemic epinephrine ($OR=2.48$, $95\%CI=1.21$, 5.08 , $p<0.01$), have a chest x-ray ($OR=1.36$, $95\%CI=1.00$, 1.85 , $p<0.05$), and/or be admitted to the hospital ($OR=1.46$, $95\%CI=1.09$, 1.95 , $p<0.01$). No differences were identified for pneumonia severity. **CONCLUSIONS:** Secondhand smoke-exposed children presenting to the PED have significantly greater illness severity, especially among those with asthma and bronchiolitis. The PED remains an important, yet underutilized setting, for SHSe assessment and cessation research.

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POS3-51

LONG-TERM LOW-INTENSITY CIGARETTE SMOKING AND RISKS OF SMOKING RELATED CANCER IN THE NIH-AARP DIET AND HEALTH STUDY

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SIGNIFICANCE: Concordant with declining cigarette smoking prevalence, a substantial number of US smokers now smoke ≤ 10 cigarettes/day or do not smoke every day. Yet, the health effects of such levels of smoking exposure are unclear. **METHODS:** We used lifetime cigarette smoking histories to identify lifelong < 1 or 1-10 cigarettes/day smokers and evaluate their risks of subsequent smoking-related cancer among 238,525 cancer-free adults, aged 59-82, in the NIH-AARP Diet and Health Study. A questionnaire administered in 2004-2005 assessed detailed current as well as historical smoking intensity during nine prior age-periods (from < 15 y to ≥ 70 y). We estimated hazard ratios (HR) and 95% confidence intervals (CI) for cancer using multivariable Cox proportional hazards regression with age as the underlying time metric, adjusted for gender, race/ethnicity, education, alcohol, physical activity, familial history of cancer, and ever use of pipe or cigar. Never smokers were used as a referent group. **RESULTS:** A large proportion of current < 1 (86%) and 1-10 cigarettes/day (67%) smokers at baseline reported smoking higher numbers of cigarettes per day earlier in their lives. We identified 137 and 1,243 lifelong < 1 and 1-10 cigarettes/day smokers, respectively. Relative to never smokers, lifelong 1-10 cigarettes/day smokers had 2.36 times higher risk of smoking-related cancers ($95\% CI=1.88-2.95$). HRs for lifelong < 1 cigarette/day smokers were also higher ($HR=1.89$, $95\% CI=0.90-3.96$), although it did not reach statistical significance. With regards to specific cancers, risks among those who reported consistently smoking ≤ 10 cigarettes/day were particularly high for lung cancer ($HR=9.41$, $95\% CI=6.76-13.10$) and bladder cancer ($HR=2.20$, $95\% CI=1.21-4.01$). However, cancer risks were lower among former smokers, particularly those who quit at a younger age. **CONCLUSION:** Lifelong smoking of < 1 and 1-10 cigarettes/day was associated with higher risk of smoking-related cancer compared with never smokers. Regardless of the number of cigarettes smoked per day, quitting smoking was associated with lower cancer risk.

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POS3-52

CIGAR USE AND SENSATION SEEKING TENDENCIES OVER TIME

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SIGNIFICANCE: Cigar use has been increasing, which is attributed to the increase in flavored products available on the market. Sensation seeking tendencies are associated with a variety of tobacco product use including cigarettes, e-cigarettes and cigars, and product attributes such as flavors. However, studies to date have focused on cigarettes, and the few studies examining cigar use are cross-sectional in nature. The purpose of the present study was to extend existing research by examining the bi-directional relations between cigar use and sensation seeking tendencies across a 2-year period of time from 2014-16. **METHODS:** Participants were 5,478 18-29 year old students (M age=20.49; $SD=2.36$; 64% female; 36% non-Hispanic white, 31% Hispanic, 19% Asian, 9% non-Hispanic black and 5% other) attending one of 24 colleges in Texas. Students completed an online tobacco survey, which included images of products to facilitate recognition. Longitudinal cross-lagged models were used to examine bi-directional relationships between past 30-day cigar use and sensation seeking tendencies across four study waves (assessed six months apart), using the brief 4-item sensation seeking scale (BSSS-4). Covariates included gender, age, ethnicity, and college type (2- vs. 4-year). **RESULTS:** Results indicated that the model fit the data well: while the chi-square was significant [χ^2 , ($df=285$) = 248.5], the CFI was larger than .95 (.97) and the RMSEA was smaller than .06 (.03). Current cigar use and sensation seeking tendencies were stable across all four waves ($p<0.001$ for all). Cigar use at waves 1 and 3 predicted higher levels of sensation seeking at waves 2 and 4 respectively ($p<0.001$ for both). Higher levels of sensation seeking at wave 2 predicted cigar use at wave 3 ($p<0.001$). **CONCLUSIONS:** The current study found longitudinal relationships between cigar use and sensation seeking among young adults; the direction varied over time. Future studies are needed to elucidate the relationship



between sensation seeking and use of flavored products, and to establish causality, which could inform Food and Drug Administration regulatory policy.

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POS3-53

ASSOCIATIONS BETWEEN ENGAGEMENT AND CESSATION OUTCOMES IN THE SMOKEFREE TXT PROGRAM: A GROWTH MIXTURE MODELING ANALYSIS

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BACKGROUND: Text-messaging programs are effective in increasing cessation rates in smokers trying to quit. However, low engagement in real world implementations of these programs limits their effectiveness. **OBJECTIVE:** To identify unique patterns of engagement among 7,090 SmokefreeTXT users, and examine associations with cessation rates. **METHODS:** Engagement was operationalized as the number of weekly texts users sent to the program for 6 weeks. A growth mixture modeling approach was used to identify distinct classes of users based on weekly text patterns. After selecting the best fitting solution, descriptive analyses were used to characterize the classes, and multilevel, multivariable models were constructed to examine the association between engagement and cessation at 6 weeks. **RESULTS:** Users were primarily female (64.3%), daily smokers (91.9%), and had a mean age of 34.3 years. A 4-class model was selected as the best fitting solution. The largest class (61.6% of users; *low engagers-decline*) had low initial engagement and their engagement declined over time. A second class had low initial engagement but users maintained their level of engagement (13.0%; *low engagers-maintain*). The other two classes had higher initial engagement, with one having a large drop in engagement (12.2%; *high engagers-decline*), while the other sustained their engagement (13.2%; *high engagers-maintain*). Gender was similarly distributed between all 4 classes. The *high engagers-maintain* group had fewer daily smokers (88.4%) and had a higher mean age (37.3 years) than the other classes. At 6-weeks, there were significant differences in abstinence rates between all pairs of classes (p -values < 0.001), except between the *low engagers-decline* and the *high engagers-decline* classes. The *high engagers-maintain* class had the highest abstinence rate (44.9%), and the *low engagers-maintain* class had a 9.0% abstinence rate. Almost all users in the remaining classes reported smoking. **CONCLUSION:** Classes of users differed in two main ways: initial and sustained engagement measured as weekly texts sent to the program. Notably, those with sustained engagement had the highest abstinence rates, but rates differed by initial engagement, which suggests potential differences between high and low initial engagers. Encouraging consistent levels of engagement can potentially benefit users.

FUNDING: National Cancer Institute

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POS3-54

IDENTIFYING STUDENTS SUSCEPTIBLE TO USING TOBACCO PRODUCTS AND E-CIGARETTES: AN EVALUATION OF CURRENT MEASURES

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INTRODUCTION: Simple metrics have been developed to measure youth susceptibility to tobacco use; however, the predictive validity of this measure has not been tested within the Canadian context or since it was initially developed almost 20 years ago. Furthermore, it is unknown how well this measure can be used to predict the onset of other tobacco products and e-cigarettes. **METHODS:** A cohort of 9th grade never-smokers was identified in the 2013-14 year of the COMPASS study, a longitudinal study of youth health behaviours in Canada. Changes to self-reported smoking status were identified one year later in 2014-15 and again in

2015-16 according to baseline self-reported susceptibility to future smoking. The positive predictive value, sensitivity, and specificity of the susceptibility measure was calculated for each tobacco product and e-cigarettes. **RESULTS:** Using the susceptibility measure, 29.5% of never-smokers at baseline were susceptible to future smoking. At follow-up, 17.8% of never-smokers tried a cigarette, 7.3% used cigarillos or little cigars, 4.8% used cigars, 10.7% used e-cigarettes, 3.4% used smokeless tobacco (SLT), and 4.6% used a hookah in the last 30 days. The positive predictive value of the measure ranged from 5.6% (SLT) to 33.7% (cigarettes), the sensitivity ranged from 48.1% (cigarillos or little cigars) to 55.7% (cigarettes), and the specificity ranged from 71.0% (SLT) to 76.0% (cigarettes). **DISCUSSION:** Almost one third of never-smoking students were susceptible to future smoking and one quarter reported using a tobacco product or e-cigarettes 2 years later. The ability of the susceptibility measure to identify future tobacco and e-cigarette users was variable across products and relatively low for most products; in contrast, the sensitivity and specificity of the measure was quite consistent across products and relatively high. Due to the low predictive ability of current susceptibility measures for other tobacco products and e-cigarettes, additional measures of susceptibility specific to each product should be explored and assessed.

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POS3-55

FACTORS ASSOCIATED WITH INTENTION TO INITIATE E-CIGARETTE USE AND ACTUAL E-CIGARETTE USE INITIATION BY CURRENT SMOKERS, FORMER SMOKERS AND NON-SMOKERS OVER SIX MONTHS

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To evaluate the population health impact of electronic-cigarettes (EC), the likelihood of uptake by current smokers (CS), former smokers (FS) and non-smokers (NS) must be assessed. A survey instrument was developed for the purpose of predicting intentions to initiate EC use and initiation behaviour amongst adults. To assess the validity of the survey instrument, a longitudinal study measuring use of tobacco and nicotine products was conducted with follow-ups at 3 and 6 months. Analyses aimed to identify associations between use of these products and a range of demographic, cognitive, and perceptual variables over time. Of the baseline sample [CS n = 306; FS n = 77; NS n = 148], 184 (35%) participants tried an EC (ie. even one puff) between baseline and 3 months [CS n = 131 (43%); FS n = 26 (34%); NS n = 27 (18%)] and 158 (30%) participants tried an EC between 3 and 6 month follow-up [CS n = 115 (38%); FS n = 15 (19%); NS n = 28 (19%)]. While similar proportions of both current and former smokers reported continuing EC use at 3 [CS n = 87 (28%); FS n = 16 (21%)] and 6 months follow-up [CS n = 77 (25%); FS n = 11 (14%)], EC use by non-smokers was rare at the point of 3 month [n = 5 (3%)] and 6 month [n = 5 (3%)] surveys. Results of logistic regression analyses suggested that current smokers' odds of intending to use an EC and odds of subsequent actual EC use at 6 months were significantly associated with having made a quit attempt in the past year and with having a perception of second-hand vapour as less harmful than cigarette smoke. Current smokers' odds of intending to use an EC and odds of subsequent actual EC use at both 3 months and 6 months were significantly associated with expectations that EC use would be enjoyable and with views of e-liquid flavours as attractive. One quarter of current smokers initiated and maintained EC use within the 6 month assessment period. Initiation of EC use by non-smokers during the same period was extremely rare. Current smokers' initiation of EC use was statistically predicted by a number of demographic, cognitive, and perceptual variables and future follow-up surveys will determine how robust these effects remain over time.

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POS3-56

THE ASSOCIATION BETWEEN THE PERCEPTION OF HEALTH RISKS AND ADDICTIVENESS ON THE AGE OF INITIATION OF FIRST TIME HOOKAH USERS: THE MARKETING AND PROMOTIONS ACROSS COLLEGES IN TEXAS (M-PACT) STUDY

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SIGNIFICANCE: Hookah use is increasingly popular among young adults. Hookah possesses the same potential for negative health consequences as cigarettes. This study explored the association of perceptions of health risks and addictiveness, with the age of initiation of hookah use among young adults. **METHODS:** The Marketing and Promotions Across Colleges in Texas (M-PACT) study surveyed 18-29-year-old young adults attending colleges in Texas (n=5,482). Wave 1 data collection occurred between November 2014-February 2015 and 3 subsequent waves of data were collected in six month-intervals. The primary outcome was age of initiation of hookah use among 18-25-year-old students who were never-hookah users at wave 1 (n=2,394). Exposure variables at wave 1 were (a) perceptions of harm to health of hookah and (b) perceptions of addictiveness to hookah. Adjusted factors included socio-demographic variables, binge drinking, susceptibility to hookah use, sensation seeking and impulsivity scores. Non-parametric survival estimates for interval censoring were obtained. The interaction between perceptions of harm and addictiveness was explored. **RESULTS:** Participants for this study were 35% male, 33% white, 29% Hispanic, 22% Asian 9% African-American, the median age was 19.8 years old. After a median time of 1 year and 4 months of follow up, 29% of the wave 1 never-users, self-reported ever use of hookah with nicotine. The interaction between perceptions of harm and addictiveness was significant (p-value=0.03). Among college students who perceive hookah as not harmful and as not addictive, the risk to initiate hookah was 33% higher than the risk of a college student who perceives hookah as harmful and additive (Adjusted Hazard Ratio [AHR]=1.33, 95% CI: 1.04-1.70). Similarly, the risk to initiate hookah for a college student who perceives hookah as not harmful but perceives it to be addictive is 13% higher than the risk of a college student who perceives hookah as both harmful and additive (AHR=1.13, 95% CI: 1.01-1.26). **CONCLUSIONS:** There is the need to improve communication on the health risk and addictiveness of hookah with nicotine among college students to reduce initiation.

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POS3-57

MISLEADING CIGARETTE PACKAGING IN 14 COUNTRIES

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Article 11 of the WHO Framework Convention on Tobacco Control (FCTC) calls for the elimination of misleading or deceptive packaging and labeling. Tobacco companies use misleading descriptors and imagery denoting strength on cigarette packs to convey less harm. This study assesses compliance with bans on misleading descriptors and describes the presence of misleading packaging in 14 countries. Cigarette packs were purchased in 2013 in Bangladesh, Brazil, China, Egypt, India, Indonesia, Mexico, Pakistan, the Philippines, the Russian Federation, Thailand, Turkey, Ukraine and Vietnam using a systematic protocol. Cigarette packs displaying health warning labels from the country of purchase (n=1,339) were coded for compliance with bans on misleading descriptors and all packs (n=3,237) were coded for select misleading descriptors and other forms of misleading packaging using a double data-entry module and rigorous review process. Descriptive analysis was conducted using Stata 14.0. Of the nine countries that ban misleading descriptors, seven countries (Egypt, India, Mexico, Russian Federation, Thailand, and Ukraine) had 100% compliance - no descriptors explicitly prohibited were found on packs. In Brazil, 13% (n=15) of packs referenced "class(es)" of cigarettes. In China, 3% of packs displayed the prohibited descriptors "mild" (n=8) and "light" (n=1). Some form of misleading packaging was found in all 14 countries. Around one-third of packs in the Philippines, Indonesia, and Pakistan displayed misleading descriptors such as "light", "low", or "smooth"

(38%, 36%, and 29% respectively). Misleading imagery (e.g. dots conveying cigarette strength) was most often observed in Ukraine (9%), the Russian Federation (7%), and Thailand (7%). Display of figures potentially denoting emission yields was found on packs from 11 countries, only excluding Brazil, Egypt and Mexico. Banned misleading descriptors were found on packs in two countries. We also identified the presence of misleading product packaging that is not explicitly banned. These findings can inform advocacy efforts for packaging requirements that are compliant with the FCTC and improved implementation of current laws.

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POS3-58

EVALUATING THE INFLUENCE OF SECONDHAND SMOKE ADVERTISEMENTS ON ATTITUDES, BELIEFS, AND BEHAVIORS OF U.S. ADULTS WHO LIVE WITH CHILDREN

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SIGNIFICANCE: The health risks of secondhand smoke (SHS) are well documented and have motivated adoption of comprehensive smoke-free air laws. The most common remaining source of SHS exposure, especially among children, is the home and car, which is under the parent's control. This study aims to evaluate the effectiveness of anti-tobacco ads on households where one or both parents smoke to motivate adoption of smoke-free home and car policies. **METHODS:** A web-based survey was conducted with 1003 adults (18+) in the US recruited from an online panel in spring 2016. Participants either smoked 1 cigarette (even a puff) in the past 7 days or live with a smoker and a child under 18 (full or part time). Respondents answered questions assessing tobacco beliefs, use, and home and car SHS policies. Each participant viewed and rated 5 TV ads about SHS with main themes of health risks, social norms, testimonials, or negative visceral images. Respondents were followed-up after 1 week to assess changes in beliefs, use, and SHS policies. **RESULTS:** 93% of respondents were between 25-54 years and 40% female; 84% reported smoking daily smoking and all currently lived with a child. More than half reported allowing smoking in their home or car. Nearly 80% report SHS exposure in a typical week, with 62% at home and 56% at work. When asked about perceptions of smoking, 45% felt adults should not smoke, while 71% felt adults should not smoke around children. Ad ratings did not differ significantly by theme. Three-fourths felt the videos made them stop and think, had a message that was personally important, and made them think about not smoking in their home or car. Over half reported that the videos made them feel uncomfortable and about 75% reported they made the respondent want to stop smoking. After one week, 65% reported changing their home or car smoking policy, while 68% reported a quit attempt. **CONCLUSIONS:** These findings show that while many Americans are protected from SHS exposure, significant exposure still exists in private domains, particularly to children who live with smokers. Mass media messages can impact attitudes and potentially influence policies set by smokers in their home and cars.

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POS3-59

POLYTOBACCO USE AMONG METROPOLITAN AND NON-METROPOLITAN ADOLESCENTS: A LATENT CLASS ANALYSIS

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SIGNIFICANCE: In recent years, the number of tobacco products on the market has increased, as well as the number of youth reporting the use of more than one tobacco product (i.e., polytobacco use). Few studies, however, have examined polytobacco use among adolescents. **METHODS:** Data from the 2014 Florida Youth Tobacco Survey were analyzed to assess patterns of tobacco product use by urbanicity. Participants who were in high school (grades 9-12) and aged 14-17



were included in the analysis ($n=28,045$). RESULTS: Overall, 12% of participants reported polytobacco use in the past 30 days ($n=3,466$). Polytobacco use was more commonly reported among youth living in non-metropolitan than metropolitan areas (14% versus 10%; $p<0.01$). Latent class analysis was used to examine polytobacco use separately among metropolitan and non-metropolitan youth. Past 30 day use of seven tobacco products were examined: (1) cigarettes, (2) chewing tobacco, snuff, or dip, (3) cigars, cigarillos, or little cigars, (4) bidis, kreteks, or tobacco in a pipe, (5) hookah, (6) snus, and (7) e-cigarettes. A five factor solution was identified as the best solution for both groups, but class structure and distribution across five classes differed by urbanicity. For metropolitan youth, the main products that defined each class were (1) cigarettes and cigars (34%), (2) e-cigarettes (25%), (3) smokeless and snus (19%), (4) all products (13%), and (5) cigarettes and e-cigarettes (8%). In contrast, the main products defining the five classes for non-metropolitan youth were (1) smokeless and snus (33%), (2) hookah and e-cigarettes (24%), (3) cigarettes and e-cigarettes (17%), (4) all products (15%), and (5) cigarettes and cigars (11%). CONCLUSIONS: Polytobacco use is more prevalent among non-metropolitan youth than metropolitan youth, and product use patterns vary among these two groups. Understanding how tobacco products are used together will be critical for the development of interventions designed to reduce polytobacco use. The present findings suggest that interventions to address polytobacco use among youth may need to be tailored to the different polytobacco use patterns by urbanicity.

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POS3-60

COVARIANCE BETWEEN REAL-TIME EXPOSURES TO TOBACCO RETAIL OUTLETS AND FINE PARTICULAR MATTER ($PM_{2.5}$) IN NEW YORK CITY

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BACKGROUND: Retail tobacco outlet density is known to affect tobacco use behaviors, but the degree that real-time exposure to tobacco products covaries with other spatially distributed toxins is unclear. As people continually interact with and are affected by the social, natural, and built environment, it is important to consider the spatio-temporal dynamics of tobacco exposures within a broader socio-ecologic context. This analysis contrasted real-time geospatial exposures to both retail tobacco products and fine particulate matter ($PM_{2.5}$) across New York City (NYC). METHODS: A NYC retail tobacco density surface was generated using kernel density estimation, which was then linked to participants' ($N=118$) real-time locations ($N=49,183$), recorded every 10 minutes for 30 days. The individual mobility data was also overlaid with an hourly $PM_{2.5}$ density surface produced by machine-learning algorithms using US Environmental Protection Agency's AirNow data. Exponential log-linear modeling was employed to investigate associations between exposure, time of day, weekend, season, and different boroughs across New York City. Mixed-effect cumulative logit models were then used to account for within-subject autoregressive clustering. RESULTS: Both tobacco retail and $PM_{2.5}$ exposures displayed significant spatio-temporal variations. Lower and higher levels of tobacco retail exposure were disproportionately associated with residence in Queens and Brooklyn, respectively. However, $PM_{2.5}$ exposures were found to exhibit smaller spatial variation between boroughs, and thus not predictive of borough residence. $PM_{2.5}$ exposure had stronger interactions with weekend and time of day ($OR=1.02$, 95% CI: 1.02, 1.02), compared to tobacco retail exposure ($OR=1.03$, 95% CI: 1.13, 1.13), although both associations were significant. CONCLUSION: This analysis elucidates the way exposures to natural and built environmental toxins are associated with spatio-temporal aspects of mobility in urban environments like New York City. Contrasting tobacco retail and $PM_{2.5}$ exposure across NYC boroughs suggests residential and real-time mobility are both crucial to properly characterize real-time exposure data.

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POS3-61

ASSESSING DIFFERENCES IN CHARACTERISTICS, BEHAVIORS, AND PERCEPTIONS BETWEEN DUAL, CIGARETTE-ONLY AND CIGAR-ONLY SMOKERS IN THE 2015 U.S. HINTS-FDA DATASET

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SIGNIFICANCE: Prior research has documented the prevalence and health risks of U.S. adult (18 years and older) concurrent cigarette and cigar smoking. Dual smokers are more likely to experience dependence and less likely to intend to quit than cigarette-only smokers. More work, however, is needed to understand the ways dual smokers differ from smokers of single products. Understanding the distinct characteristics of dual smokers is an important step in promoting cessation to this high-risk group. This study explores the characteristics, behaviors, and perceptions of dual-smoking adults in a national dataset. METHODS: We analyzed the 2015 U.S. Health Information National Trends Survey (Federal Drug Administration cycle, HINTS-FDA). All analyses were conducted in Stata using `svyset` and `svy` commands to account for the two-stage, stratified design. RESULTS: Of the 3,738 respondents, 104 (2.78%) reported dual smoking, 463 (12.39%) reported cigarette-only smoking, and 105 (2.81%) reported cigar-only smoking. Respondents who self-identified as Hispanic or Non-Hispanic Black were more likely to report dual-use ($p=0.0046$). Dual smokers were more likely to report lower income, lower education, and unemployment ($p=0.0000$) and were more likely to live with a smoker ($p=0.0000$) and had more friends who smoke ($p=0.0043$). Importantly, dual users were less likely to believe people could change their smoking behavior ($p=0.0035$). There were no differences among groups of smokers with regards to addictive perceptions or harm perceptions of cigarettes, however dual smokers were more likely to perceive cigars as very addictive ($p=0.0000$) and very harmful ($p=0.0000$). Additionally, multinomial logistic regression was computed with covariates and predicted participant smoking behavior. CONCLUSIONS: Dual smokers are a unique subgroup of tobacco users and thus have different perceptions in the risk and addictiveness of smoking than their cigarette-only and cigar-only adult counterparts. These unique characteristics of dual smokers can be insightful in the development of education materials and cessation services that are specific to the unique needs of this often-misunderstood group.

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POS3-62

FLAVORED E-CIGARETTE USE AMONG ADULTS: RESULTS FROM TWO NATIONAL DATA SETS

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Flavored e-cigarettes have generated controversy and interest. To examine flavored e-cigarette use among US adults, two national surveys were analyzed: the PATH study, a representative sample of 32,320 adults (1,575 current established e-cigarette users) surveyed in-person September 2013 to December 2014; and, the National Tobacco Behavior Monitor (NTBM), an online panel sample of 46,637 adults (4,845 past-30-day e-cigarette users) surveyed online January 2014 to June 2015. The two surveys defined current e-cigarette use differently, yet provided similar findings. Across surveys, two-thirds of e-cigarette users reported using flavored varieties (PATH: 67%/NTBM: 67%). Flavored e-cigarette use was lowest among non-Hispanic Caucasians (63%/62%). In NTBM, African Americans reported the highest rate of flavor use (86%), due to a high percentage (86%) using menthol e-cigarettes; 78% of African Americans in PATH reported using flavored varieties, but the survey did not identify the flavor used. Flavor use declined steadily with age in both surveys, from 83%/85% for 18-24-year-olds to 50%/41% after age 65. The relationship between use of flavors and e-cigarette use frequency was modest (varying from 66% to 73% across a range of frequencies of use in PATH and from 60% to 76% in NTBM), and less consistent between surveys. E-cigarette users who had quit smoking were more likely to use flavors (70%/74%) than were current smokers (66%/66%); among current smokers, those who smoked less frequently were more likely to use flavors (80%/82% of less-than-weekly smokers, 63%/58% of daily smokers). These patterns suggest that adoption of flavors in

e-cigarettes increases with decreasing smoking (including cessation), consistent with prior reports that shifts toward flavored e-cigarettes are often part of a transition from smoking to e-cigarette use. Flavored e-cigarette use is complex and worthy of further systematic quantitative research. The relatively close agreement between the two surveys – despite differences in definitions of use, sampling, and data collection methods – suggests these findings are robust, and that similar estimates can be obtained via different methods.

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POS3-63

IMPACT OF SOCIAL SMOKING IDENTITY ON CIGARETTE SMOKING TRAJECTORIES IN TWO COHORTS OF U.S. YOUNG ADULTS

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The highly prevalent pattern of social smoking in young adulthood could lead to the maintenance or escalation of cigarette use in adulthood. The goal of the current study was to describe longitudinal patterns in cigarette smoking behavior, the influence of social smoking on those patterns, and correlates of those patterns in two large contemporary cohorts of U.S. young adults (aged 18-24). Data were included from ever smokers in an urban, community-based sample in Chicago, IL (Social Emotional Contexts of Adolescent and Young Adult Smoking Patterns, SECAP; n=893) and a large, national sample of young adults (Truth Initiative Young Adult Cohort Study, YA Cohort; n=1,524). Smoking rate was derived from the number of days reported smoking a cigarette in the past month multiplied by the average number of cigarettes smoked per day, divided by 30 days. Latent class growth analyses and growth mixture models used smoking rate as the outcome and baseline social smoking (yes/no) as the only predictor in each model to identify the optimal number of trajectories in each sample. Five distinct smoking trajectory classes emerged in each sample: a non-smoking class (n=1,247 (82%) YA; n=697 (78%) SECAP); a moderate/stable smoking class (n=56 (4%) YA; n=95 (11%) SECAP); a high/stable smoking class (n=142 (9%) YA; n=39 (4%) SECAP); a declining smoking class (n=48 (3%) YA; n=30 (3%) SECAP); and an escalating smoking class (n=31 (2%) YA; n=32 (4%) SECAP). In the YA Cohort, the moderate/stable smoking class yielded the largest proportion of participants identifying as social smokers (16%), whereas the non-smoking class in SECAP reported the largest proportion of social smokers (36%). In both samples, the next largest proportion of social smokers were found in the escalating smoking class. Living with a smoker, having a greater number of friends who smoke, and having a partner who smokes were also associated with smoking trajectory class. Identifying developmental smoking patterns, including potential modifiable leverage points such as social influence factors, will inform targeted interventions for young adults to reduce tobacco use.

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POS3-64

ATTITUDES TO ELECTRONIC CIGARETTES: A QUALITATIVE STUDY OF WOMEN WHO ARE PREGNANT OR HAVE RECENTLY GIVEN BIRTH

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BACKGROUND: Electronic cigarettes (ECs) are increasingly being used by smokers to help reduce or quit smoking, with some studies showing positive outcomes. However, very little is known about EC use in pregnancy. A useful starting point is to seek the views of pregnant or recently pregnant women towards ECs. A greater understanding of this will help to inform future interventions. MAIN OBJECTIVES: To explore attitudes to ECs among women who are pregnant or have recently given birth. METHODS: Semi-structured telephone interviews were conducted with pregnant or recently pregnant women who self-reported as current smokers or recent ex-smokers. Participants were purposely sampled to ensure the interviews captured a broad range of experiences with ECs. Women were recruited from stop smoking services, antenatal and health visitor clinics, and a pregnancy website. Data were transcribed verbatim and framework analysis was used to analyse data. RESULTS: 30 UK women were interviewed (15 pregnant, 15 postpartum), including 9 current EC users, 8 former users, and 13 never users. The main themes that emerged were: (i) Safety of ECs compared with cigarettes: most women perceived ECs to be a safer and healthier substitute for cigarettes; (ii) Uncertainty of EC ingredients: women felt uncertain of the substances in ECs, compared to current users, women who had not used an EC before were more likely to be sceptical about their safety during pregnancy; (iii) Nicotine dependence: concerns were expressed about the potential for ECs to increase nicotine dependency by excessive use; (iv) Attitudes to ECs compared with nicotine replacement therapy (NRT): some women felt NRT was safer during pregnancy as, unlike ECs, it is usually recommended by health professionals. They also felt that there was some stigma associated with using ECs compared with using NRT. CONCLUSION: Participants felt ECs are likely to be a healthier alternative to cigarettes during pregnancy. However, some had concerns about the content of ECs, dependence on ECs and their safety relative to NRT. Findings highlight the need for health professionals to provide information to pregnant women to allow them to make an informed choice about whether to use ECs.

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POS3-65

THE CHANGE OF WEIGHT CONCERNS ACCORDING TO SMOKING QUIT ATTEMPTS DURING SEVEN YEARS FOLLOW-UP

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SIGNIFICANCE: Weight concerns (WeCo) are one of the barriers to smoking cessation. Less is known about how changes in WeCo relate to quit attempts. We examined the change of WeCo from the baseline 2007 to the follow-up 2014 in smokers who had tried to quit smoking at least once and those who had not tried at all in the Finnish population-based study. METHODS: Total of 392 (204 men, 188 women) daily smokers aged 25-73 years from the DILGOM 2007 study were followed up in 2014. They were dichotomized according to if they had made at least one cessation attempt (abstinent at least for 24 hours) or no attempts. The WeCo were measured with a 6-item self-reported scale, sum score ranging 0-24. The change in WeCo was quantified by the difference between the 2014 and 2007 sum scores. Regression analyses were used to examine the role of cessation attempts in WeCo change, adjusted for several confounders. Smokers with no cessation attempts were the reference group. RESULTS: Overall, 57% of men (n=117) and 62% of women (n=116) had made at least one cessation attempt. When adjusted for age, sex, baseline WeCo and BMI, there was a significant difference between the groups in the change of WeCo ($\beta=1.32$, 95%CI 0.29, 2.4, $p=0.012$). WeCo remained the same for those who had made quit attempts but decreased for those who had not (means 0.01 (SD=0.33) and -1.21 (SD=0.40), respectively).



CONCLUSION: Smokers who had not made any cessation attempts during seven year period reported decreased levels in WeCo while the level of WeCo remained constant for those with at least one cessation attempt. As WeCo were measured only at baseline and at follow-up, we cannot make any conclusion about causal association between cessation attempts and WeCo. In order to define the exact association between cessation attempts and WeCo these two should be assessed at several follow-up time points. Weight concerns remain an important aspect of smoking behavior and cessation.

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POS3-66

ASSOCIATION BETWEEN LONG-TERM SMOKING AND LEISURE-TIME PHYSICAL INACTIVITY - A COHORT STUDY AMONG FINNISH TWINS WITH A 35-YEAR FOLLOW-UP

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SIGNIFICANCE: Both smoking and physical inactivity are global health problems. However, the long-term effects of smoking on leisure-time physical inactivity are yet unknown, and more knowledge should be gained on the effects of familial confounding (genes and a shared environment in childhood) for the associations. The aims of this study were to investigate longitudinal associations of smoking and a change in smoking status with leisure-time physical inactivity. The specific aim was to evaluate the influence of familial confounding on the associations of smoking status with leisure-time physical activity using a co-twin control design. **METHODS:** Comprehensive questionnaire data was available of the population-based Finnish Adult Twin Cohort of 5254 twin individuals born in 1945-1957 (41% men) who participated in all four surveys (1975, 1981, 1990 and 2011) over a 35-year follow-up. Logistic and conditional logistic regression models with multiple covariates were used to calculate Odds Ratios (OR) with 95% Confidence Intervals (CI). **RESULTS:** Compared to never-smokers, long-term daily smokers (1975-1990) had the highest probability for both long-term inactivity (OR 1.91; 95% CI, 1.45, 2.51) and a change to inactivity (OR 2.07; 95% CI, 1.93, 3.81) by 2011. Recurrent smoking (by 1990) was associated with long-term inactivity (OR 1.48; 95% CI, 1.01, 2.16). Instead, in comparison to persistent daily smokers, quitting smoking decreased the likelihood of becoming inactive. The associations remained in the analyses after accounting for multiple covariates and familial confounding. **CONCLUSIONS:** Daily smoking increases the likelihood of remaining or becoming physically inactive over the decades. Our results suggest a possible causal basis for the co-existence of smoking and inactivity and emphasize the importance to prevent smoking initiation but also to support early smoking cessation in promotion of lifelong physical activity.

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POS3-67

MEASURING DEPENDENCE AMONG SOUTH ASIAN SMOKELESS TOBACCO USERS

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BACKGROUND: Smokeless tobacco (ST) use is most prevalent in South and South-East Asia where more than 90% of world's ST users live. Despite high prevalence of ST use, ST dependence in this population has not been studied. Therefore it is of interest to explore if ST dependence measures developed and validated in the western countries are of similar relevance to ST users who are

culturally different and use distinct ST products. Aim of this study is to assess dependence among ST users in Bangladesh by employing three different approaches to measure tobacco dependence: Tobacco Dependence Screener (TDS), a measure based on clinical definition of dependence; Fagerström Test for Nicotine Dependence for ST users (FTND-ST); and Oklahoma Scale for Smokeless Tobacco Dependence (OSSTD), a multidimensional measure of ST dependence. **METHODS:** Data collected from a community based sample of exclusive ST users living in Dhaka, Bangladesh (n = 200) were used for this study. Three ST dependence measures were translated in Bangla and administered to the study participants. Saliva samples were collected for cotinine measurement. Reliability of dependence measures was evaluated by Cronbach's coefficient α and item-total correlation. Concurrent validity was examined with correlation and regression analysis. **RESULTS:** Mean (SD) cotinine concentration of the sample was 462.7 (270.9) and 40% of the study participants had TDS based dependence diagnosis. Women had higher mean OSSTD and TDS scores as compared to men (p < 0.001). OSSTD demonstrated better reliability ($\alpha = 0.93$) than FTND-ST and TDS ($\alpha = 0.35$ and 0.84, respectively). Concurrent validity of OSSTD as evaluated by FTND-ST and TDS was affirmative. There was significant association between FTND-ST and cotinine concentration. **CONCLUSION:** Despite differences in ST products used in Bangladesh, FTND-ST and OSSTD are valid and reliable tools to measure dependence in this population. Significant association of FTND-ST with cotinine concentration endorses that it measures physical dependence. OSSTD, a comprehensive measure of dependence, assessing various dependence dimensions, demonstrated better reliability and concurrent validity.

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POS3-68

IS E-CIGARETTE USE ASSOCIATED WITH SMOKING INITIATION AMONG YOUTH? FINDINGS FROM A LONGITUDINAL COHORT STUDY OF CANADIAN YOUTH

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SIGNIFICANCE: The influence of e-cigarette use on smoking initiation is a highly controversial issue, with limited longitudinal data to examine temporal associations. The current study examined e-cigarette use among a large cohort of Canadian secondary school students, including whether e-cigarette use was associated with cigarette smoking initiation at one-year follow-up. **METHODS:** Respondents were grade 9-12 students who participated in two waves of COMPASS, a cohort study of purposefully-sampled secondary schools in Ontario and Alberta, Canada, at baseline (2013/14: n=44,163) and follow-up (2014/15: n=41,262). Cigarette smoking and e-cigarette use were assessed at baseline and follow-up using self-completed surveys. Correlates of e-cigarette use at baseline and follow-up were assessed using generalized estimating equations modeling. Smoking initiation between waves was examined within the longitudinal sample (n=19,130) using a generalized linear mixed effects model that included baseline e-cigarette use and correlates. **RESULTS:** Past-month e-cigarette use significantly increased from 7.2% in 2013/14 to 9.7% in 2014/15 (p<0.0001), while past-month cigarette smoking did not change significantly across years. Across survey waves, e-cigarette use was strongly associated with smoking status, as well as smoking susceptibility. In the longitudinal sample, use of e-cigarettes at baseline was associated with greater odds of cigarette smoking initiation at one-year follow-up (OR=2.12; 99% CI: 1.56 to 2.86), controlling for other covariates. **CONCLUSIONS:** E-cigarette use was strongly associated with cigarette smoking behaviour, including smoking initiation at follow-up. The findings are consistent with a causal relationship between e-cigarettes and cigarette smoking; however, common factors underlying the use of both products may also account for the temporal order of initiation.

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POS3-69

PATTERNS OF E-CIGARETTE USE AND HARM PERCEPTION AMONG YOUTH AND YOUNG ADULTS

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SIGNIFICANCE: E-Cigarette use (vaping) is rising among youth and young adults, with 16% of all high school students having vaped in the past 30 days. Given the current lack of scientific conclusions about overall harm, it is important to know how these devices are being used both alone and with cigarettes (dual use) as well as the relative harm perceptions of cigarettes compared to e-cigarettes. **METHODS:** Patterns of vaping, cigarette, and combined cigarette-vaping use among non-users at baseline were examined across four waves of a probability-based, online longitudinal cohort of youth aged 15 to 21 ($n = 13,158$). A multilevel ordinal logistic regression determined if harm perceptions of vaping moderated the relationship between time and vaping use. **RESULTS:** Among the 11,237 non-users at baseline, continued non-use of vaping or cigarettes across the subsequent three waves was the most predominate pattern (85%), followed by "vaping only" (7%), "cigarettes only" (4%), and "dual use only" (2%). Other patterns occurred, but all were less than 1% of the sample (e.g., vaping only to dual use, dual use to cigarette only, vaping only to cigarette only, etc.). Harm perceptions of vaping were a significant moderator in the relationship between time and vaping use. Those who rated vaping as less harmful than cigarettes had lower probabilities, over time, of being in the "never vaping use" group, and higher probabilities of being in the "ever" and "current" vaping use groups, as compared to those who perceived vaping as more harmful than cigarettes. Those who rated vaping as more harmful/about the same harmfulness as cigarettes had higher probabilities, over time, of being in the "never vaping use" group, and lower probabilities of being in the "ever" and "current" vaping use groups. **CONCLUSIONS:** Given the potential dangers of vaping for youth and young adults, it is important to understand patterns of use and harm perceptions. This is a complicated issue because while youth should not be vaping due to the possible risks, it may still be a less harmful alternative to cigarettes. Clear public education on the relative harm of e-cigarettes is needed for a youth audience.

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PATTERNS OF DUAL- AND POLYUSE OF CIGARETTES, E-CIGARETTES AND SNUS AMONG NORWEGIAN ADOLESCENTS.

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SIGNIFICANCE: Recent international studies have indicated that diverse patterns of adolescents' use- and polyuse of tobacco products among adolescents are emerging. In Norway, the prevalence of cigarette use among adolescents is declining, and snus use is stabilizing, while e-cigarettes are becoming more popular. The objectives are to 1) describe user patterns of exclusive versus dual and polyuse of three tobacco products (cigarettes, e-cigarettes and snus), and to 2) examine whether established risk factors for tobacco use discriminates these user categories. **METHODS:** Data from a cross sectional study with 874 respondents (53.7 % males, 13-17 years old) from Eastern Norway applying electronic questionnaire in a school based survey October 2014 was used. The survey assessed tobacco use, and psychosocial risk and protective factors based on the domains in Bronfenbrenner's bioecological model: individual level characteristics (e.g. depression, impulsivity, sensation seeking), social influence factors (e.g. tobacco exposure from parents- and peers) and environmental factors (e.g. academic competence, involvement in organized sports). Descriptive statistics, Chi square test and one-way ANOVA were used. **RESULTS:** Overall 24.5 % (214/874) reported current tobacco use (>1 the last 12 months) or regular use (>monthly the last 12 months). Out of the tobacco users, 28.9 % reported dual use and 22.9 % subjects reported poly-use. Among exclusive tobacco users, 20.5 % used snus, 18.2% used e-cigarettes and 8.9% smoked cigarettes. The most common combination of dual use were cigarettes and snus (17.2 %). Dual- and poly-users were more exposed to

risk factors (lower academic achievement and binge drinking, exposed to close friends' tobacco use) compared to the exclusive users and non-users ($p < 0.01$). There were also differences in mean score between the user categories in impulsivity, sensation seeking and depression ($p < 0.01$). In general, poly-users had the highest mean scores. **CONCLUSIONS:** Dual and poly-use of tobacco products were common among adolescents, and data may suggest that this should inform tobacco related preventive efforts.

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POS3-71

ASSOCIATION BETWEEN E-CIGARETTE USE, DISCRIMINATION, AND LGBT COMMUNITY AFFILIATION IN A SOUTHEASTERN UNITED STATES LGBT POPULATION

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BACKGROUND: The LGBT population experiences high rates of discrimination and resultant minority stress. As such, LGBT individuals may have an increased likelihood of engagement in maladaptive stress coping strategies like tobacco use. Higher rates of LGBT electronic cigarette (e-cig) use have been found compared to cisgender, heterosexual counterparts. The purpose of this study was to investigate associations between LGBT community affiliation, stress, discrimination, and e-cig use. **METHOD:** Participants ($n=436$) were identified from a larger health needs survey that collected data from February to June 2016. Individuals were asked about their e-cig use, perceptions of e-cig risks, LGBT community affiliation, and whether they have experienced sexual orientation/gender identity discrimination or victimization. **RESULTS:** E-cig use was correlated with perceived LGBT-based discrimination for housing ($r = 0.11$, $p < 0.05$), education ($r = 0.11$, $p < 0.05$) and job hiring ($r = 0.11$, $p < 0.05$), as well as gender identity-based discrimination for education ($r = 0.13$, $p < 0.05$) and job hiring ($r = 0.12$, $p < 0.05$). E-cig use was correlated with physical assault due to sexual orientation ($r = 0.14$, $p < 0.05$) and gender identity ($r = 0.11$, $p < 0.05$). Respondents who used e-cigs more frequently tended to use them for stress reduction ($r = -0.34$, $p < 0.05$). Also, respondents with higher levels of LGBT community affiliation reported lower perception of e-cig harm ($r = -0.159$, $p < 0.05$) and greater intention to continue use ($r = -0.29$, $p < 0.05$). **CONCLUSIONS:** Individuals reporting discrimination and assault had higher rates of e-cig use than those not reporting such experiences. Minority stress may partially be responsible LGBT e-cig risk, especially given our study found increased frequency of e-cig use related to stress reduction attempts. Although LGBT community affiliation is often seen as health protective, our study found higher affiliation was related to lower perceived e-cig harm and intent to continue use. If e-cigs are more acceptable within the LGBT community, it may partially explain this relationship. Additional research is needed to model the specific relationships between these variables.

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POS3-72

SYMPTOMS OF NICOTINE DEPENDENCE AMONG YOUTH AND YOUNG ADULT E-CIGARETTE, CIGARETTE, AND DUAL USERS.

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SIGNIFICANCE: Developing brains through young adulthood are uniquely vulnerable to the consequences of nicotine exposure, including addiction to nicotine and other substances, reduced impulse control, and deficits in attention and cognition. Potential for e-cigarette (ENDS) dependence exists as some users have blood nicotine and cotinine levels equivalent to combustible cigarette smokers. We examined dependence symptoms for past 30 day cigarette only, ENDS only, and dual users (cigarettes and ENDS) in youth and young adults in Texas. **METHODS:** Cross-sectional analysis of data from M-PACT, a study of 18-29 year old college students from 24 colleges ($n=5,482$) and TATAMS, a representative study of stu-



dents in the 6th, 8th and 10th grades (n=3,907, N=461,069). Data for both studies was collected in the fall of 2014. For young adults, dependence was assessed by: craving, need to use, and use within 30 minutes of waking. For youth, dependence was assessed by: desire to quit using, trying to quit, and need to use. RESULTS: Among young adults, 9.8% of dual users and 5.5% of ENDS only users report using ENDS within 30 minutes of waking while 13.4% of dual users and 9.0% of cigarette only users report smoking a cigarette within 30 minutes of waking. At least one symptom of ENDS dependence was reported by 37.6% of dual users and 29.2% of ENDS only users. Higher symptom rates were seen for cigarettes: 77.6% of dual users and 69.9% of cigarette only users reported any symptom of cigarette dependence. Among youth, 25.7% of dual users and 17.4% of ENDS only users report needing to use ENDS while 52.0% of dual users and 36.5% of cigarette only users report needing to use cigarettes. At least one symptom of ENDS dependence was reported by 52.9% of dual users and 65.9% of ENDS only users, while 83.6% of dual users and 88.7% of cigarette only users report at least one symptom of cigarette dependence. DISCUSSION: Findings suggest cigarettes and ENDS are associated with symptoms of nicotine dependence. Dual use shows similar levels of dependence symptoms for both products. While ENDS dependence symptoms are fewer than dependence symptoms for cigarette use, the prevalence of dependence symptoms in ENDS-only users is concerning.

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POS3-73

PRODUCT USE PATTERN, NICOTINE AND TOBACCO-SPECIFIC NITROSAMINE EXPOSURE BETWEEN SINGLE PRODUCT, DUAL-, AND POLY-TOBACCO USERS: NHANES 1999-2012.

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SIGNIFICANCE: Previous studies have analyzed nicotine and tobacco-specific nitrosamine (TSNA) concentration across single tobacco products. However, little is known about how nicotine and TSNA exposure vary by exclusive use patterns based on number and categories of products consumed. METHODS: Data were pooled across adult tobacco users (18 years or older) who participated in NHANES 1999-2012. Self-reported past-5-day tobacco use behaviors were used to classify participants in seven tobacco product use patterns (T-PUPS): cigarette-only (CIG), non-cigarette combustible only (NCC), non-combustible only (NC), CIG and NCC dual-use (CIG & NCC), CIG and NC dual-use (CIG & NC), NCC and NC dual-use (NCC & NC), and poly-tobacco use (CIG & NCC & NC). We compared tobacco use behaviors, serum cotinine, and total urinary NNAL across these seven categories, adjusting for demographics. RESULTS: Product consumption somewhat varied across T-PUPS. While cigarette use is common among CIG, CIG & NC, CIG & NCC, and poly-tobacco users, only CIG & NC users significantly smoked fewer number of cigarettes compared to CIG users (p<0.01). Cigar and pipe consumption did not differ between NCC, NCC & NC, and poly-tobacco users (p> 0.05). Cotinine levels varied by T-PUPS (p<0.01), where NCC users had the lowest (adjusted geometric mean=9.67 ng/mL) and CIG & NC users had the highest (adjusted geometric mean=155.9 ng/mL) concentrations. Compared to NCC users, cotinine levels were significantly higher among users of CIG & NCC, NCC & NC, and poly-tobacco (ps<0.001). Total urinary NNAL varied across T-PUPS with CIG & NC users being the highest (adjusted geometric mean=409.39 ng/mL) and NCC users being the lowest (mean=36.71 ng/mL) (p<0.01). Compared to CIG users, NNAL was lower among NCC users (p<0.01) and higher among NC, NCC & CIG, and NC & CIG users (ps<0.001). CONCLUSIONS: Nicotine and TSNA exposure varied by T-PUPS. Dual- and poly-tobacco users do not consume fewer combustible products compared to cigarette only users. This raises concerns about the risk of adverse health outcomes particularly among dual- and poly-tobacco users of not only cigarettes but various other tobacco products.

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POS3-74

AN ITEM ANALYSIS OF THE FAGERSTROM TEST FOR NICOTINE DEPENDENCE IN AN ADOLESCENT SAMPLE

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INTRODUCTION: The Fagerstrom Test for Nicotine Dependence (FTND) has been validated among adults, but there has been limited validation research on the scale among adolescents who have different smoking patterns and rates than adults. In addition, questions about the dimensionality of the FTND remain. We examined the psychometric properties of this scale among adolescents using methods developed for the Patient-Reported Outcomes Measurement Information System (PROMIS). METHODS: The calibration sample for our analyses was drawn from participants in one wave of a longitudinal study of youth smoking and other problem behaviors and included 749 adolescent smokers with a mean age of 15.3 years (SD = 1.0). Participants were administered all six items of the FTND. We used coefficient alpha to examine the internal reliability of the FTND, confirmatory factor analysis (CFA) to examine its dimensionality and the two-parameter logistic (2PL) item response model to assess the quality of items. RESULTS: The standardized coefficient alpha for all items was 0.73, suggesting that the FTND had acceptable reliability. All items had salient factor loadings (> 0.4) in the unidimensional (X²(9) = 35.04, CFI = 0.966, RMSEA = 0.06) and bidimensional (X²(8) = 20.89, CFI = 0.983, RMSEA = 0.05) CFA models. The bifactor model (X²(3) = 6.29, CFI = 0.996, RMSEA = 0.04) suggested that three items had some multidimensionality. However, the bidimensional model would not converge unless the factors were highly correlated suggesting that the FTND did not have true multidimensionality. Under the 2PL model, two items exhibited local dependence and were dropped from the scale. The resulting short scale exhibited excellent psychometric properties. The item on time to first cigarette contributed the greatest amount of information about nicotine dependence. CONCLUSIONS: To a large extent, the FTND is unidimensional. Among adolescents, a short form of the scale with items on frequency of smoking in the past 3 months, time to first cigarette, smoking in forbidden places, and smoking while sick should be administered. If survey length is a concern, then the item on time to first cigarette is appropriate to use on its own.

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POS3-76

THE IMPORTANCE OF TOBACCO AND E-CIGARETTE SALES TO SMALL SHOPS IN THE UK: AN ANALYSIS USING RETAIL SALES DATA

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SIGNIFICANCE: The tobacco industry argues that tobacco sales are important to small retailers' business. We examined 1) tobacco gross margins, sales, and profits in small shops, 2) differences by area deprivation and smoking prevalence, and 3) the role of e-cigarettes. METHODS: Sales data from 1447 shops covering two 2-week periods in 2015 (weeks starting 1 June, 8 June, 14 Sept, 21 Sept) recorded by electronic point of sale systems (EPOS) in small shops in the UK were obtained from an EPOS company. Data were aggregated into weekly tobacco, non-tobacco, and e-cigarette sales values, gross margins, sales quantities, and transactions. RESULTS: For the week starting 21 Sept (N=1416), mean gross margins on tobacco products were 6.6% (SD=2.2) and 24.1% (SD=4.9) on non-tobacco products. Mean total sales values (tobacco+non-tobacco sales) =£14,893.58 (SD=8543.91) while mean tobacco sales=£3,716.17 (SD=2087.16), thus tobacco accounted for 26.0% (SD=0.08) of total sales. Mean total gross profits=£2,894.54 (SD=1788.81) while mean gross profits from tobacco were only £241.80 (SD=165.41), thus tobacco accounted for 9.1% (SD=0.05) of total profits. Area smoking prevalence and deprivation were both positively correlated with tobacco sales values and tobacco gross profits, but negatively correlated with tobacco gross margins (p<0.0001 for all). N=550 shops had at least one e-cigarette transaction, with a mean of 3.2 (SD=5.3) transactions and mean gross margins of 43.4% (SD=10.5). Week 4 (N=1416) was chosen for presentation because it was the most current and had fewer EPOS errors. Findings across the 4 weeks were similar although small differences were found, including tobacco and total sales values (p<0.0001). To-



bacco gross margins did not differ ($p=0.68$). CONCLUSIONS: Despite high sales values, tobacco has low gross margins compared to other products. Tobacco sales values are higher in more deprived/higher smoking prevalence areas. The lower gross margins on tobacco in more deprived/higher smoking prevalence areas suggest that more smokers in these areas smoke cheap discount brands. E-cigarettes have high gross margins but transactions in small shops are low.

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POS3-77

SMOKE-FREE LAWS AND DISPARITIES IN CURRENT SMOKING, INTENSITY, AND CESSATION ACROSS US STATES, 2001-2011

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BACKGROUND: Smoke-free laws are associated with lower overall smoking rates and better health outcomes, but their influence on disparities in smoking has not been established. This study provides a comprehensive evaluation of the relationship between smoke-free laws and disparities in smoking and smoking cessation by race/ethnicity, education, and income. METHODS: We used data on adult self-respondents 25 years and older from the 2001-2002, 2003, 2006-2007, and 2010-2011 waves of the Tobacco Use Supplement to the Current Population Survey (TUS-CPS) (N=818,369). Smoke-free laws data were collected by the Americans for Nonsmokers' Rights. Three state-level smoke-free laws were defined as 100% vs not, separately for: non-hospitality workplaces; restaurants; bars. In regression models that controlled for state and year fixed effects, we examined changes in current smoking, cigarettes per day (cpd), and recent cessation associated with the adoption of one, two, or three state smoke-free laws. We used two-part models for predicting current smoking and cpd, and linear probability models for cessation. Analyses were age-stratified. Regression models controlled for age, gender, and tobacco tax in state. RESULTS: The adoption of all three smoke-free laws was associated with 0.7 percentage point decrease in current smoking in the total population relative to states with no smoke-free laws. In the youngest group, 25 to 39 years, the adoption of the laws was associated with a decrease in current smoking among Whites and a decrease in cpd among those with less than a high school diploma and low household income. In the middle age group, 40 to 54 years, the adoption of all laws was associated with a marginally higher probability of cessation among low income populations. Decrease in current smoking was greater among non-Hispanics than among Whites. In the oldest group, 55 years and over, we uncovered countervailing patterns by educational attainment. While the passage of the three laws was associated with a lower probability of cessation for the least educated, the probability of cessation was higher for college graduates. Whites reported lower current smoking than other racial and ethnic groups, and cpd decreased most among households with incomes between 15,000 and 29,999 dollars. CONCLUSIONS: Smoke-free laws are likely to have a heterogeneous effect by race/ethnicity, education, and income, particularly among the youngest and oldest Americans.

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POS3-78

PREDICTORS OF E-CIGARETTE EXPERIMENTATION AMONG ADOLESCENTS IN ROMANIA: A SIX-MONTH LONGITUDINAL STUDY

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BACKGROUND: E-cigarettes are the most commonly used non-tobacco nicotine delivery devices and their use is increasing among adolescents worldwide. OBJECTIVE: To explore predictors of e-cigarette experimentation among adolescents in Tirgu Mures, Romania. METHODS: Sixteen high schools in Romania were invited to participate in a school-based, computer-assisted smoking prevention curriculum designed to reduce conventional tobacco use initiation. To assess the impact of the curriculum on e-cigarette use, 879 ninth grade students (n=433 control group; n=466 intervention group) who reported never using e-cigarettes at baseline were assessed for e-cigarette use at six-month follow-up. A complex sample logistic regression analysis was conducted separately on the control and intervention subsamples to explore predictors of experimentation with e-cigarette, controlling for the school-level cluster. RESULTS: The proportion of students who tried e-cigarette for the first time from baseline to six-month follow-up was 22.6% in the control group and 20.4% in the intervention group ($p=0.539$). The groups were similar in terms of significant correlates of e-cigarette experimentation. Experimenting with e-cigarettes was more likely in students who were ever-smokers at baseline (control group: OR=3.47; 95%CI: 2.34-5.16; intervention group: OR=4.02; 95%CI: 1.96-8.26). The likelihood of trying e-cigarettes doubled with every 10-unit increase on the sensation seeking scale (control group: OR=1.88; 95%CI: 1.18-2.98; intervention group: OR=2.15; 95%CI: 1.18-3.90). Past 30-day use of conventional cigarettes at baseline was a significant predictor of e-cigarette experimentation only in the control group (OR=2.48; 95%CI: 1.03-5.95). Gender was not a significant predictor of e-cigarette experimentation. CONCLUSION: To reduce experimentation with e-cigarettes, prevention programs must address dual tobacco use and healthy alternatives to sensation seeking among adolescents.

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POS3-79

ONE SIZE DOES NOT FIT ALL: THE RELATIONSHIP BETWEEN DIMENSIONS OF TOBACCO USE AND HEALTH VARIABLES IN AN LGBT SAMPLE

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BACKGROUND: Various dimensions of tobacco use may have differential interactions with health variables, although specific research on these measurement considerations is limited. The current study examined the self-reported health of LGBT individuals, a sample with historically high smoking prevalence rates. With an emphasis on differences in findings based on the features of tobacco use measurement utilized, variables known to be associated with use were examined. METHODS: This study uses data collected in 2016 as part of health assessment study of LGBT adults in the Central Savannah River Area of Georgia and South Carolina using a self-administered online survey. For the current study, variables included demographics, mental and physical health information, and three measures of tobacco use: (1) lifetime tobacco use, (2) days smoked in the past 30 days, and (3) daily cigarette consumption amount, with a sample of 433 individuals (mean age= 35, SD=13.50; 63% gay/lesbian; 65% Caucasian; 78% cisgender). RESULTS: Lifetime tobacco use was significantly correlated with current/past alcohol abuse ($r[360] = .12, p < .05$), Bipolar Disorder ($r[364] = .12, p < .05$), drug abuse ($r[358] = .15, p < .05$), and non-cisgender identity ($r[397] = -.11, p < .05$). Higher frequency of use over 30 days was correlated with current/past history of ADHD ($r[227] = -.16, p < .05$), Anxiety ($r[235] = -.16, p < .05$), Bipolar Disorder ($r[231] = -.25, p < .001$), and higher PHQ-2 depression scores ($r[256] = .15, p < .05$).



.05) Higher daily smoking was correlated with older age ($r[115] = .25, p < .01$), as well as increased current/past cancer ($r[101] = -.23, p < .05$), heart disease ($r[99] = -.31, p < .01$), hypertension ($r[103] = -.31, p < .01$), and overweight/obesity rates ($r[102] = -.27, p < .01$). CONCLUSIONS: Results varied based on how tobacco use was measured. For instance, lifetime use was the only tobacco variable associated with gender. Also, individuals with higher frequency of use reported more mental health conditions, while those with higher amounts of use reported more chronic health conditions. Researchers and clinicians should consider including various measures of tobacco use, which will allow for the development of more individualized tobacco cessation treatment plans as well as a more robust understanding of tobacco use risk profiles.

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POS3-80

DECLINING EXPOSURE TO SMOKING IN THE HOME IS AN IMPORTANT DRIVER OF RAPIDLY DECLINING SMOKING IN 14-15 YEAR OLDS IN NEW ZEALAND

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SIGNIFICANCE: The drivers of the recent decline in adolescent smoking in many high-income countries are not well understood. This study explores the extent to which changes over time in key predictors, including smoking in the home, explain the dramatic decline observed in New Zealand (NZ). The findings may inform efforts to further reduce smoking, and assist countries at an earlier stage in the tobacco epidemic to replicate the success seen in NZ. METHODS: We used annual cross-sectional data (ASH Year 10 Snapshot Survey, N= 21,000 – 33,000 per year) from 2002-2015 to describe recent smoking trends in 14-15 year olds in NZ, and changes in individual-level smoking predictors (e.g. smoking status of parents, siblings and peers; exposure to smoking in the home). We calculated odds ratios to explore the changing relationships between exposures and outcomes over time. RESULTS: Preliminary analysis shows that regular smoking (at least monthly) fell from 22% in 2002 to 5% in 2015, and never smokers rose from 38% to 79% over the same period. Exposure to smoking in the home almost halved from 31% in 2004 to 16% in 2013, and was strongly associated with regular smoking, with the relationship becoming stronger over time (OR 2.8 (95%CI 2.6 – 3.0) in 2002; OR 4.6 (4.2 – 5.1) in 2013). We found a clear social gradient in the relationship between smoking in the home and neighbourhood deprivation (using school decile as a proxy), but greater decline in smoking in the home in more deprived deciles over time. CONCLUSIONS: Decreasing exposure to smoking in the home has been a key driver of smoking decline in NZ adolescents since 2002. Public policy measures (e.g. extension of smokefree laws in 2004 to include all indoor workplaces including bars and restaurants) appear to have led to sustained and growing denormalisation of indoor smoking across the socioeconomic spectrum. There is marked similarity in adolescent smoking trends in NZ, Australia, England and USA since the early 1990s, but more research is needed to establish whether declining exposure to smoking in the home is an important explanatory factor for trends in other jurisdictions.

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POS3-81

CONTENT ANALYSIS OF ELECTRONIC CIGARETTE NEWS STORIES IN THE U.S. IN 2015

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SIGNIFICANCE: Coverage of electronic cigarettes (e-cigarettes) in the news media may shape public perceptions about the products and their impact on individual and population health. This study characterizes the discussion of e-cigarettes in top-circulating print and online news media sources in the U.S. in 2015. METHODS: Systematic database searches using *Access World News* and *Factiva*

identified all e-cigarette-related news articles appearing in the top 30 circulating newspapers, 5 newswires, and 5 online news sources in the U.S. between January and December 2015 (n=295). Coders identified the main topic of each article and documented the presence of various statements related to regulation, trends in use, and health effects. RESULTS: Nearly half of all articles (45.1%) focused primarily on policy and regulatory issues related to e-cigarettes, although prevalence of e-cigarette use (21.0%) and the health effects of e-cigarettes (21.7%) were common main topics. Specific policy strategies such as age-of-sale restrictions (35.9%) and smoke-free air laws (28.1%) were frequently mentioned, but comments regarding warning labels and ingredient listings appeared in less than 10% of articles. Concerns about youth use dominated discourse, with almost half of articles citing the rise in youth e-cigarette use (45.4%). A full third of news stories included claims that e-cigarettes could be a gateway to tobacco use (33.9%) and nearly a quarter cited concerns that flavors appeal to youth (22.4%). It should be noted, however, that one-third of articles included acknowledgements that e-cigarettes may be less risky than cigarettes (34.2%) and 25% included suggestions that e-cigarettes can help some smokers quit. CONCLUSIONS: In 2015, rising rates of e-cigarette use among youth and policy strategies to address this trend dominated print and online news stories about e-cigarettes in the United States, setting an agenda for what the public may view as the most critical issue related to e-cigarettes. Although discussion about e-cigarettes' potential for harm reduction was present, health risk statements about the devices outnumbered claims about their health benefits.

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POS3-82

USING ECOLOGICAL MOMENTARY ASSESSMENT TO UNDERSTAND FLAVORED CIGAR USE AMONG AFRICAN AMERICAN YOUNG ADULTS

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INTRODUCTION: Although flavored cigar use is highly prevalent among African American young adults (AAYDs), few studies have examined the characteristics of their flavored cigar use. This study aims to fill this gap by using the Ecological Momentary Assessment (EMA) method, which captures flavored cigar use and its factors in real-time. METHODS: Over 14 days, 64 AAYDs (ages 18-29 years) completed eight daily text message-based EMA surveys in which they entered their cigar smoking (large cigars, cigarillos, and filtered cigars), its characteristics (brands, flavors, and marijuana use), and smoking environment and cues. Cigar use was analyzed using generalized estimating equations stratified by cigars smoked as-is (regular cigars) and with marijuana (blunts). RESULTS: Participants recorded 968 cigar entries (33.9% plain and 66.1% flavored). About 94% of our sample used flavored cigars. Of the flavored cigars (both regular cigars and blunts), 8.6%, 53.1%, and 38.1% were mint/menthol, alcohol, and fruit/sweet flavors, respectively. Compared to plain, flavored cigars were more likely to be used in social interactions (OR=1.2, $p < .05$) and vehicles (OR=1.4, $p < .05$). Plain and flavored cigars were equally used as blunts ($p = .11$), yet fruit/sweet-flavored were more (OR=3.5, $p < .001$) and alcohol-flavored were less (OR=0.43, $p < .001$) likely than plain to be used as blunts. In stratified analysis, flavored regular cigars were more likely to be used in restaurant/bars (OR=2.2, $p < .05$) and social interactions (OR=1.4, $p < .01$); flavored blunts were more likely to be used in vehicles (OR=1.7, $p < .001$). Garcia y Vegas and Al Capone brands predicted the use of flavored regular cigars (OR=1.8, $p < .01$; OR=1.4, $p < .05$) and flavored blunts (OR=2.6, $p < .001$; OR=4.4, $p < .01$). DISCUSSION: The EMA method shows in greater detail flavored cigar use among AAYDs. While participants used both plain and flavored cigars to make blunts, fruit and sweet flavors were preferred. Smoking environment and cues predicting flavored use differ greatly by marijuana use. Cigar brands may be chosen intentionally to satisfy both flavor preference and marijuana use.

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POS3-83

PREDICTORS OF POSTPARTUM RETURN TO SMOKING: A SYSTEMATIC REVIEW

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SIGNIFICANCE: Finding effective ways to help pregnant women quit smoking and remain abstinent in the long term is a major public health issue. Approximately half of UK women who smoke attempt cessation after conception; unfortunately, up to 75% will have returned to smoking within 12 months postpartum. No interventions to prevent postpartum return to smoking have yet been found effective; it is important to identify factors that facilitate or inhibit postpartum relapse to inform the development of new interventions in this area. This study aims to identify by systematic review the factors associated with postpartum return to smoking. **METHODS:** Systematic searches of electronic databases (MEDLINE, EMBASE, PsychINFO, CINAHL), trials registers and relevant conference proceedings were conducted up to January 2016. Studies which statistically examined factors associated with return to smoking postpartum among women who quit smoking during pregnancy, or in the 3 months prior to pregnancy were included. The Newcastle Ottawa Quality Assessment Scale was used to assess the quality of the studies. Findings were synthesised narratively. **RESULTS:** 37 studies, including 11 trials and 26 observational studies, were included. 29 (78.4%) were considered to be of high quality. Among the high quality studies, the factors that were commonly associated with the largest increased risks of postpartum return to smoking were partner/household member smoking, not breastfeeding and intending to quit smoking only for pregnancy. **CONCLUSIONS:** Of the factors found to be associated with relapse, intending to quit smoking only for the duration of pregnancy is most likely to have a direct, causal impact on smoking behaviour after childbirth. An intervention focussed on modifying or countering the beliefs which underpin this stated intention may be effective at preventing a return to smoking after childbirth. Interventions that target household smoking as a whole may also be of benefit.

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POS3-84

POINT OF NO RETURN: SMOKING FREQUENCY, SMOKING INTENSITY AND NICOTINE DEPENDENCE IN YOUTH

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SIGNIFICANCE: Nicotine dependence (ND) symptoms can occur soon after first puff and once symptoms manifest, it becomes increasingly difficult to stop smoking. Yet some surveillance systems and researchers do not consider an individual to be a smoker until they report 100 cigarettes lifetime. To better understand the natural course of ND, we described ND in grades 7-11, and at ages 20 and 24 (i) by smoking status (triers, sporadic, monthly, weekly, daily smokers); and (ii) among incident versus prevalent smokers. **METHODS:** Data were available in a longitudinal investigation of 1,294 Grade 7 students (age 12-13 years at inception) recruited in 10 secondary schools in Montreal in 1999. Analyses were restricted to smokers. Data on smoking status, a 3-month cigarette consumption recall, lifetime consumption of 100 cigs, ND symptoms (cravings, withdrawal), and ICD-10 tobacco dependence (yes, no) were collected every 3 months during the 5 years of high school and at age 20 and 24. **RESULTS:** The prevalence of 100 cig lifetime was 31%, 47%, 54%, 57%, 58% 78% and 84% in grade 7-11 and at age 20 and 24, respectively. The prevalence of ICD-10 dependence increased from 21% in grade 7 (median 4 cig/month) to 30% in grade 10 (15 cig/month) and remained stable thereafter at 30% despite higher cigarette consumption (101-112 cig/month). Low frequency smokers (triers sporadic, monthly smokers), regardless of grade or age, reported ND symptoms. 16%, 11%, 3%, 4%, and 0% of ICD-10 dependent

smokers in grade 7-11, respectively had not smoked 100 cigarettes lifetime. Finally 51%-66% of daily smokers across grades/ages were ICD-10 dependent. **CONCLUSION:** ND symptoms are reported at low cigarette consumption regardless of grade/age. The 100 cigarettes lifetime criterion to define a smoker will not capture many novice smokers who are already ND. Grade 10 may represent a time point at which the prevalence of ND stabilizes at 30%. ND should be monitored in surveillance systems since ND symptoms may represent a critical "point of no return".

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POS3-85

MEASUREMENT OF EXHALED BREATH CARBON MONOXIDE: A STUDY OF LEVELS IN CENTRAL PENNSYLVANIA COMMUNITY MEMBERS

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SIGNIFICANCE: Although there are sources of CO exposure among community dwellers (e.g. car exhaust), cigarette smoke is the largest single source of CO and is found in high levels among smokers. Because of this, an exhaled breath carbon monoxide (eBCO) reading > 6 ppm is often used to validate tobacco use status. However, given that eBCO can come from external sources that all community members are exposed to, it is important to understand what usual eBCO levels are among both smokers and non-smokers. Therefore, this study aimed to measure one community's eBCO and identify potential environmental factors that may affect eBCO among nonsmokers. **METHODS:** Participants were at least 18 years of age. Data was collected at community health events and included self-reported tobacco use and potential sources of carbon monoxide exposure. A PICO+ breathalyzer was used to measure eBCO. External CO exposure was measured by asking if they have been exposed to any of the following in the last 48 hours; living with a smoker, being able to smell smoke for more than one hour per day, or being exposed to indoor sources of carbon monoxide. **RESULTS:** 486 community members age 18+ were analyzed. 21.2% were self-reported smokers who had a mean eBCO of 20.1ppm. Non-smokers had a mean eBCO of 4.4 which was significantly lower than the levels of smokers (p<0.001). 16.2% of non-smokers had an eBCO >6ppm. Among those non-smokers with an eBCO >6ppm, 63.6% reported exposure to other sources of CO in the past 48 hours. There was no difference in eBCO levels between those who were exposed to other sources of CO and those who were not (p=0.077). **CONCLUSION:** The majority (83.8%) of community nonsmokers had an eBCO level less than 7ppm and 8.8% had an eBCO 7-9ppm. 7.4% had an eBCO level >9ppm and were considered smokers. Reported exposure to environmental CO in nonsmokers with elevated eBCO levels (7-9ppm) was not significantly different compared to those with expected eBCO levels (0-6ppm). This suggests that there may be other factors contributing to elevated eBCO levels in self-reported nonsmokers.

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POS3-86

USING CONCEPT MAPPING PARTICIPATORY RESEARCH METHODS TO UNDERSTAND POSITIVE AND NEGATIVE EXPERIENCES ASSOCIATED WITH ELECTRONIC CIGARETTE USE AMONG U.S. ADULTS

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SIGNIFICANCE: Electronic cigarette (e-cigarette) use is growing, but little is known about user experiences and reasons for use. This study used concept map-



ping, which integrates mixed methods and participatory approaches, to structure knowledge about positive and negative e-cigarette use experiences. **METHODS:** Four concept mapping studies (CM1-CM4) were conducted from 2014-2016 to understand 1) reasons for e-cigarette use, 2) adverse effects of e-cigarette use, 3) reasons for using flavored e-cigarette liquids, and 4) positive outcomes associated with e-cigarette use among adult e-cigarette users aged 18-64 in the U.S. Research staff followed standard concept mapping methods: 1) preparation of a prompt; 2) generation of statements; 3) sorting and rating brainstormed statements; 4) multi-level analyses and computation of average ratings for clusters; 5) interpretation of clusters; and 6) determination of the utility of the four concept maps. In each study, past 30-day e-cigarette users were recruited from vape forums, vape conferences, and Craigslist to complete a web-based study. Participants were asked to brainstorm statements in response to a prompt that asked about e-cigarette attitudes and beliefs and/or sort and rate statements into clusters of similar content. **RESULTS:** Of participants (n=303), 86.5% were White, 6.0% Hispanic, and 37.8% female. The CM1 study yielded 11 clusters that described reasons for use (n=125 statements); CM2 yielded 5 clusters on adverse effects (n=79 statements); CM3 yielded 5 clusters describing reasons for using flavors (n=107); and CM4 yielded 7 clusters that described positive outcomes of e-cigarette use (n=123 statements). Studies revealed that beliefs and attitudes related to e-cigarette use included sensory stimulation/modification (i.e. smell, taste), social acceptance/convenience (i.e. stigma, smoke indoors), psychological effects (i.e. calm, satisfied) and physiological effects (appetite suppressant, feelings of euphoria). **CONCLUSIONS:** Concept mapping provided data that can inform the development of instruments that measure key constructs and inform hypotheses that help us understand e-cigarette use appeal and behaviors.

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POS3-87

SMOKING AND MENTAL HEALTH AMONG SOCIOECONOMICALLY DISADVANTAGED PREGNANT WOMEN

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SIGNIFICANCE:

Smoking during pregnancy is the leading preventable cause of poor pregnancy outcomes in the United States. In spite of the well-established negative health implications of smoking during pregnancy, national survey data reveal that 15% of pregnant women report past-month cigarette smoking. Socioeconomically disadvantaged women may experience even higher rates of continued smoking during pregnancy. Mental health issues, particularly depression and stress, are highly associated with smoking. The purpose of this study is to assess smoking and mental health among socioeconomically disadvantaged pregnant women in their first, second, and third trimester of pregnancy, comparing pregnant women who continue smoking with those who quit in their first trimester. **METHODS:** The sample of 130 pregnant women was drawn from women attending their first prenatal visit at a public obstetrics clinic in 2013. Self-reported smoking and mental health measures were collected at intake, 3 months post-intake, and 6 months post-intake. Smoking was biochemically verified at each time point, and self-report measures included times per day (TPD) smoked, numbers of days smoked out of past 90 days, and tobacco dependence. Mental health measures included the Edinburgh Postnatal Depression Scale (EPDS), Perceived Stress Scale (PSS), and internalizing and externalizing disorder screeners. Scale scores within the two groups were averaged and compared across each of the three time points, with significance determined at $p < .05$. **RESULTS:** The sample was predominately African-American (81%) and never married (74%), with a mean age of 27. At intake current smokers (n=86) reported smoking 66 of the past 90 days and 11 TPD. There were no significant differences in depression and stress between pregnant women who continued to smoke during pregnancy and those who had recently quit smoking. Stress and depression levels, as well as internalizing and externalizing scale scores, were relatively moderate and stable in both groups over the course of pregnancy. Stress was significantly higher than the general population at each time point. Mental health did not vary significantly by how often or how much a woman reported smoking or on her level of tobacco dependence. **CONCLUSIONS:** Moderate and stable levels of depression and stress were reported by pregnant women who smoked throughout pregnancy and those who discontinued

smoking in their first trimester. No differences were observed between these two groups, suggesting mental health intervention may be needed by both.

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POS3-88

AURORA SMOKING AND HEALTH SURVEY: A COMMUNITY-BASED SURVEY ON STRESS, COPING AND SMOKING STATUS

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SIGNIFICANCE: The community-academic partnership project was designed to assess smoking patterns, coping skills, knowledge, motivation to quit smoking and barriers to cessation including chronic life stressors in a low socioeconomic status (SES) population. We hypothesized that stress levels would be similar among smokers and non-smokers and coping self-efficacy would be associated with smoking status. **METHODS:** The cross sectional survey respondents were English and Spanish speaking adult smokers and non-smokers recruited through recreation centers, a local food bank program, multi-unit housing complexes and a public library in the targeted neighborhood. The survey instrument included validated measures and a stress instrument of 6 domains comprised of life stressors, stress related to work, relationships, neighborhood, unfair treatment and finances. Each stress domain score was standardized into a Z-score distribution. Coping was measured using the Coping Self-Efficacy instrument. **RESULTS:** A total of 405 individuals were surveyed including 295 current smokers (72.8%) and 110 non-smokers (27.2%). Respondents were 48% male, 42.6% African American and 31.4% Hispanic and 45.8% were single and only 11% of the population completed college or higher. Three fourths of the respondents were not working. The majority had some type of health insurance (79.4%) with most reporting Medicaid as their insurance (72.4%). Most respondents smoked cigarettes (95.6%) compared to cigars (8.8%). A third of respondents reported smoking their first cigarette within five minutes of waking up (35.4%). Regarding past quit attempts, respondents who did use evidenced based treatments reported NRT (26.6%), and QuitLine (18.3%) use. Those more likely to be smokers were men with less than college education and non-Latinos. Those experiencing higher levels of stress due to discrimination were at higher odds (aOR 1.82, 95% CI 1.25-2.67) of being a smoker than those with lower stress levels after controlling for demographic and other stress variables. Higher levels of stress across the 6 stress domains were associated with smoking (aOR 1.37 95% CI 1.07-1.76) even after adjustment. Those with higher levels of coping self-efficacy were more likely to be non-smokers (OR 0.99 95% CI 0.985-0.996). **CONCLUSION:** Different types of stressors and the coping skills to handle them are an under-researched area for smoking cessation interventions. Assisting the low SES smoker to quit and adhere amidst chronic stressors will be essential to further reduce smoking prevalence.

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POS3-89

SYSTEMATIC REVIEW OF BIOMARKER STUDIES ON E-CIGARETTES

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BACKGROUND: E-cigarettes are battery-powered nicotine vaporising devices, commonly used as replacements for regular cigarettes or cessation aids for smokers. They are increasingly popular but quantification of their benefits and risks to public health remain unclear. Epidemiological studies of their long-term safety are unavailable and the products and how they are used keeps evolving. Evaluation of biomarkers can potentially provide interim evidence on potential impacts to health. **METHODS:** We conducted a systematic review of the published literature up to 25 May 2016 to identify biomarker studies relating to vaping. We also identified potential biomarkers that could be used in future research and assessed their feasibility for use in research. **RESULTS:** We identified 61 human biomarker studies and 57 animal/ cell-line studies reporting on the potential health impacts of e-cigarettes. Most studies in humans report lower levels of biomarkers among vapers compared to smokers (eg, NNAL, 3-HPMA from acrolein, markers of oxidative stress eg, sNox2-dp), with some at levels observed in non-smokers (eg, expired carbon monoxide). We identified over 40 potential relevant biomarkers covering cardiovascular, respiratory, reproductive, oral health, endocrine and immune system impacts, of varying feasibility based on cost and participant burden. **CONCLUSIONS:** Studies involving comparisons with smoking suggest vaping generally involves substantially lower levels of toxicant exposure (especially carbon monoxide). Ideally, future research on e-cigarettes should incorporate as many feasible biomarkers to advance our understanding of the health risks of vaping relative to smoking.

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POS3-90

SALES OF NICOTINE-CONTAINING ELECTRONIC CIGARETTE PRODUCTS, UNITED STATES, 2015

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SIGNIFICANCE: Some electronic cigarette (e-cigarette) products are marketed as containing zero percent nicotine. However, the demand for these products relative to nicotine-containing e-cigarette products is currently unknown. **METHODS:** Using customized retail scanner data for 2015, we assessed aggregate unit sales of nicotine-containing e-cigarettes sold in convenience stores and other retail channels, including food, drug, mass merchandise, dollar, and military commissaries. These data did not include purchases via the internet or independent "vape shops." Assessed e-cigarette products included: 1) disposable e-cigarettes; 2) rechargeable e-cigarettes and starter-kits ("rechargeables"); and 3) prefilled cartridges, prefilled cartomizers, and e-liquid bottles ("refills"). A zero-nicotine indicator was created based on the nicotine strength listed in the Nielsen data. For unit sales with no listed strength (36.7%), brand-level investigations of product websites were employed. Missing data comprised less than 1% of all unit sales after brand-level investigations were completed. **RESULTS:** During 2015, 99.6% of disposable e-cigarette sales, 100% of rechargeable sales, and 99.5% of refill sales sold in convenience stores and other assessed channels contained nicotine. Overall, 99.6% of all e-cigarette products sold contained nicotine; 99.4% of flavored e-cigarette products contained nicotine; and 99.9% of non-flavored e-cigarette products contained nicotine. **CONCLUSIONS:** Our findings indicate that in 2015, the vast majority of e-cigarette products sold in US convenience stores and other assessed channels contained nicotine. Labeled nicotine levels may differ from actual levels; however, these sales data are nonetheless more objective measures of nicotine consumption via e-cigarettes compared to self-reported information, which is more susceptible to bias, especially among youth. Efforts are warranted to educate the public that e-cigarettes typically contain nicotine, which is addictive and can harm the developing brain. Additionally, these findings reinforce the importance of regulations requiring warning labels for nicotine-containing products, ingredient reporting, and restrictions on sales to minors.

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POS3-91

PRINT AND ONLINE ELECTRONIC CIGARETTE ADVERTISING CONTENT AND THEMES

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SIGNIFICANCE: Electronic cigarettes (ECs) are a relatively new tobacco product with a rapid growth in use and market share in the US. Widespread advertising is one important factor in these trends. Other than the use of health claims, there are no current restrictions on the methods and types of EC advertisements (ads). The purpose of the current content analysis was to characterize EC ads present in the US during 2015-2016. **METHODS:** EC ads were identified through Competitrack, an advertising tracking firm that monitors 21 media sources including TV, radio, magazines, and online display. Only static ad categories (e.g., magazine, online display) with a run date between 1/1/2015-5/16/2016 (n=790; n=500 available for analysis) were included. Nine content areas were assessed: source, primary product, health themes, technology themes, youth themes, subjective themes, selling characteristics, people present, and setting. Two individuals independently coded all ads, and a third coder resolved differences. Inter-rater agreement was measured with Cohen's kappa coefficient. **RESULTS:** Most items achieved moderate agreement (66% at kappa \geq 0.41); low reliability items typically involved subjective themes. Assessed ads were primarily consumer (78%) versus retailer-directed (14%) and online (72%) versus magazine/outdoor (29%). blu (19%) and NJOY (14%) brands were most prevalent. Over 50% of ads featured a flavored product with most (61%) displaying multiple flavors or tobacco-flavor only (23%). Few ads (n=5) referenced reduced EC harm but 20% contained an "alternative to cigarette" message (e.g., circumvent smoking policies, encourage switching). Technology and "quality" themes were common (both 42%). People were noted in 17% of ads, and cartoons were in 9%. Over 80% of ads did not feature age restrictions. **CONCLUSIONS:** EC ads assessed were largely online and contained certain content that could appeal to youth (e.g., flavors, cartoons). Few ads made overt health claims, but many promoted ECs as an alternative to a cigarette. EC ad content suggests producers are targeting a broad range of populations some of which may not be reached by traditional tobacco industry advertising.

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POS3-92

DIFFERENTIAL EFFECTS OF E-CIGARETTE CHARACTERISTICS ON A BEHAVIORAL ECONOMIC MEASURE OF PRODUCT DEMAND ACROSS SMOKERS AND NON-SMOKERS

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SIGNIFICANCE: As United States e-cigarette use rises, evidence is needed by policy makers regarding the influence of product characteristics on patterns of use. This study used a behavioral economic measure of demand for addictive products, called the cigarette purchase task (CPT), to compare the reinforcing value of e-cigarettes that differ in nicotine concentration, flavor, and marketing message. **METHODS:** Between January-July 2016, 681 current cigarette smokers and 413 never smokers completed a cross-sectional online survey via Amazon Mechanical Turk. Participants were randomly assigned to 1 of 8 conditions differing in e-cigarette characteristic: no nicotine, low nicotine, high nicotine, tobacco flavor, menthol flavor, fruit flavor, reduced harm message, and reduced carcinogens message. The CPT was completed; results from the breakpoint, defined as the price where product demand is suppressed to zero, are presented. Smokers also completed an own brand (OB) cigarette CPT. Nonparametric bivariate tests were used to compare breakpoints for each e-cigarette condition to smokers' OB, between e-cigarette conditions separately among smokers and non-smokers, and between smokers and non-smokers separately for each e-cigarette condition. The probability of making a Type I error was adjusted for multiple comparisons. **RESULTS:** Among smokers, breakpoints were lower for every e-cigarette condition compared to OB suggesting a lower reinforcing value for e-cigarettes generally compared to OB ($p < 0.05$). Breakpoint also differed significantly across e-cigarette conditions among smokers ($p < 0.05$). Specifically, in post hoc tests, breakpoints were

higher for low nicotine vs. no nicotine e-cigarettes and for tobacco flavor vs. fruit flavor e-cigarettes ($p < 0.05$). Among non-smokers, no significant differences were observed between e-cigarette conditions. Smokers reported significantly higher breakpoints than non-smokers in every e-cigarette condition ($p < 0.05$). CONCLUSIONS: Results suggest that regardless of the e-cigarette characteristic tested, the reinforcing value was higher for smokers than non-smokers, but lower than their OB. Further, this study provides preliminary evidence that regulating the availability of nicotine concentration or liquid flavors may affect smokers' propensity to use e-cigarettes.

FUNDING: No Funding

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POS3-93

AFRICAN AMERICAN CULTURAL REPRESENTATIONS IN YOUTUBE VIDEOS PROMOTING LCCS FOR MARIJUANA

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SIGNIFICANCE: The use of little cigars and cigarillos (LCCs) is increasing among African American youth and young adults, who may also co-use LCCs with marijuana. YouTube, a social network site (SNS) to which users may post, view, interact with, and share videos, claims over 1 billion users and is the most popular SNS among teens. Age restrictions are voluntary or viewer-recommended. Little is known about YouTube content related to dual use of marijuana and tobacco and how this content may target African American youth. METHODS: From the user-generated popular language database UrbanDictionary.com, we identified 10 terms related to dual use of marijuana and tobacco (e.g., blunt; spliff). We used the YouTube Application Program Interface (API) to query the most relevant videos related to these terms. After viewing 130 videos, we identified 8 content-based genres and selected 6-7 of the most-viewed videos per genre for a final sample of 51 videos, and developed a codebook of a priori and emergent codes. We compared code results for dual-use rationales (i.e., pro or con, and type rationale); dual-use product type (e.g., LCC/blunts, tobacco marijuana mix); main video presenter's characteristics (i.e., age, gender, race/ethnicity, and claims to authority); and music type (e.g., hip-hop, rock). We also recorded displays of dual use, and age restrictions. RESULTS: Of the 51 videos, marijuana and/or tobacco use was demonstrated in seventy-percent of the sample. Nearly half of videos were not age restricted. Typical presenters appeared to be male, adult or young adult, and white or African American. Most videos included pro-dual use messages. The most common pro-dual use rationales were social, aesthetic, or functional, while health was the most common con-dual use rationale. More than half of videos showed use of blunts/LCC with marijuana. African American cultural cues appeared with celebrities, hip-hop music, or blunts/LCC products. CONCLUSION: Culturally embedded YouTube content may promote tobacco and marijuana dual use messages to African American youth and young adults. Cultural iconography such as music and celebrity personalities may support this promotional message.

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POS3-94

ADDRESSING TOBACCO IN ADDICTION TREATMENT: A CROSS-SECTIONAL SURVEY OF STAFF ATTITUDES AND PERCEIVED BARRIERS

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SIGNIFICANCE: The attitudes and perceived barriers of addiction treatment staff are important influences determining the provision of smoking cessation care (SCC). This survey of addiction staff aimed to examine: i) current attitudes toward

SCC; ii) service and staff characteristics associated with unsupportive SCC attitudes, and iii) perceived barriers to providing SCC. METHODS: Between July-October 2014, 506 staff from 31 Australian addiction treatment services completed an online cross-sectional survey which assessed agreement with 6 attitudinal statements (supportive and unsupportive) and 10 perceived barriers to SCC in the addiction treatment setting. Logistic regressions were used to examine service (sector) and staff (age, gender, smoking status, number of years in addiction treatment field) characteristics associated with unsupportive attitudes towards SCC. RESULTS: A large proportion of respondents agreed with the supportive statements: SCC should be part of usual care (87%), counselling for smoking cessation is as important as counselling about other drugs (72%) and that staff have the organisational support to provide SCC (58%). A substantial minority agreed with the unsupportive statements: addiction treatment clients are not interested in addressing their tobacco smoking (40%), increasing smoking restrictions would lead to client aggression (23%) and that smoking is a personal choice and it is not the service's role to interfere (16%). Respondents from non-government managed services, current tobacco smokers and those with less than 1 year, 4-6 & 7-9 years' experience in the addiction treatment field had higher odds of agreeing with specific unsupportive SCC statements. The most frequently identified barriers rated as very/quite important to the provision of SCC were: client inability to afford smoking cessation medicines (61%), insufficient funding to address tobacco smoking (61%) and a lack of a coordinated staff approach towards tobacco treatment (61%). CONCLUSIONS: Strategies are required to target unsupportive SCC attitudes and characteristics associated with these attitudes in order to improve the workplace culture for the delivery of SCC in the addiction treatment setting.

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POS3-95

ADDRESSING TOBACCO USE DISPARITIES IN RURAL OLDER ADULTS THROUGH A MOBILE PHONE INTERVENTION: PROJECT WISE

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SIGNIFICANCE: Rural older adult smokers are an underserved population. The smoking rate is higher in rural areas yet cessation services are less available. Mobile phone text message based studies have been found to be efficacious but have not targeted rural older adults. Relying on SMS texting can increase the reach of programs. The purpose of this study was to test the feasibility, acceptability and preliminary efficacy of a scheduled gradual reduction (SGR) program delivered via text message paired with SMS support messages in decreasing smoking among rural older adults. METHODS: Adults over 60 years were recruited from primary care clinics and randomized to the SGR arm (N=20, a four-week scheduled gradual reduction program delivered via text, designed to reduce smoking over a four-week period plus SMS support messages) or the control arm (N=20, SMS support messages only). Assessments were conducted at 30-day follow-up and included feasibility and acceptability of the intervention, smoking reduction, and biochemically validated 7-day point prevalence via saliva samples. RESULTS: Among the 40 older adults, the median age was 68, 35% were male, 60% had post-secondary education, 58% were white, and 55% reported an income of \$15,000 or less. The median number of cigarettes smoked per day at baseline was 12.0. Most (81%) reported reading all the messages they received during the intervention. Participants found the intervention useful in helping them quit smoking (SGR=53%, Control=62%) and would recommend it to a friend (SGR= 72%, Control=78%). The SGR group had a higher rate of biochemically-validated cessation (SGR=15%, Control=5%). The median smoking reduction was four cigarettes per day for both arms. CONCLUSIONS: Text-based cessation interventions can be easily disseminated to rural older adult tobacco users to aid in cessation, thus helping to decrease tobacco-related health disparities. The SGR program has greater efficacy than support messages alone. This program is feasible and acceptable among rural older adult smokers and warrants further testing.

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POS3-96

DETERMINATION OF CALIBRATION FACTOR FOR TWO REAL-TIME DETECTION INSTRUMENTS USED IN E-CIGARETTE RESEARCH

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Real-Time Detection Instruments (RTDIs) are convenient for measuring aerosol concentration in environments with high variability and/or aerosol that is particularly difficult to capture by traditional means, as is the case with semi-volatile liquid aerosols. Several studies have utilized the TSI SidePak with 2.5 μ m inlet to covertly estimate PM_{2.5} in various venues but did not first determine the accuracy of these instruments for measuring e-Cigarette (e-Cig) aerosol. The purpose of this study was to determine the calibration factor necessary for accurate e-Cig aerosol measurement by two common RTDIs, the TSI SidePak and the Grimm Portable Aerosol Spectrometer (Grimm) e-Cig aerosol was delivered 1-4 times per minute at varied power, using an automated puffing machine, into a well-mixed exposure chamber. The e-juice was "chocolate" 70:30 VG:PG, 24 mg/mL nicotine, confirmed by density analysis. e-Cig aerosol was simultaneously sampled with six devices, 3 RTDIs and 3 filter based samplers: SidePak-PM_{2.5}, SidePak-PM₁₀, Grimm, and PM_{2.5}, PM₁₀ and Respirable cyclones. RTDIs were set to calibration factor of 1, i.e. no correction from manufacturer calibration. Filters were equilibrated at 27°C and 50%RH until stable pre-weight and post-weighted immediately after each trial to minimize evaporation. Linear regression of RTDI data on filter results determined the RTDI specific calibration factors. RESULTS: The R² of RTDI regression was 0.98 - 0.995. The SidePak-PM_{2.5} and SidePak-PM₁₀ overestimated by 98% and 86%. The Grimm underestimated PM_{2.5} by 15%, but overestimated PM₁₀ and Respirable mass by 14% and 6%. The corresponding calibration factors are: SidePak-PM_{2.5}, 0.51; SidePak-PM₁₀, 0.54; Grimm PM_{2.5}, 1.18; Grimm PM₁₀, 0.88; Grimm Respirable, 0.94. CONCLUSIONS: Estimation of e-Cig aerosol concentration with RTDI is a good application of this technology, especially when considering the potential for sample loss during real life conditions where aerosol concentration may become very low and collected sample may evaporate. However, use of aerosol-specific calibration factors is necessary for obtaining accurate measurement.

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POS3-97

FACTORS ASSOCIATED WITH SUBJECTIVE RESPONSES TO FIRST TOBACCO USE EXPERIENCE IN A NATIONAL SAMPLE OF YOUNG ADULTS

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Both positive and negative subjective responses to first tobacco use are associated with smoking uptake among adolescents. However, the link between initial experiences and current tobacco use has not been studied among young adults. This study examined correlates of initial subjective responses to first tobacco use and associations with current tobacco use behavior. Data were analyzed from waves 4-8 of the Truth Young Adult Cohort Study, a national sample of young adults aged 18-34 assessed every six months. Ever tobacco users (n=724) reported nine subjective responses to their first tobacco use as well as past 30-day use of tobacco products (including cigarettes, little cigars/cigarillos, e-cigarettes, and hookah), and current substance use (alcohol and marijuana). Exploratory factor analysis (EFA) reduced the subjective responses to two factors: *Negative Experiences* (dizzy, lightheaded, nauseated, coughing, difficulty inhaling, buzz) and *Positive Experiences* (relaxed, liking the taste and smell). Linear regression models first examined correlates of EFA-derived factors by entering demographic, tobacco, and substance use correlates in a stepwise fashion. Next, logistic regression models examined associations between initial experiences and past 30-day tobacco use retaining variables with $p < .05$ from previous models as covariates. Two thirds reported cigarettes as their first product (68%) and the mean age at first use was 17 years (SD=5.4). In the first set of models, being male, younger age at first use, and higher number of past 30-day tobacco products emerged as significant correlates

of *Negative Experiences*, while being male, Black vs. White race, and better financial situation emerged as significant correlates of *Positive Experiences*. Both negative (OR=1.27) and positive (OR=2.1) experiences were positively associated with past 30-day tobacco use controlling for relevant covariates. Respondents who reported more negative experiences were not deterred from subsequent tobacco use nor from using a greater number of tobacco products. Findings have the potential to inform interventions to decrease the appeal of tobacco products and discourage experimentation.

FUNDING: Truth Initiative

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POS3-98

NICOTINE ADDICTION MANAGEMENT (NAM) IN SURGERY PATIENTS: MAKING NAM ROUTINE IN THE POST ANESTHESIA CARE UNIT (PACU) - NURSE'S IMPRESSIONS

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INTRODUCTION: While most elective surgical patients are screened in preoperative clinics for tobacco use and NAM, emergency/day surgery patients may not be given such an opportunity. This QI project was designed to make tobacco screening and NAM a routine part of the PACU process. METHODS: Pre-implementation needs assessment and pre/post-implementation audit and interviews were performed. Nurses received videotaped lectures addressing issues identified. We measured the improvement in identifying smokers at PACU and assessed the impact of the project on work environment. RESULTS: The needs assessment indicated that the absence of nicotine replacement medication in the PACU and lack of familiarity with the guidelines for treating tobacco use were the main barriers preventing implementation of NAM in PACU. Nurses perceived that direct lectures/videos (56%) would be the most effective methods of education. Prior to initiation of the project no patients were screened for smoking status in PACU and the overall screening rate for all patients entering PACU was 54%. One-month post initiation the overall screening rate for all patients entering PACU increased to 88% of which 26% were smokers. Qualitative analysis of eighteen interviews with nurses indicated that the program had very limited impact on their daily work load and felt it was a valuable and sustainable initiative. Nurses acknowledged that personal factors had impact on their ability to intervene, especially their knowledge and confidence in making the intervention. Although many indicated they were skeptical initially, with time they felt being able to intervene positively and provide NAM. Most nurses saw the project as easy to sustain and hoped it will continue beyond the piloting period. CONCLUSION: A significant improvement in patient screening and number of patients provided NAM was observed. Providing nurses with appropriate education can enhance confidence and leads to an expansion of their role with relative ease. The process needs to be clear, simple, and to have limited impact on their daily work. Ongoing support and strong leadership is essential as is clear communication of outcomes.

FUNDING: Alberta Health Services- Quality Improvement Grant

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POS3-99

A PILOT OF MEASURES ASSESSING NORMS TOWARDS SMOKING, NICOTINE USE, AND THE TOBACCO INDUSTRY: FINDINGS FROM THE 2016 ENGLAND SMOKERS' TOOLKIT SURVEY

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AIMS: There is concern that electronic cigarettes (ECs) are renormalising smoking, nicotine use, and the tobacco industry, so measures are needed to monitor these norms. Following a systematic review and cognitive testing, 13 measures were

selected and/or developed. The present study aimed to test these 13 measures for validity and reliability in order to select a smaller set of measures to use in national surveys. **METHODS:** In March/April 2016, the Smoking Toolkit Study (n=1685) included 13 measures of social norms towards smoking (perceived: number of smoking acquaintances; family, friend, partner and public approval of smoking; commonality of smoking; comfort smoking in public) and nicotine use (perceived: public approval of ECs; commonality of ECs), and personal attitudes towards smoking (living with smoker), nicotine use (using nicotine to quit; using nicotine for boost) and the tobacco industry (tobacco industries out of business). Construct validity of each was assessed using multivariate linear regression using smoking status as a criterion (never, ex, current smoker). Internal reliability was assessed using Principal Components Analysis (PCA). Face validity was assessed by the wider research team. **RESULTS:** Compared with never and ex-smokers, current smokers were more likely to have positive social norms towards smoking on five of seven measures (perceived: number of smoking acquaintances; family, friend, partner and public approval of smoking), and express positive attitudes towards living with a smoker and the tobacco industry (all $p < .001$). Compared with never smokers only, current smokers were more likely to have positive social norms towards nicotine on one of two measures (perceived public approval of ECs, $p < .01$) and express positive attitudes towards nicotine use on one of two measures (using nicotine for boost, $p < .01$). PCA demonstrated clear four (nonsmokers) and five (smokers) component solutions, corresponding broadly to the different categories of norms and attitudes. Of the nine measures associated with smoking status, the public approval of ECs measure was dropped due to poor face validity, leaving a set of eight measures. **CONCLUSIONS:** Eight valid and reliable measures to monitor norms and attitudes towards smoking, nicotine use and the tobacco industry were identified for use in national surveys: five social norms towards smoking measures, and one measure each assessing personal attitudes towards smoking, nicotine use and the tobacco industry.

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POS3-100

SMOKING AS A BRAIN DISEASE: A MIXED METHODS STUDY ON SMOKERS' ENDORSEMENT OF BIOMEDICAL DEFINITIONS OF TOBACCO DEPENDENCE

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SIGNIFICANCE: Like other forms of drug dependence, tobacco dependence is increasingly being described as a "chronic brain disease." This medical labelling has been critiqued in relation to other addictions, but the implications for tobacco control have been neglected. Some have posited that biomedical conceptions of addiction will reduce stigma and increase uptake of efficacious treatments. Others have countered that it could increase stigma, reduce treatment seeking, and deter unassisted quitting. We explored how Australian smokers respond to the labelling of smoking as a brain disease. **METHODS:** A mixed method study comprising a national online survey of 1,538 smokers with closed and open-ended questions. **RESULTS:** The quantitative results showed that 58% of participants believe that smoking changes the chemistry of the brain, and around one third of participants agreed that smoking was a brain disease. Many participants expressed uncertainty about the role of the brain in smoking, with a high prevalence of "don't know" responses. Participants were asked to complete an open-ended question about why they agreed or disagreed that smoking was a brain disease. A content analysis of responses found that common reasons for rejecting the brain disease label were that the language of "disease" downplayed or ignored the role of choice; that the "brain disease" label was too serious to apply to smoking; and that it could lead to an increase in the stigmatization of smokers. The minority who agreed that smoking was a brain disease felt it was consistent with their personal experience of "craving" cigarettes, that it explained why they felt a loss of control over their

smoking. **CONCLUSIONS:** The definition of smoking as a "brain disease" is inconsistent with most Australian smokers' conceptualisations of their smoking, and may have unintended consequences if it is widely disseminated in healthcare settings or anti-smoking campaigns.

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POS3-101

BEST PRACTICES FOR TOBACCO STUDY RECRUITMENT USING FACEBOOK

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RATIONALE: More than 75% of clinical trials fail to meet enrollment goals; recruitment challenges including costs are often cited as reasons. With 1.7 billion users, Facebook reaches potential study volunteers in ways traditional media can't - on a device in which they can volunteer in real time, at lower cost, and with the ability to target an audience by geographic location and personal interests. **METHODS:** As part of an NCI-funded research project evaluating the effects of smoking and vaping, we utilized Facebook ads to recruit study participants. The study ran 5 different Facebook ad campaigns over 12 months. We assessed factors associated with higher rates of clicks and volunteering, including different creative elements, keywords, and payment options. **RESULTS:** In total, the ads reached 510,902 people, generating 63,035 clicks at a cost of \$12,384 (about \$0.20/click). About 2,200 people volunteered at a cost of \$5.63/volunteer. This compares favorably to traditional media costs. **CONCLUSIONS:** Factors associated with greatest Facebook ad results included: 1. Creative Elements. Ads performed best when the image featured an attractive person from the target demographic who *wasn't* smoking. The more detailed the text in the ad and sign-up page, the more likely people were to self-screen. Mentioning financial reimbursement spurred viral referrals to friends. Including a URL in the "Display Link" box was essential to prevent Facebook auto-generating content without previewing. 2. Keywords. More of the target audience was reached by using keywords that reflected their entertainment interests (hobbies, pop stars, popular movies, etc.) than by limiting keywords to items like "smoking" or "addiction." Periodically refreshing keywords improved outcomes. 3. Payment Options. Costs were contained by selecting the Facebook "pay per click" option with a maximum outlay for the ad buy, a major advantage over traditional ads that demand a fixed payment regardless of response. In this way, the Facebook ads ran until enough people clicked it. Selecting open-ended dates to avoid approval delays also boosted efficiency.

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POS3-102

NICOTINE DEPENDENCE AND SLEEP QUALITY IN YOUNG ADULTS

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SIGNIFICANCE: More cigarette smokers report poor sleep quality than non-smokers, but the association between nicotine dependence (ND) and sleep quality has not been well-characterized. The objective of this study was to describe the associations among frequency and intensity of cigarette smoking, ND symptoms and sleep quality in young adults. **METHODS:** Data on past-year smoking frequency, number of cigarettes smoked in the past month, five ND indicators (i.e., craving, withdrawal, self-medication symptoms, mFTQ, ICD-10 criteria for tobacco dependence) and sleep quality (measured with the Pittsburgh Sleep Quality Index (PSQI)) were collected in 2011-12 in self-report questionnaires completed by 405 young adult smokers (mean age 24 (0.6) years; 45% male; 45% daily smokers) participating in a longitudinal investigation of the natural course of ND.



Associations between indicators of cigarette smoking, ND and sleep quality were examined in multivariable logistic regression analyses controlling for age, sex, mother's education and alcohol use. RESULTS: Thirty-six percent of participants reported poor sleep quality (PSQI ≥ 5). Higher cigarette consumption (OR(95% CI), 1.03(1.001-1.05)) but not frequency of past-year smoking, more frequent withdrawal symptoms (1.05(1.004-1.10)), more frequent cravings (1.05(1.004-1.10)), higher mFTQ scores (1.14(1.02-1.27)) and endorsing more ICD-10 criteria for tobacco dependence (1.19(1.04-1.36)) were associated with poor sleep quality. CONCLUSION: Cigarette smoking and ND symptoms are associated with poor sleep quality in young adult smokers. Advice from practitioners to cut back on number of cigarettes smoked per day and treatment of ND symptoms may improve sleep quality in young adult smokers.

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POS3-103

PRIMARY RESULTS OF A 10-YEARS FOLLOW-UP OF A RCT ON EMERGENCY DEPARTMENT-INITIATED TOBACCO CONTROL

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SIGNIFICANCE: Between October 2005 and December 2006, 1012 emergency department smokers were enrolled in the randomized controlled Tobacco Control in an Urban Emergency Department (TED)-study, investigating emergency department-initiated tobacco control (ETC) in the form of motivational interviewing plus 4 telephone booster sessions. Smoking status was assessed by self-reports 1 month, 3 months, 6 months and 12 months after the tobacco control intervention. At 12 months, a positive although non-significant effect of ETC on tobacco abstinence was observed. The Langzeit-Follow-up der Tobacco Control in an Urban Emergency Department (Laocoon)-study aimed to investigate the 7-days point prevalence abstinence 10-years after the initial ETC intervention and to evaluate its long-term effect on repeated point prevalence abstinence over 10 years. METHODS: After ethical committee approval and between December 2015 and June 2016, all study participants of the TED study received a mailed questionnaire investigating their smoking status and additional covariates. Returned questionnaires were digitalized and the Laocoon-data pooled with the data of the TED-study. The numbers of current non-smokers were compared between study groups using both observed-only as well as intention-to-treat (ITT) analysis. For the ITT analysis, non-responder were classified as current smokers. The long-term effect of ETC was evaluated with multilevel-models for binary outcomes and using all available follow-up information. RESULTS: Overall, 229 (22.6%) patients responded to the 10-year-follow-up. Of these 112 (48.9%) were current abstainers, 61 (51.3%) in the intervention group and 51 (46.4%) in the control group, $p = 0.46$. In ITT analysis 12.1% of the TED intervention group and 10.1% of the TED control group were current abstainers, $p = 0.31$, respectively. Preliminary analysis of all observed follow-up data suggest a marginal significant long-term effect of ETC on repeated point prevalence with an odds ratio of OR = 1.34 (95% confidence interval 1.00 – 1.78), $p = 0.05$. CONCLUSIONS: Preliminary findings of the Laocoon-study suggest a marginally significant effect of emergency department initiated tobacco control on repeated tobacco abstinence up to 10 years after the initial intervention.

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POS3-104

DEVELOPING A WORKSITE-BASED CULTURALLY ADAPTED SMOKING CESSATION INTERVENTION FOR HISPANIC/LATINO CONSTRUCTION WORKERS: ISSUES OF ACCEPTABILITY AND PRACTICAL CONCERNS

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SIGNIFICANCE: The number of United States (US) Hispanic/Latino construction workers (CWs) tripled this past decade to 2.6 million, with 91% of South Florida CWs being Hispanic/Latino. Smoking rates among CWs are nearly twice the national average. Yet, cessation efforts for CWs are hindered by high rates of job mobility, limited access to cessation services, and the absence of interventions tailored to the culture/work circumstances of CWs. A method to engage these smokers is to partner with lunch trucks routinely visiting construction sites to support the delivery of a unique smoking cessation intervention. We performed focus groups to explore this concept, assess acceptability, and seek input into intervention development. METHODS: We conducted four focus groups with Hispanic/Latino CWs in 2016 to explore tobacco behaviors/norms and elicit information on the acceptability of a brief worksite face-to-face culturally tailored smoking cessation intervention using lunch trucks ($n=31$). Participants were daily smokers from a large Miami construction site. Sessions were 60 minutes and semi-structured. Content analysis was used to examine *a priori* themes of work environment, smoking cessation treatments (e.g., NRT), method of intervention delivery, cultural issues related to cessation, and quit interest. RESULTS: Data showed construction sites as challenging work environments with CWs reporting they are under tremendous job stress. Most smoking took place during the day at work or on breaks and most CWs were unaware of NRT as a quit aid. Most CWs were open to a worksite face-to-face cessation intervention; but some felt it had to be immediately before or after work and not during lunch as some workers underutilize the lunch truck while others reported too much pressure to keep working. Finally, some CWs felt it was unnecessary to tailor the intervention to Hispanics/Latinos indicating that all smokers are the same regardless of race/ethnicity. CONCLUSIONS: Findings demonstrate the need to consider the work environment, job demand/stress, and worker group preferences in the development of tailored and accessible cessation interventions to reach these isolated smokers. Focus group findings will allow us to create a unique cessation intervention tailored to the needs of these workers.

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POS3-105

DSM-V TOBACCO USE DISORDER SYMPTOMS IN A NATIONALLY REPRESENTATIVE SAMPLE OF US ADULT LIFETIME EVER ELECTRONIC- AND COMBUSTIBLE- CIGARETTE USERS

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There is ongoing public health and regulatory interest in the scope of use of tobacco products and problems associated with use. Relatively little is known to date about the rate of problematic tobacco use associated with electronic-cigarettes. Weighted analyses aimed to examine lifetime rates of DSM-V tobacco use disorder symptoms in a nationally representative sample of US adult lifetime ever electronic (ECIG-) ($N=159$) and combustible (CCIG-) ($N=432$) cigarette users from a US adult sample ($N=1029$) who completed a survey administered through GfK's KnowledgePanel. In lifetime ever ECIG users, rates of tobacco withdrawal symptoms ranged from 6.1% for depressed mood to 14.4% for concentration problems after quitting/cutting down on ECIG; other tobacco dependence symptoms ranged from 6.6% for reduction in activities to 37.7% for tolerance in relation to ECIG use. In terms of problems associated with CCIG use, in lifetime ever CCIG users, rates of withdrawal symptoms ranged from 19.9% for depressed mood to 46.6% for irritability; other tobacco dependence symptoms ranged from 9.9% for reduction in activities to 46.3% for craving in relation to CCIG use. Weighted logistic regression analyses examining CCIG-related problems, controlling for number of cigarettes smoked per day, age, and gender found that, relative to CCIG users only, dual



ECIG and CCIG users had significantly greater odds of all the tobacco withdrawal symptoms, except appetite change, with increased odds (ratio(OR)) ranging from OR= 2.3 (95% Confidence Interval(CI): 1.4-3.9) for irritability and sleep problems (OR=2.3 (95%CI:1.3-4.3) to OR=5.4 (95% CI:3.0-10.0) for depressed mood; increased odds of all the remaining dependence symptoms, except for tolerance and continuing to use despite physical problems, was also detected, ranging from OR=2.0 (95%CI:1.2-3.4) for difficulty quitting to OR=18.9 (95%CI:6.0-59.4) for interference with role obligations. Results highlight problems associated with ECIG use and the risk of problematic CCIG use among dual users. Future prospective studies will be required to critically inform the direction of the relationship between dual ECIG-CCIG use and related problems.

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POS3-106

STRATEGIC USE OF MEDIA MODALITIES TO MAXIMIZE SERVICE VOLUMES: PREDICTORS OF A STATEWIDE CESSATION PROGRAM

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SIGNIFICANCE: After declining consumer interest in existing tobacco cessation services, ClearWay MinnesotaSM launched a new suite of QUITPLAN[®] Services in 2014: a set of Individual Services (2 week NRT starter kit, email program, text messaging and quit guide), and the Helpline (phone counseling plus NRT, integrated email, integrated text messaging and materials). The "No Judgments. Just Help" mass media campaign that used empathetic messaging was launched concurrently with several other media efforts to promote services. Increased service volumes were observed in the two years post launch. This research examines which media efforts had the biggest impact on service volumes. METHODS: Regression analysis was used to identify relationships between weekly service volume and campaign messages from March 2014 - February 2016. Two separate multivariate linear regression models were used to predict volume: one predicting inbound calls and the other predicting web visits (log-transformed). Predictors included the following QUITPLAN media events: TV and radio ads, an infomercial, promotions for a quitting contest, digital and Facebook impressions, and earned media TV coverage. The CDC's Tips campaign was included in the models, controlling for non-media factors including New Year's Day, prior week inbound calls and prior week web visits. RESULTS: The adjusted R-Square for the final inbound call volume model was .70; for the final web visit model was .84. After controlling for the other factors in the models, QUITPLAN TV ads, infomercial and radio ads were significantly associated with an increase in inbound calls and QUITPLAN digital impressions, TV ads, infomercial and quit contest events were significantly associated with an increase in the natural log of web visits. The Tips campaigns were also significantly associated with an increase in inbound calls. CONCLUSIONS: A variety of media approaches work to increase service volumes. Media appears to work differently for inbound calls and web visits. In addition to TV, an infomercial and radio were effective for both. Findings suggest approaches to maximize scarce promotional dollars.

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POS3-107

ELECTRONIC CIGARETTE AND PSYCHOLOGICAL DISTRESS: FINDINGS FROM THE 2014 NATIONAL HEALTH INTERVIEW SURVEY

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OBJECTIVE: It is well recognized that individuals with higher levels of psychological distress and a range of mental health problems have increased rates of cigarette use. To date, the possible association between individuals' levels of psychological distress and e-cigarette use has not been investigated, despite the

dramatic growth of e-cigarette use in the US. We examined this possible association using a nationally representative sample of US adults. METHODS: A total of 36,697 adults from the 2014 National Health Interview Survey (NHIS) were included. The Kessler 6 scale was used to measure psychological distress. Multivariate logistic regression analysis was conducted to assess the association between level of psychological distress and e-cigarette use. RESULTS: Both e-cigarette and cigarette use varied according to level of psychological distress as well as multiple socio-demographic characteristics. In a multivariate model, as levels of psychological distress increased, so did the likelihood of being an exclusive e-cigarette user (OR=3.7; 95% CI=1.6, 8.6), current dual user of e-cigarettes and cigarettes (OR=4.6; 95% CI=3.1, 6.7), former cigarette user who had used e-cigarettes (OR=3.2; 95% CI=2.2, 4.8) and/or a current user of cigarettes only (OR=2.1, 95% CI=1.7, 2.6). CONCLUSION: These are the first data to demonstrate that, as is true for cigarettes, e-cigarette use increases with increasing levels of psychological distress. Further large-scale, longitudinal studies are needed to determine the direction of this relationship and to evaluate the long-term positive and negative consequences of such use among individuals with a range of mental health problems.

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POS3-108

WHY DO YOUTH AND YOUNG ADULTS USE E-CIGARETTES? MOTIVATIONS AND EXPECTANCIES

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There is evidence suggesting the potential for e-cigarettes (e-cigs) to serve as cessation tools, while information also exists about possible risks from the devices. The purpose of this study is to better understand beliefs about the outcome of using e-cigs, or e-cig expectancies, among youth and young adults with varying levels of e-cig use. Online surveys among 1,554 youth and young adults ages 15-24 measured e-cig use and expectancies. E-cig users were placed on a continuum based on their level of use. Non-users were identified as either closed (never users of tobacco or e-cigs) or at-risk (never e-cig use but ever or current tobacco users). E-cig users ranged from low-involvement (used e-cigs <4 times in past 30 days) to low level experimenters (ever used combustible tobacco; used e-cigs >4 times in past 30 days), high level experimenters (current combustible tobacco user; used e-cigs <10 times in past 30 days), and heavy users (current combustible tobacco user; used e-cigs >10 times in lifetime and >4 times in past 30 days). E-cig expectancies items covered six themes: perceived reduced harm, flavors/tastes, social acceptability, convenience, new technology, and options for quitting. Three in five youth and young adults were classified as non-e-cig users, with 32% classified as closed and 27% as at risk. Forty percent used e-cigs: 10% were low-involvement, 8% were low level experimenters, 12% were high level experimenters, and 10% were heavy users. All three e-cig user subgroups (low-involvement and low and high level experimenters) were motivated by perceived reduced harm and flavors. Low involvement users were also motivated by social acceptability (52%) and convenience (37%). Low level experimenters were drawn to new technology (24%) and tastes (42%). Heavy users desired an affordable option to help in quitting cigarettes (36%). Most youth expect e-cigs to negatively impact their overall health, but they have the impression that e-cigs are not as harmful or as addictive as other nicotine/tobacco alternatives. Users are attracted to e-cigs by their flavors. This information will be used to inform messaging around e-cigs among young people.

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POS3-109

PREVALENCE AND CORRELATES OF ELECTRONIC CIGARETTE USE WITH NICOTINE AMONG SOUTHERN CALIFORNIA ADOLESCENTS AND YOUNG ADULTS

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SIGNIFICANCE: Use of electronic cigarettes (e-cigarettes) is popular among adolescents and young adults. However, there are limited data on whether youth are using e-cigarettes with nicotine and on factors that are associated with use of nicotine-containing e-cigarettes. **METHODS:** Data from the 2015 assessment of the Happiness & Health Study (high school students; N=3,369) and the Southern California Children's Health Study (recent high school graduates; N=1,553) were combined for analysis. Prevalence and correlates of use of e-cigarettes with nicotine were examined using logistic regression adjusting for gender, parental education, race/ethnicity and cohort. **RESULTS:** In the combined sample, 471 (9.6%) participants reported e-cigarette use in the past 30 days. Among past 30-day e-cigarette users, more than half of the adolescents (52.6%) and two thirds of young adults (67.8%) reported using an e-cigarette that contained nicotine. Youth who used e-cigarettes more frequently during the past 30-days were more likely to use e-cigarettes with (vs. without) nicotine (OR [10+ vs. 1-2 days]=5.41; 95%CI: 4.62, 6.21). Youth who smoked (vs. did not smoke) cigarettes in the past 30-days were also more likely to use e-cigarettes with (vs. without) nicotine (OR=4.68, 95%CI: 2.63, 8.33). Notably, more than half of never-smokers used e-cigarettes with nicotine in the past 30 days. Use of fruit flavorings was common (65.4% of combined sample), but was not associated with use of nicotine-containing e-cigarettes. Associations of vaping, smoking, and flavoring with e-cigarette nicotine content did not significantly differ by age (adolescents vs. young adults). **CONCLUSIONS:** A substantial proportion of adolescents and young adults in Southern California may use e-cigarettes that contain nicotine, which could increase risk of more frequent vaping, cigarette smoking and possibly nicotine dependence. The implications of vaping nicotine by youth for longitudinal transitions in tobacco product use and regulation merit further study.

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POS3-110

THE INTERACTION BETWEEN URBANIZATION AND REDUCING FINANCIAL BURDEN OF SMOKING CESSATION SERVICE: DISPARITY IN LONG-TERM ABSTINENCE

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INTRODUCTION: Taiwan Smoking Cessation Service (TSCS) has been established since 2002, which reimburses physician counseling and subsidized 8-week pharmacotherapy for motivated smokers. The financing strategy of drugs used in TSCS changed from a fixed subsidy (FS) to ceiling copayment (CC) in 2012, and in turn markedly reduced monetary burden for treatment-seeking smokers. This study examines whether the impact of new financing policy on cessation outcome depended on the urbanization level of smoker's place of residence. **METHODS:** We used the TSCS data from 2008-14 to examine subject's self-reported 30-day point prevalent abstinence (PPA) by telephone interview at 6 months and its association with new financing policy (i.e. CC), urbanization and CC*urbanization. There are five clusters of urbanization with cluster 1 indicating the highest level and cluster 5 the lowest one. We modeled the probability of 30-day PPA with GEE while controlling variables including sex, age, cigarettes pre day, physician specialty, seasonality and time trend of service. **RESULTS:** A sample of 107,358 were selected for telephone interview at 6months, with a mean age of 44.1±12.4 and male predominance (83.5%). Of them, 61,220 were after implementing CC, and 46,138 were in the FS. The 30-day PPAs in cluster 1 to 5 were 17.7%, 16.0%, 14.6%, 13.6% and 14.6% before implementing CC, and increased to 23.9%, 23.5%, 20.9%, 18.2% and 16.4% after its implementation. Urbanization significantly impacted on 30-day PPA (p=0.0112) after controlling other variables. Compared to cluster 1, the ORs for cluster 2-5 were 0.88 (0.79-0.99), 0.84 (0.76-0.93), 0.80 (0.69-0.93) and 0.88 (0.75-1.03). The interaction between CC and urbanization was significant (0=0.0087). The ORs for CC*(cluster 1-5) were 1.18 (95% CI: 1.08-1.28), 1.31 (1.16-1.47), 1.24 (1.15-1.34), 1.16 (1.03-1.31), 0.93 (0.74-1.14). **CONCLUSION:** Higher level of urbanization was associated with better cessation outcome at 6 months. Reducing financial burden generally promoted abstinence for treatment-seeking smokers. However, subjects in lower

urbanized regions gained very limited benefit. As a result, the new financing policy enlarged rather than minimized the disparity among smokers from communities with various levels of urbanization.

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POS3-111

AVAILABILITY AND MARKETING OF TOBACCO PRODUCTS AND E-CIGARETTES IN TWO RUSSIAN CITIES FOLLOWING IMPLEMENTATION OF STRINGENT TAPS LEGISLATION

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BACKGROUND: Electronic cigarettes are gaining popularity globally. Countries with comprehensive tobacco control policies that do not regulate e-cigarettes, like Russia, may be vulnerable to the expansion of e-cigarettes as tobacco consumers look for ways to cope with regulations that limit the use and availability of combustible tobacco. Retail display, and marketing play a crucial role in shaping product adoption and usage patterns. **METHOD:** This observational study assessed changes in the availability of tobacco products and e-cigarettes in retail outlets in Moscow and St. Petersburg following passage of comprehensive tobacco control legislation in 2014. Data were collected in 2014 and 2016 using a checklist in. In 2014, we visited 298 supermarkets, independent grocers, and kiosks. By 2016, 54 stores had closed leaving a sample 244 retailers. In addition to availability, we assessed the prevalence of product display and marketing among retailers selling tobacco or e-cigarettes in 2016. **RESULTS:** The availability of tobacco products for sale was largely consistent across retailers between 2014 and 2016, while the availability of e-cigarettes increased from 28.9% to 52% of retailers selling these devices in 2014 and 2016, respectively. Of retailers that sold these products in 2016, tobacco products were featured on display among 17.5% (n=37/212) and e-cigarettes among 78% (n=99/127). Displays of e-cigarettes were most common in the cashier zone (70.1%, n=89) and in proximity to sweets (68.5%, n=87). Advertising for e-cigarettes was present in 55.1% of stores (n=71), and was almost exclusively in the form of signage (55.1%, n=70), compared to other forms of promotion like discounts or giveaways. **CONCLUSION:** The availability of tobacco remains largely unchanged following implementation of stringent anti-smoking laws in Russia while the availability of e-cigarettes has increased. E-cigarettes may not be replacing, but rather supplementing, tobacco in the marketplace. Marketing for e-cigarettes is minimal and follows regulations in place for tobacco. As e-cigarettes are not currently regulated in Russia, it is possible that marketing practices may become more aggressive in the future.

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POS3-112

TRAJECTORIES OF WATERPIPE TOBACCO USE: A REVIEW OF THE PROSPECTIVE LITERATURE

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BACKGROUND: Waterpipe (WP) smoking is increasing globally despite health risks and dependence potential. Dependence can lead to an escalation of WP use over time and uptake of other tobacco products (e.g., cigarettes) that provide a more convenient method for procuring nicotine. **OBJECTIVES:** This narrative review examines two important aspects of WP use trajectory: 1) whether WP use escalates over time; and 2) whether WP users are at higher risk than non-users for transitioning to cigarette use. **METHODS:** The following electronic databases were searched: PubMed, PsychINFO, OmniFile Full Text Mega, Social Sciences Full Text, CINAHL, and Web of Science. Search terms included waterpipe and its many variant terms. Articles were included if they were published between 1990 and 2016 and examined (1) within-person change in WP use between at least two-time points, or (2) use of other forms of tobacco as a function of WP use at



an earlier time point. RESULTS: Three articles assessed escalation of WP use over time. In one study from North America, only 8% of WP users progressed to more frequent use over four years, whereas two studies from the Middle East found upwards of 1/3 of youth and young adults progressed in the frequency of WP use over 1-3 years. Progression was more likely among males, and among persons who smoked cigarettes, had more highly educated parents, and were exposed less to health warnings. Six studies tested the association between WP use and subsequent cigarette use. Three studies showed WP use was significantly associated with subsequent initiation of cigarette smoking. In two of three other studies, WP use predicted escalation of cigarette use over 3-8 months, and one study showed WP users had more difficulty quitting cigarette smoking than non-WP users. CONCLUSIONS: This review suggests many WP users may become dependent and increase their use over time. Further, WP use increases the risk of initiating cigarette smoking and may increase the risk of escalation and failure to quit cigarettes.

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POS3-113

SMOKING PREVENTION IN CHILDREN AND YOUTH: A SYSTEMATIC REVIEW OF INDIVIDUALIZED INTERVENTIONS

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SIGNIFICANCE: Traditional approaches to smoking prevention among adolescents, often provided in school environments, have been effective in the short-term and have contributed to declining rates of cigarette smoking among adolescents since the mid-1990s. However, the rate of decline in adolescent smoking rates has slowed in recent years; thus, examining alternative settings for intervention is warranted. This study sought to determine what cognitive-behavioral based, individual-level preventative interventions have been implemented since 1990 and administered outside of formal school settings to decrease the likelihood of smoking initiation among children and adolescents aged seven to 18 years. METHODS: Study procedures were conducted in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist. We searched MEDLINE, PsycINFO, CINAHL, Pub Med, SCOPUS, and Sport Discus for relevant studies, published in English. Eligible studies had experimental designs, presented quantitative data, applied a smoking prevention intervention conducted among children and adolescents, measured some form of post-intervention cigarette smoking prevention outcome (behavioral and/or psychological), and were conducted in 1990 or later. Article review, data extraction, and assessment of risk of bias were conducted by two independent reviewers. RESULTS: We included 14 studies administered in various settings: six in primary health care; three applied informally during and outside of school hours; three in the home; and two in an extra-curricular setting. Positive preventative effects in smoking behavior ranging from 3-months to 4-years were observed in eight studies. Social environmental influences (e.g., parental smoking, friends) appear to be a salient factor for consideration. CONCLUSIONS: Effective approaches involved interventions conducted in primary health care settings as well as those employing interpersonal communication and support strategies (e.g., via peer leaders, parent support, physician advice). These strategies should be employed to help reduce rates of smoking uptake in children and adolescents.

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POS3-114

CORRELATES OF EXCLUSIVE HOOKAH USE AND DUAL USE AMONG US YOUNG ADULTS FROM WAVE 1 OF THE PATH STUDY

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BACKGROUND: Hookah use is increasing among young adults and is commonly used in conjunction with other tobacco products. Little is known about young adults who are exclusive users of hookah compared to dual users of cigarettes and hookah. This analysis examined correlates of exclusive hookah use and dual

use of hookah and cigarettes among young adult ever hookah users, in a nationally representative sample of US young adults. METHODS: Data were drawn from Wave 1 of the Population Assessment of Tobacco and Health (PATH) Study, and was limited to young adults, ages 18 to 24 (n= 9,112) who were ever hookah users (n= 5,061). Measures included demographics, past 30-day use of alcohol and marijuana, and 12 questions assessing reasons for hookah use. Weighted bivariate and multivariate logistic regression models were conducted to examine predictors of past 30-day exclusive hookah use and of past 30-day dual use of hookah and cigarettes, separately. RESULTS: Males (AOR=0.6, 95% CI=0.5-0.5) and past 30-day users of marijuana (AOR=0.3, 95% CI=0.2-0.4) had lower odds of exclusive (vs. non-exclusive) hookah use while Hispanic young adults had 1.6 times greater odds of exclusive hookah use (AOR=1.6, 95% CI=1.3-2.2). Ever users who used hookah because it is "allowed in places cigarettes aren't" were less likely to be exclusive users (AOR=0.5, 95% CI=0.4-0.8). In contrast, males (AOR= 1.5, CI= 1.2-1.9) and past 30-day marijuana users (AOR= 1.8, 95% CI= 1.4 -2.2) had higher odds of being a dual user of cigarettes and hookah. Dual users also had different reasons for using hookah such as "comes in flavors I like" (AOR= 1.4, 95% CI= 1.0-1.8), "people who are important to me use it" (AOR= 1.4, 95% CI= 1.1-1.7), and using hookah is "part of my culture" (AOR= 1.5, 95% CI= 1.0-2.2). CONCLUSIONS: Findings reveal that dual hookah/cigarette use is associated with male gender, using marijuana, and using hookah for social/cultural reasons or the appeal of flavors, whereas exclusive hookah user is associated with female gender, Hispanic ethnicity, and non-current or never marijuana use. Characterizing different types of hookah users has implications for developing targeted interventions.

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POS3-115

WHOM DO U.S. ADULTS TRUST TO COMMUNICATE THE HEALTH EFFECTS OF ELECTRONIC NICOTINE DELIVERY SYSTEMS?

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OBJECTIVE: This study assessed the ratings of trust that U.S. adults ascribe to public health, the tobacco and vapor industry, and news media for information about the health effects of electronic nicotine delivery systems (ENDS). METHODS: Data were obtained from the 2015 Tobacco Products and Risk Perceptions Survey of a probability sample of 6,051 U.S. adults. Weighted regression analyses were conducted to examine sociodemographic and attitudinal in trust ratings, as well as to evaluate whether trust ratings were associated with the perceived risks and use of ENDS. RESULTS: On average, US adults reported that they would trust the information concerning the health effects of ENDS from health experts, the FDA, and CDC, whereas they would distrust the tobacco and vapor industry and the news media. Trust ratings varied between sources with the CDC and health experts being most trusted and tobacco manufacturers being the most distrusted. Trust also varied depending on sociodemographic characteristics and cultural worldviews. Greater trust of public health sources was reported by those with higher income and education and with egalitarianism and communitarianism worldviews, whereas the tobacco and vapor industry was trusted more by current ENDS users, current smokers, and those with individualistic and hierarchical worldviews, and with lower income and education. Ratings of greater trust toward the tobacco and vapor industry was associated with perceptions of lower risk of premature death due to daily ENDS use but also greater uncertainty about their risk perceptions. Trust of the tobacco/vapor industry was also associated with greater odds of ENDS use, even after controlling for worldviews, cigarette smoking, and sociodemographic variables. CONCLUSIONS: Despite a very public and critical debate about the potential health risks and benefits of ENDS for individual and population health and regulatory actions of the FDA, the public health community, particularly the CDC, remains trusted for information about the health effects of ENDS use. These results have implications for the targeting and effectiveness of health messaging about ENDS for different population segments.

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POS3-116

MOST PARENTS IN THE U.S. WHO SMOKE LACK SMOKE-FREE HOMES AND CARS AND ARE USUALLY NOT ADVISED ABOUT SMOKE-FREE POLICIES BY THEIR CHILD'S DOCTOR

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SIGNIFICANCE: Smoke-free homes and cars help protect children from secondhand and thirdhand tobacco smoke exposure. Results from a previous study using data collected approximately five years prior to the data collected for the current study showed most pediatricians did not ask or advise parent smokers about smoke-free homes and cars despite many parents failing to protect their children with strictly enforced smoke-free home and car policies. **METHODS:** Parental exit interview data was collected between April and October 2015 in five control practices within five U.S. states (VA, NC, OH, IN and TN) participating in a cluster randomized controlled trial of the Clinical Effort Against Secondhand Smoke Exposure (CEASE), a pediatric office-based intervention that addresses parental smoking. A multivariable logistic regression model was constructed to identify factors associated with having a strictly enforced smoke-free home and car policy while controlling for parent sex and education. A strictly enforced smoke-free home and car policy was defined as having a rule that no one is allowed to smoke in the home and car and that no one has smoked in the home and car in the past three months. **RESULTS:** Data collected from 699 currently smoking parents were analyzed. 58.2% of smoking parents reported having a strictly enforced smoke-free home policy and 33.2% of smoking parents who have a car reported having a strictly enforced smoke-free policy for their car(s). About one-quarter of smoking parents (27.7%) reported having strictly enforced smoke-free policies for both their home and car(s). Of the 429 smoking parents without a strictly enforced smoke-free car policy, 247 (57.6%) reported smoking in the car when children were present. Few parents who smoke were asked at the pediatric visit if they have a smoke-free home (28.2%), asked if they have a smoke-free car (18.0%), advised to have a smoke-free home (21.2%), or advised to keep the car smoke-free (17.5%). Older parents were more likely to have a strictly enforced smoke-free home and car policy (aOR 1.04(1.01, 1.07)). Parents were less likely to have a strictly enforced smoke-free home and car policy if they smoked more cigarettes per day (aOR 0.90 (0.87, 0.93)) and if their youngest child was older (aOR 0.83(0.78, 0.89)). **CONCLUSIONS:** The majority of smoking parents do not protect their children from tobacco smoke exposure in both the home and car with a strictly enforced smoke-free policy. This study highlights the continued need for enhancing tobacco control interventions for parents at the pediatric office.

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POS3-117

PREVALENCE OF SMOKING IN HIV-INFECTED ADULTS IN SOUTH AFRICA

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SIGNIFICANCE: Widespread access to antiretroviral therapy (ART) improves prognosis for those with HIV, but smoking likely exacerbates cardiovascular, pulmonary and malignant comorbidities, which people with HIV are predisposed to due to ART regimens. In South Africa, about 3.5 of 6 million people with HIV are receiving ART, but prevalence of smoking is poorly reported. Thus, we assessed smoking in this population. **METHODS:** A cross-sectional survey was conducted among randomly selected adults with HIV infection attending 3 HIV treatment clinics in Klerksdorp, South Africa from April 2012 to August 2013. A question-

naire was administered to participants, and both exhaled carbon monoxide (eCO) and urine for cotinine analysis was collected from each participant to assess current smoking status. **RESULTS:** We enrolled 1,210 HIV-infected adults, of whom 753 (62%) were women. At the time of interview, 409 (34%) self-reported ever smoking: 301 (74%) (74 (25%) women, 227 (75%) men) were current and 108 (26%) were former smokers. Using eCO and urine cotinine tests, 239 (52%) men and 100 (13%) women were defined as current smokers. Nearly all smokers were receiving ART, and their median (IQR) CD4 count and BMI were 333 cells/mm³ (181 – 534 cells/mm³) and 21 kg/m² (19 – 24 kg/m²), respectively. Adjusted analysis among men showed odds of current smoking were higher with marijuana use (OR = 6.9, 95% CI: 4.1 – 12.2) and lower with increasing BMI (OR 0.9, 95% CI: 0.8 – 0.9). Among women, only the increase in number of people in the home was associated with smoking (OR = 0.9, 95% CI: 0.8 – 1.0). A subset of participants was asked about alcohol use, which was positively associated with smoking for men (OR = 7.6, 95% CI: 2.7 – 23.9) and women (OR = 4.6, 95% CI: 1.8, 12.3). Among self-reported smokers, 237 (79%) report wanting to stop within the next month, and 242 (80%) reported trying to quit within the past year. **CONCLUSIONS:** Smoking prevention and cessation strategies are needed, especially for men, in South Africa, where HIV is highly prevalent. Drivers of smoking, its interactions with alcohol and marijuana, and the health consequences in this population need further elucidation.

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POS3-118

PROFILE OF MATERNAL SMOKERS WHO QUIT DURING PREGNANCY: A POPULATION-BASED COHORT STUDY OF TASMANIAN WOMEN 2011-2013

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INTRODUCTION: Smoking remains the single-most significant preventable cause of poor pregnancy outcomes, yet around 12% of Australian women smoke during pregnancy. Many women are motivated to quit when they find out they are pregnant, yet few are successful. While previous studies have examined the profile of the maternal smoker compared to her non-smoking counterpart (Aim 1), little is known about what differentiates women who quit during pregnancy to those who do not (Aim 2). Here we present results from a study investigating the characteristics of women who were able to quit during pregnancy. **METHODS:** Data were drawn from the Tasmanian Population Health database of women who had received antenatal care between 2011-2013 (n=14300). Data collected included age, relationship status and ethnicity of expectant mothers, antenatal details, mental health conditions, and drug use. Independent samples t-tests were used to compare differences between women who had, to those who had not, quit during pregnancy. The 19.4% of women who self-reported as smoking in the first half (first 20 weeks) of their pregnancy were further grouped and analysed comparing those who reported still smoking in the second half of their pregnancy (smokers: n=2570, 92.4%) to those who had quit (quitters: n=211, 7.6%). **RESULTS:** Quitters (57.8%) were more likely to be in a relationship than their non-quitting counterparts (49.6%, p=.022), and were less likely to suffer from postnatal depression (2.4% vs 6.0%; p=.029). No other differences between quitters and smokers were observed. **CONCLUSIONS:** Determining the profile of women who are able to quit during pregnancy may be important to improve the relatively poor cessation rates among maternal smokers and may assist in more effectively targeting at risk women.

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**POS3-119****SMOKING AND FOOD INSECURITY: FINDINGS FROM THE HANDLS STUDY**

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OBJECTIVES: High cigarette prices drive smokers to quit, but may cause financial hardship among those who continue. Using data from the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) Study, we assessed if current smokers were more likely than nonsmokers to experience food insecurity and to report lower monthly expenditures on food. We also assessed if quitting smoking was associated with lower likelihood of food insecurity. **METHODS:** HANDLS is a cohort study of White and African American adults (initially aged 30-64) from Baltimore City, Maryland. Two analytic samples were participants provided information on current smoking status and food insecurity (not having enough money to buy food, skipping meals because of money, and monthly food expenditures) at Wave 1 (2004-2009; n=1099), and those provided information on smoking at Wave 1 and 3 and food insecurity (having enough money for food and eating less because of money) at Wave 3 (2009-2013; n=1215). Smoking behaviors at Wave 3 were defined as current smokers at both waves, former smokers (quit smoking between waves), and nonsmokers. Multivariable logistic and linear regression models were used. **RESULTS:** At Wave 1, 61% of the sample was African American, 53% were below poverty line, and 58% reported current smoking. Current smokers were more likely than nonsmokers to report not having enough money to buy food (AOR=1.91, 95% CI=1.46, 2.51), and having skipped meals because of money (AOR=1.71, 95% CI=1.39, 2.10), after adjusting for demographics. Current smokers spent \$39 less (95% CI=\$21, \$56) than nonsmokers each month on food. At Wave 3, current smokers were less likely than nonsmokers to report having enough money for food (AOR=0.47, 95% CI=0.36, 0.62) and more likely to report eating less in the past 30 days because of money (AOR=2.10, 9% CI=1.60, 2.77). In contrast, former smokers showed no difference in food insecurity when compared to nonsmokers (p<0.05). **CONCLUSION:** Smoking is associated with food insecurity, and quitting smoking may reduce food insecurity. Effort to promote smoking cessation among low income smokers may reduce food insecurity in this population.

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POS3-120**VALIDATION OF FAMILY AFFLUENCE SCALE FOR MEASURING SOCIOECONOMIC STATUS OF ADOLESCENTS IN HEALTH INEQUALITY RESEARCH IN A LATIN-AMERICAN COUNTRY**

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OBJECTIVES: (1) To determine the validity of the family affluence scale (FAS) for measuring socioeconomic status (SES) among adolescents in an urban, Latin-American context, (2) to evaluate the association between FAS and smoking behaviors at the individual- and school-level. **METHODS:** Data came from a cross-sectional survey of secondary school students attending 18 public and 15 private schools in three Argentinian cities (n=3,127). FAS is a four-item, self-report measure (number of computers, number of cars, own bedroom, holidays abroad) that has been validated in high-income countries. Scores were summed (range=0-8). Other proxy measures of SES were parent education (at individual-level), type of school (public vs private) and receipt of social assistance (at school-level). Smoking outcomes were: susceptibility to tobacco use among never smokers, current tobacco use, and e-cigarettes use. Multilevel logistic regression models regressed tobacco outcomes on individual FAS, controlling for sex and age. Weighted Pearson correlation coefficients were used to study associations at the school-level. **RESULTS:** Missingness was lower for FAS scores (0.6%) than parent education (6.2%). Correlations between the four FAS items scores were modest but statistically significant (r_s range=0.08–0.66; all p<0.001). Individual

FAS scores were positively associated with parent education (r_s =0.29, p<0.001). School mean FAS was lower in public than private schools and in schools receiving social assistance (both p<0.001). Individual FAS was positively associated to e-cigarette use, after controlling for student sex and age (OR_{high vs low FAS}=2.24, 95%CI 1.55-3.25), but not associated with tobacco use. School mean FAS was inversely associated with current tobacco use (r =-0.48), and positively with e-cigarette use (r =0.38; all p<0.05). **CONCLUSIONS:** The Spanish FAS had low missing data. Evidence for external validity was found, both at individual- and school-level. These findings, along with the described association between FAS and smoking behaviors, suggest that FAS is a valid measure of SES among Argentinean adolescents, and may help clarify SES-related health disparities.

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POS3-121**SMOKING IN A SAMPLE OF US ARMY RESERVES: THE KEY ROLE TRAUMA AND PARTNER INFLUENCE PLAY**

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SIGNIFICANCE: Smoking rates in the US have been decreasing. Similarly, rates of smoking are declining in the military. However, it is likely that social environmental factors have an influence on who continues to smoke. Therefore, we examined social environmental factors that may be associated with current smoking in a sample of reserve soldiers. **METHODS:** Data are cross-sectional from the baseline assessment of Operation: SAFETY (Soldiers And Families Excelling Through the Years), an ongoing longitudinal study of US Army Reserve/National Guard Soldiers and partners (N=411 couples). Participants were assessed across multiple health domains (physical and mental health, substance use, and deployment events). Logistic Regression models were used to examine the impact of social environmental factors (physical and mental health, substance use and partner factors) on current smoking (among those who smoked at least 100 cigarettes in their lifetime) in the military. **RESULTS:** Smoking prevalence was 18% and 14% for male and female soldiers, respectively. Male soldiers with partners who smoked (Odds Ratio (OR): 9.9, Confidence Interval (CI): 5.2-18.8; p<0.001), reported being physically injured by their partner (OR: 3.1; CI: 1.2-8.3; p<0.05), and suffered body pain (OR:1.3; CI: 1.0-1.6; p<0.05) were more likely to be current smokers. Additionally, there was an association between experiencing past and current wartime trauma (ps<.06) with an increase likelihood of being a current smoker. Female soldiers who had higher PTSD scores (OR: 1.1; CI: 1.0-1.1; p<0.05) and had partners who smoked (OR: 5.0; CI: 1.2-20.5; ps<.05) were more likely to be a current smoker. Higher anger scores in female soldiers were associated with being a current smoker, at a trend (p<.09). **CONCLUSIONS:** Findings indicate that experiencing trauma, both physically and mentally, are significantly related to current smoking in the military. Additionally, among both male and female soldiers, having a partner who smoked increased the odds that the soldier smokes. Military intervention efforts should focus not only on post-wartime cessation programs but also partner influence processes which may play a critical role.

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POS3-122**HISTORY AND CURRENT TRENDS IN THE ENDS RETAIL MARKETPLACE IN THE U.S.: 2010-2015**

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SIGNIFICANCE: Electronic nicotine delivery system (ENDS) devices began appearing in U.S. retail outlets in approximately 2010. Reports suggest significant



growth in ENDS retail sales since that time. Yet there is limited published evidence examining historical trends in the ENDS retail marketplace. Such surveillance is critical for understanding industry strategies and consumer demand, and may also inform regulatory efforts. **METHODS:** We used Nielsen market scanner data from 2010 to 2015 from U.S. retail outlets to examine sales overall and by product type, brand and flavoring. **RESULTS:** ENDS retail sales grew from \$10.5 million in 2010 to \$636.6 million in 2015. Sales growth was steep from 2010 through 2012 (ranging from 218% to 620% growth), but slowed to 4% in 2014 and 2015. A decline in disposable sales contributed to slow growth in recent years, while sales for cartridges and refillables grew or remained stable. Accordingly, disposable prices declined by 31% from 2010 to 2015, while prices for cartridges and refillables remained stable. Sales of newer products such as vaporizers, tanks and mods (VTMs) emerged at the end of 2015. In 2010, tobacco-flavored products captured 80% of sales and menthol-flavored 20%. By 2015, menthol grew to 30% of market share and tobacco flavored products captured 50%. Alcohol and sweet flavors grew from 0% to 12% market share from 2010 to 2015. In 2010, the market was dominated by NJOY, taking 55% of sales. Market share shifted as tobacco companies entered the industry, RJ Reynold's Vuse and Imperial Tobacco's blu captured 40% and 20% of market share in 2015, respectively. **CONCLUSIONS:** The early growth in the ENDS market slowed in recent years, with tobacco company-owned brands establishing dominance. Product sales and prices likely reflect the shift from older generation 'closed system' products to newer 'open system' products, which can be better customized to users' preferences. Flavored products, including menthol, have gained market share over time, but tobacco flavored products are still predominant. Findings shed light on evolving consumer preferences and can inform policy in a rapidly shifting tobacco and regulatory landscape.

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POS3-123

MARIJUANA USE AMONG SMOKERS AND NON-SMOKERS: RESULTS FROM THE ITC NETHERLANDS GOLD MAGIC SURVEY

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BACKGROUND: The legal environments around marijuana (MJ) and tobacco use are rapidly evolving. Existing evidence shows that tobacco-MJ co-use is common, and may become increasingly common as more jurisdictions permit medicinal and/or recreational marijuana use. Examining tobacco-MJ associations and co-use is particularly relevant in a context where the social prohibitions on the use of drugs are experiencing somewhat of a reversal. The current study examined the co-use of MJ and tobacco in a context where MJ use is decriminalized. **METHODS:** Weighted data was analyzed among 1599 participants in the 2015 ITC Netherlands—Gold Magic Wave 2 survey (1209 current smokers, 390 non-smokers), conducted in July-August 2015. Participants were recruited via existing web-based commercial panels. **RESULTS:** Among respondents who reported MJ use in the past 30 days (n=111), 86% were tobacco smokers. Smoking MJ in a joint was the most prevalent consumption method among smokers (94%) and non-smokers (82%) (Chi-Square=2.0; p=0.20). The majority of current MJ users are mixing marijuana in joints with tobacco, regardless of self-reported smoking status (91% among smokers (n=96); 88% among non-smokers (n=8) (Chi-square=1.98; p=0.37). Use of e-cigarettes to vape MJ was negligible (0.1%). In a multivariate logistic regression model predicting current marijuana use, respondents aged 25+ were more likely than 16-24 year olds to use marijuana (OR=2.77; 95%CI: 1.01-7.59). Females were less likely than males to use MJ (OR=0.41; 95%CI: 0.18-0.91). Tobacco users were more likely than non-tobacco users to use MJ (OR=2.25; 95%CI: 0.33-15.20). **DISCUSSION:** Current MJ use varies by tobacco use status and is higher among smokers; methods of MJ consumption were similar. The majority of MJ users reported mixing MJ with tobacco for consumption. Though sample size is small, a very high proportion of non-smokers reported mixing marijuana with tobacco for consumption. This may lead to misclassification of nonsmokers who have some tobacco/nicotine exposure via their MJ use.

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POS3-125

MODELING THE IMPACT OF CHANGES IN TOBACCO USE ON INDIVIDUAL DISEASE RISKS

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Philip Morris International has developed a Population Health Impact Model (PHIM) to estimate the effects of the marketing of Reduced Risk Products (RRPs) on population health. To do this, PHIM creates a disease-specific risk profile for each individual based on their detailed smoking history. To create these risk profiles, the PHIM calculates, at each year of age, the excess relative risk (ERR = RR1) associated with a tobacco use pattern by multiplying an individual's equivalent dose (ED) by the ERR for smoking cigarettes vs. never smoking. The ED is defined as 0 at birth, and stays at 0 while the individual remains a non-smoker. Once tobacco use starts, the individual's ED gradually rises towards the relative exposure (RE) corresponding to the product used (1 for cigarettes, <1 for RRP). Following quitting or a change of product, the individual's ED moves towards the new value of RE. Apart from the individual's smoking history, all the model requires are estimates of age- and disease-specific current smoking RRs and half-lives of ERR following cessation, these being derived from meta-analyses of published data. The half-life estimates were derived from data on the decline in ERR following quitting, but are also used when estimating the rise in ERR following initiation, or the change in ERR following a change in product smoked. We apply the method to data for the four main smoking-related diseases; lung cancer, ischemic heart disease (IHD), stroke and chronic obstructive pulmonary disease (COPD). For lung cancer and COPD half-lives of ERR are longer than for IHD and stroke, so changes in ERR following a change in RE are more gradual. Thus, while the RR of IHD for smokers quitting in early life will return to virtually the level of a non-smoker within a few years, the residual ERR of lung cancer in smokers quitting after many years smoking will remain clearly evident for many years. For a given disease and age-group, the PHIM can derive estimates of the average ERR for each individual in the population studied. Given an overall estimate of absolute population risk, PHIM can then also be used to derive estimates of absolute risk for each individual. ^a Reduced Risk Products ("RRPs") is the term PMP SA use to refer to products with the potential to reduce individual risk and population harm in comparison to smoking cigarettes. More details are available on www.pmiscience.com.

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POS3-126

EXPLORING NON-COGNITIVE SKILLS, PERSONALITY, IMPULSIVITY, AND TOBACCO USE AMONG GED RECIPIENTS

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General Educational Development (GED) recipients have the highest smoking prevalence of any education level. Evidence suggests GED recipients may have more behavioral problems compared to high school (HS) dropouts and a deficiency in non-cognitive skills may explain poor health behaviors. It is unclear if these traits are associated with smoking in this group. We used Population Assessment for Tobacco and Health (PATH) Wave 1 data from September 2013 to December 2014 to examine the association between non-cognitive skills and tobacco use behaviors among GED recipients (n=1,671) compared to HS dropouts (n=3,098) aged 25 or older. We explored items from the Global Appraisal of Individual Needs Short Screener to assess behavioral problems and we assessed impulsivity measured by the experimentation of various types of tobacco products, alcohol, and illicit drugs. GED recipients were significantly more likely than HS dropouts to report having sleep trouble, a hard time paying attention, starting a fight, and giving answers before a person has completed the question. GED recipients were signifi-



cantly more likely to experiment with 8 different types of tobacco, with odds ratios ranging from 1.24 (95% CI: 1.02, 1.51) for hookah to 1.93 (95% CI: 1.53, 2.43) for cigarettes. Experimentation with alcohol and 6 different types of illicit drugs assessed was also significantly higher among GED recipients compared to HS dropouts, with odds ratios ranging from 1.45 (95% CI: 1.03, 2.03) for prescription drugs to 2.47 (95% CI: 1.80, 3.38) for heroin. The odds of currently smoking cigarettes was 1.5 (95% CI: 1.3, 1.73) times higher among GED recipients compared to the odds of smoking among HS dropouts after adjusting for sex, age, race, and poverty status. After further adjusting for non-cognitive skills and experimentation with drugs and alcohol, odds of smoking was attenuated but still significantly higher than for HS dropouts (OR: 1.23; 95%CI: 1.05, 1.42). A better understanding of the non-cognitive and behavioral differences between GED recipients and other education levels is necessary in order to more effectively address tobacco use in this often overlooked disparate group.

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POS3-127

MULTILEVEL ANALYSIS OF FACTORS ASSOCIATED WITH TOBACCO SMOKING AT A PROVINCE IN KOREA

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BACKGROUND: Community social deprivation factors have not been analyzed enough by multilevel approach in Asian society. Thus, this study was to analyze variables related to tobacco smoking on both individual and community levels. **METHODS:** A total of 41,192 participants from 44 districts in Gyeonggi-do Province who responded to the community health survey in 2014 were included. Smoking status was analyzed considering two different levels of variables; individual level (demographic, socioeconomic and health behavioral factors) and community level (social deprivation index, establishment of municipal ordinances on healthy cities and registration rates in smoking clinics). Multilevel logistic regression analysis was employed with SAS PROC GLIMMIX. **RESULT:** Risk of belonging to the smoking group had tendency to be decreased with females, those who had increased age, higher education level and monthly income, practicing physical activities and having breakfast more than 5 times a week. On the other hand, the odds ratio for smoking group was high with sales and service workers or technicians and the group currently drinking alcohol in occupation variables. Among variables in community level, the higher social deprivation index presented the significance result with increased the smoking rate of each district. The lower level of socioeconomic environment the community has, the higher smoking rate it showed. In the multilevel model considering both individual and community levels, there was a significant relation with the highest power of explanation between smoking and the variables such as gender, education level, monthly income, occupation, status of drinking, exercising, number of days having breakfast, obesity and social deprivation index. **CONCLUSION:** Smoking rate was related to the factors of community level such as social deprivation index as well as of individual level. More detailed efforts to derive improvements on inequity of smoking rate should be involved by district monitoring in future studies.

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POS3-128

REGRET FROM INABILITY TO QUIT AMONG SMOKERS - RESULTS FROM A NATIONAL SURVEY, 2015

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INTRODUCTION: At least 70% of smokers want to quit and each year only 3 to 5% are able to quit successfully. Few studies have focused on subjective feelings associated with continued addiction to smoking. This study uses data from a national survey of US adults to estimate current smokers' regret from inability

to quit smoking. **METHODS:** We analyzed data from the 2015 Tobacco Products and Risk Perceptions, a nationally representative annual survey of adults. Self-reported information was collected on regret, intention to quit, perceived addiction, and risk perception for lung cancer. Multivariate logistic regression adjusting for gender, age, ethnicity, income and health status was used to predict correlates associated with regret. **RESULTS:** The study consisted of 1,284 current smokers, of whom only 10% indicated not having regret, i.e., they disagreed when asked if they would not have started smoking if they had it to do over again. Predictors for regret were poor health status (odds ratio [OR]=1.59, 95% confidence interval [CI] 1.23-2.34), and having intention to quit (OR 2.22, 95% CI 1.22-4.03). Compared to those who perceived not being addicted to cigarettes, respondents who reported being somewhat addicted (OR=2.25; 95% CI, 1.05-4.85) and those who reported being very addicted to cigarettes (OR=3.67; 95% CI, 1.59-8.52) were more likely to reporting having regret. Respondents who worried most of the time about lung cancer were four times more likely to regret (OR=4.15; 95% CI, 1.64-10.54) starting smoking than those not worried about lung cancer. Respondents who thought they were more likely to develop lung cancer in the future were more likely to experience regret (OR=1.96, 95% CI 1.45-2.65). **CONCLUSION:** The results suggest that a high number of smokers experience regret from their inability to quit smoking and indicate high intention to quit. Smokers who are worried about lung cancer, have cravings for cigarettes, and report being very addicted and want to quit are more likely to regret having started smoking. Smokers who do not report having regret are a small minority.

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POS3-129

INCREASING COMPLIANCE TO TOBACCO-REGULATION IN INDEPENDENT TOBACCO RETAIL ENVIRONMENTS: A MECHANISM TO REDUCE TOBACCO DISPARITIES IN SOCIOECONOMICALLY DISADVANTAGED RACIAL/ETHNIC MINORITY COMMUNITIES

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In spite of great gains in tobacco prevention and control in the United States, large tobacco disparities exist in socioeconomically disadvantaged racial/ethnic minority communities. Disparities are sustained by tobacco industry marketing and retail environments that foster initiation and hamper relapse prevention in vulnerable communities. This study is the first to examine independent retail environments via 500 in-person interviews with retailers and store audits in diverse socioeconomically disadvantaged African-American, Hispanic/Latino, Korean, American Indian, and Non-Hispanic White neighborhoods in California. Most independent retailers surveyed (60%) were managers or owners, with more than half (62.5%) born outside of the United States. Retailers in the Hispanics community had the lowest level of education of all groups; with 70% Hispanic, 62.5% Korean and 56% African Americans not speaking English at home. Other languages spoken included Spanish, Korean, Arabic, Nepali, French, and Armenian. Although 69% percent of retailers believe that the Food and Drug Administration (FDA) has the authority to regulate tobacco, more than half (54%) experienced barriers to compliance, including lack of access to low literacy in-language educational materials, not knowing the rules, or feeling pressure from customers to illegally sell single cigarettes. More than half (61%) did not smoke or use electronic-cigarettes. One third (31%) reported not knowing if electronic-cigarettes were safer or more dangerous than conventional cigarettes, yet half (49%) sold inexpensive disposable electronic-cigarettes, a gateway for youth smoking. To reduce tobacco disparities by increasing compliance in socioeconomically disadvantaged communities, retailers suggested obtaining posters in language with current rules placed by the checkout counter. Half (51%) wanted information delivered via electronic media, and a user-friendly FDA website. To enhance compliance in socioeconomically disadvantaged racial/ethnic communities, regulatory authorities need to fill knowledge gaps, address barriers, and produce low literacy level culturally tailored educational materials.



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POS3-130

THE USE OF SPORTS IMAGERY AND TERMINOLOGY ON CIGARETTE PACKS FROM 14 COUNTRIES

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SIGNIFICANCE: Tobacco companies have historically associated their products with sports through sponsorship and sports-themed ad campaigns. These channels are, however, increasingly restricted. Making linkages between cigarette brands and sporting concepts may associate smoking with notions of strength, individual accomplishment and a healthy body – all of which are false and misleading when it comes to tobacco use. It is important to investigate the ways in which tobacco companies may continue to associate their products with sports in a policy context where explicit sponsorship and advertising is increasingly restricted. We analyze cigarette packs as valuable communicative real estate and present ways in which sporting associations are made on the pack with a specific focus on analyzing the sports-related appeals on cigarette packages from fourteen countries. **METHODS:** Cigarette packs were collected from fourteen low- and middle-income countries in 2013; data collection was repeated in four countries in 2015. Trained coders coded cigarette packs for sports-related appeals and conducted a scan for sports-related brand names. **RESULTS:** The analysis yielded 78 'sports appeal' packs depicting a variety of sports. Both lexical (words-based) appeals and sports-related imagery were identified. Lexical appeals were most common; 65 of the 78 'sports appeal' packs (83%) included sporting terminology in the brand name or other text on the pack (e.g., 'Polo', 'Olympic', 'Win' and 'iScore'). Sporting imagery was present on 36 packs (46%) (e.g., a soccer ball, race car, wrestling match or trophy). **CONCLUSIONS:** Tobacco companies use a variety of appeals on cigarette packages that link their product with sports. Despite legislation in some countries banning tobacco sponsorship, the pack remains a potentially powerful medium through which tobacco companies can continue to associate their products with ideas conveyed by sporting references, namely competition, success, power, skill and ultimately a healthy and capable body. These are all false associations and could be eliminated through plain and standardized packaging.

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POS3-131

CHALLENGES AND ASSETS TO UPSTREAMING TOBACCO PREVENTION IN YOUTH-PARTICIPATORY ACTION RESEARCH

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SIGNIFICANCE: Communities impacted by health disparities increasingly look to upstream solutions to address social-structural determinants of tobacco use. Our Youth Participatory Action Research project engaged Southeast Asian youth and allied youth of other communities of color to identify community tobacco influences and promote policy solutions. **METHODS:** The community engagement plan included: (1) a leadership core of five youths who conducted community-based research, analyzed results, and designed and conducted an intervention; and (2) community dissemination, in which the team provided the research results to the broader community, along with recommendations for community action. **RESULTS:** Our initial research focused on local tobacco policy and influences which impacted minority youth. Our initial research identified three main challenges: (1) Low community readiness to enforce local tobacco regulatory policies; (2) Low responsiveness to project goals by existing community tobacco coalitions; and (3) Insufficient project resources for broader community mobilization. The team refocused their efforts to research and action in their school environment. They

identified poor sense of self-worth and self-efficacy and low school morale (indicated by students throwing trash on the ground) and poor enforcement of smokefree school policies (indicated by observed on-campus smoking and tobacco trash) as tobacco use risks for students. Their one-year intervention combined campus clean-ups, peer-to-peer trainings, and advocacy for a clean and smokefree campus. Participants were able to leverage their knowledge of and access to school resources and peers. Evaluation indicated less on-campus smoking, but little change in littering on campus. For the youth participants, the results highlighted the difficulty in initiating and maintaining systems changes. In particular they noted the need for a "bigger change," with more active and supportive leadership from school authorities and broad changes in peer culture. **CONCLUSIONS:** Youth and service organizations from communities most impacted by tobacco-related disparities may have the least/limited resources to effect upstream changes in their social, policy, and physical environments. Engaging youth in developing and scaling intervention goals using participatory methods can help leverage their assets and reduce the challenges and barriers they face in making changes as young people in their communities.

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POS3-132

SUSCEPTIBILITY MEDIATES THE ASSOCIATION BETWEEN PSYCHOSOCIAL FACTORS AND YOUNG ADULTS' SUBSEQUENT E-CIGARETTE INITIATION

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SIGNIFICANCE: Tobacco product use has diversified in recent years, including dramatic increases in e-cigarette use among young adults. Yet, the etiology of e-cigarette initiation is not well studied in young adults. This study examined if susceptibility to e-cigarette use mediates the relationships between various psychosocial factors and subsequent initiation of e-cigarettes in a sample of college students. **METHODS:** Participants were a subset of 18-29 year old students (mean age=20.2; sd=2.2) involved in a 4-wave 24-college study in Texas (67% female; 34% white, 27% Hispanic; 24% Asian, 8% African-American). To study initiation, only participants reporting never use of e-cigarettes at wave 1 or wave 2 were included in this study (n=2,133). Wave 1 data collection occurred in November 2014-February 2015 and every six months thereafter. The hypothesized mediated model was tested using path analysis and Mplus 7.3. Psychosocial factors (e-cigarette harm perceptions, social acceptability of e-cigarettes, and whether one would date someone who uses e-cigarettes) were measured at wave 1; the susceptibility mediator was measured at wave 2; and ever use of e-cigarettes at waves 3 and/or 4 was the outcome variable. Wave 1 sociodemographic covariates were also included in the model. **RESULTS:** The hypothesized mediated model had an excellent fit (Chi-Square (df=11) = 12.812, p=0.3054; RMSEA=0.009, CFI=.998). Consistent with expectations, each psychosocial factor predicted susceptibility six months later (p<.001 for all paths), which in turn predicted subsequent ever use of e-cigarettes six months to one year later (p<.0001). Tests of indirect effects confirmed that susceptibility mediated the relationship between each psychosocial factor and ever use (p<.05 for each effect). **CONCLUSIONS:** Findings highlight the need to study the etiology of e-cigarette initiation, including the role psychosocial factors play in susceptibility and use. Social normative beliefs and harm perceptions are important constructs in this causal model predicting e-cigarette initiation in college students and are vital areas of focus for interventions in this population.

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**POS3-133****PAST CIGARETTE BRAND-SWITCHING AND LIKELIHOOD OF FUTURE SWITCHING BASED ON INFORMATION ABOUT CHEMICALS IN CIGARETTE SMOKE: A NATIONAL STUDY**

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SIGNIFICANCE: The Tobacco Control Act requires public disclosure of the levels of harmful and potentially harmful constituents in cigarette smoke by brand and subbrand (style) in a way that is "understandable and not misleading." However, this information may encourage smokers to switch to brands and styles with lower constituent quantities due to the false belief that they would be reducing their health risk—as happened with "tar" levels. We sought to investigate 1) demographic correlates of past brand-switching behavior and 2) whether information about the levels of harmful constituents in cigarette smoke might influence susceptibility to brand switching. **METHODS:** We conducted a phone survey with a national probability sample of 1,151 adult smokers ages 18+ and an internet survey with a convenience sample of 1,561 adult smokers. Both surveys assessed whether smokers had in the past switched to another cigarette brand or style to reduce their health risk. The survey also assessed how likely smokers would be to switch if they learned that their brand had a higher level of a specific constituent (e.g., lead) than other cigarettes. **RESULTS:** Past brand switching was reported by 44% of smokers in the phone sample and 28% of smokers in the online sample. In both studies, smokers who had switched brands were more likely to be female and over the age of 25 (both $p < .05$). Most participants in the phone sample reported that they "might" or "definitely would" switch to another cigarette brand or style if they learned the cigarettes they smoke have a lot more lead (73%), formaldehyde (76%), arsenic (76%), or ammonia (76%) than other cigarettes (all $p < .05$ compared to nicotine (61%). We found a similar pattern in the online sample (all $p < .001$). **CONCLUSIONS:** Our study found that many smokers have switched cigarette brands in the past to reduce their health risk. If notified about differing levels of chemicals in cigarette brands, many smokers said that they might switch brands. These findings suggest that disclosing specific quantities of chemicals by brand has the potential to mislead smokers to switch brands under a belief that they would reduce their health risks.

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POS3-134**MAILED DISTRIBUTION OF FREE NICOTINE PATCHES WITHOUT BEHAVIORAL SUPPORT: PREDICTORS OF USE AND CESSATION**

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INTRODUCTION: There is growing evidence that the mailed distribution of free nicotine replacement therapy (NRT), usually as part of smokers' helplines, can be effective in increasing the odds of cessation on a population level. However, limited information is available on the uptake of NRT when it is provided for free, and factors associated with regimen compliance have remained largely unexplored. **METHODS:** In the context of a randomized controlled trial, 500 adult smokers across Canada hypothetically interested in free NRT to quit were mailed a 5 week supply of nicotine patches, but no other support was offered. Analyses evaluated which a priori-defined demographic and smoking characteristics predicted nicotine patch use at 8 week follow-up of 421 patch recipients, as well as examined the association between patch use and smoking cessation at 6 months. **RESULTS:** At 8 weeks, 10.9% had used all, 47.5% had used some but not all, and 41.6% had not used any of the provided nicotine patches. Lower age, unemployment, past NRT use and intent to quit in the next 30 days at baseline (preparation stage of change) were all identified as independent predictors of some nicotine patch use. The precontemplation (intent to quit in the next 6 months) and preparation stages of change at baseline were the only independent predictors of using all provided nicotine patches. Only use of all patches was associated with greater odds of smoking cessation at 6 months, compared to non-users (Adj. OR = 2.96; 95%CI = 1.06 – 8.27, $p = 0.038$). **CONCLUSIONS:** The mailed distribution of free

nicotine patches to smokers at large can be effective at promoting cessation, particularly among financially disadvantaged groups, those with previous NRT experience and among individuals with already advanced intent to quit. Strategies aimed at encouraging greater compliance with the advised treatment regimen, by way of offering additional support or highlighting self-help strategies, may improve cessation outcomes as well as enhance the value of real-world mass distribution programs.

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POS3-135**WHAT FACTORS INFLUENCE FUTURE USE INTENTIONS OF CURRENT VAPERS AND NON-VAPERS AMONG SMOKERS AND EX-SMOKERS IN AUSTRALIA AND THE UK?**

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BACKGROUND: With the rapid rise in the use of e-cigarettes (EC) and the growing controversies surrounding EC use, there is a need to better understand the determinants of future use intentions of current vapers and non-vapers among current smokers and ex-smokers who had tried EC previously. **AIM:** To identify factors associated with future intentions to vape among smokers and ex-smokers who have ever tried EC in Australia and the UK. **METHODS:** Data analysed were from the Australian and the UK arms of the International Tobacco Control Four-Country survey collected in 2014/5. Smokers and ex-smokers who have ever used EC were included ($n=1,119$), divided into four sub-groups: smoking vapers, ex-smoking vapers, smoking non-vapers and ex-smoking non-vapers. **RESULTS:** There were differences in factors associated with future use intentions across the four groups. Higher perceived satisfaction increased future intention to use EC for the two smoking groups only. Perceiving EC to be less harmful predicted positively for all groups but ex-smoking vapers. Among smokers, perceived importance of EC for stopping smoking was negatively associated with intentions to continue vaping for current vapers, but positively associated with uptake intentions for current non-vapers; perceived importance of EC for cutting down smoking was positively associated only for non-vapers. Among ex-smokers, perceived importance of EC for maintaining smoking cessation was positively associated with uptake intentions for current non-vapers but not associated with continued use intentions for current vapers. The association with perceived importance of EC based on perceiving vapour being less harmful to people around also depended on vaping status for ex-smokers. The only country interaction found was with perceiving EC to be less harmful among smoking non-vapers. **CONCLUSIONS:** Factors influencing intentions vary by smoking and/or vaping status, with greater differences between the two ex-smoker groups. The findings suggest that EC are primarily seen as a way of managing smoking, rather than something of value itself, for all groups except the ex-smoking vapers.

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POS3-136**ADOLESCENT TOBACCO AND CANNABIS CO-USE: PATTERNS AND CORRELATES BY TOBACCO PRODUCT**

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SIGNIFICANCE: Tobacco and cannabis are two of the most commonly used drugs among adolescents, and co-use of these products is increasing. Previous research has focused primarily on co-use of cigarettes and cannabis despite the



recent increases for alternative tobacco products among adolescents. Available data suggest that rates and correlates of tobacco and cannabis co-use may differ by tobacco product type, but results are limited. This study examined patterns of tobacco-only and tobacco and cannabis co-use and compared co-use correlates between tobacco product sub-groups. **METHODS:** Responses from 1,252 high school students who completed the 2013 Virginia Youth Tobacco Survey and reported using ≥ 1 tobacco product in the past month were analyzed. The sample was split by past month cannabis use (tobacco-only users; co-users), and weighted rates of use by tobacco product type were calculated. Four weighted logistic regression models predicted tobacco and cannabis co-use (use of ≥ 1 tobacco product; cigarette co-use; smokeless tobacco [ST] co-use; cigar co-use) relative to tobacco-only use. Model covariates included: demographics; frequency of past month cigarette, ST, cigar, and alcohol use; and lifetime illegal drug use and prescription drug misuse. **RESULTS:** Use of only one tobacco product was most common among tobacco-only users (cigarette-only, cigar-only, and ST-only use; combined 70.1%). The majority of co-users identified as poly-tobacco users (e.g., cigarette+cigar, cigarette+cigar+ST; combined 59.3%). In all models, identifying as Black NH, frequent cigarette and alcohol use, and prescription drug misuse was associated positively with co-use. "Other" race/ethnicity and illegal drug use were associated positively with ST and cigar co-use. Age, gender, and ST frequency were not associated with co-use in any model. **CONCLUSION:** Increased rates of poly-tobacco use may explain the greater likelihood of nicotine dependence and increased difficulty quitting tobacco among co-users of tobacco and cannabis. Some correlates of tobacco and cannabis co-use were similar across tobacco product sub-groups and may inform prevention efforts targeting this risky behavior pattern.

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POS3-137

SUBJECTIVE REACTIONS TO "CIGALIKE" E-CIGARETTES AMONG CIGARETTE SMOKERS MOTIVATED TO QUIT: REACTIONS FROM THE FIRST TWO WEEKS OF EXPERIMENTATION

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SIGNIFICANCE: Despite intense smoker interest in ECIGs as a harm reduction or cessation aid, it is notable that many smokers abandon ECIGs after a short trial period and return to smoking. The purpose of this longitudinal qualitative study was to (1) understand the subjective sensory experience of initial cigalike ECIG use among adult smokers motivated to quit and (2) explore how the subjective sensory perception experience encourages or discourages continued use of cigalike ECIGs. **METHODS:** Participants (n=17) were U.S. adult smokers, aged ≥ 18 years residing in the Washington, D.C. metro area recruited as part of the Moment Study, a mixed-methods observational study that examined the environmental and psychological factors that influence ECIG use. Participants were followed for three weeks and provided NJoy King e-cigarettes in Weeks 2 & 3. Participants took part in three, 30-minute semi-structured interviews (n=51) at the end of Weeks 1, 2 & 3. All interviews were audio-recorded, transcribed, de-identified. We conducted thematic analyses in NVivo 10.0 using an established subjective sensory perception framework from tobacco industry documents. **RESULTS:** Participants were 10 men and 7 women, with a mean age of 49.7 years (SD=12.4) and predominately non-Hispanic Black (n=14) daily menthol cigarette smokers (n=15). At baseline, participants reported having some college or more (n=11), current unemployment (n=10), and 3.3 (SD=8.8) past-year quit attempts. ECIG sensory dimensions included taste, visual appearance, feel, scent, and whole body response. Salient sensory attributes of the NJoy ECIGs included sweetness, bitter aftertaste, throat irritation and a lack of physiological satisfaction compared to their preferred cigarette. Both taste and inhalation effects resulted in an overall sensory experience that decreased participants' satisfaction with the NJoy King during the first two weeks of use. **CONCLUSIONS:** Findings contribute to a better understanding of

the sensory experience driving cigalike ECIG use and abandonment, particularly taste and throat irritation.

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POS3-138

PROMOTION OF LOW DOSE CT SCREENING FOR EARLY DETECTION OF LUNG CANCER AMONG SMOKERS CALLING A QUITLINE

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SIGNIFICANCE: Cigarette smoking is the main cause of lung cancer (LC) and is responsible for 80-90% of all LC deaths. This pilot study is predicated on the clinical observation that relatively few smokers are aware that LC screening is proven to decrease LC mortality rates, with even fewer eligible smokers screened. The primary objective is to evaluate the impact of three distinct interventions to promote LC screening awareness and behavior among callers to the New York State Smokers' Quitline (NYSSQ). **METHODS:** Focus groups and structured interviews with smokers assessed knowledge and perceptions of LC screening. Educational materials were revised as a result and used in an intervention study with callers to the NYSSQ. Callers from outside Erie/Niagara counties were randomized to receive only the educational materials or the materials with more in-depth counseling on screening. Callers within Erie/Niagara were randomized to receive the educational brochure plus in-depth counseling, with an offer for a direct transfer to the Roswell Park Cancer Institute LC screening clinic. Participants are followed-up 4 months later to assess changes in beliefs and behavior. **RESULTS:** Qualitative data from focus groups/interviews found that most smokers were not aware of LC screening. Cost was not perceived to be a barrier and smokers wanted more information on eligibility and access. Materials were revised to reflect these results. To date, the intervention study has found 548 smokers. Nearly two-thirds of smokers have consented to participate; half received the educational materials, while the other half received the educational materials with in-depth counseling about screening. Nineteen smokers received materials, counseling, and direct referral to Patient Access to schedule an appointment. Recruitment is ongoing. Follow-up calls will evaluate changes in perceptions, talking to their doctor, and screening behavior. **CONCLUSIONS:** Smokers calling a quitline are receptive to receiving information about lung cancer screening. This study will help determine the most effective and efficient educational and clinical interventions for lung cancer screening in a quitline environment.

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POS3-139

DIFFERENCES IN PATTERNS OF AND REASONS FOR CIGARETTE SMOKING BETWEEN ADULTS WITH AND WITHOUT MENTAL HEALTH PROBLEMS: RESULTS FROM THE POPULATION ASSESSMENT OF TOBACCO AND HEALTH STUDY

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There is a robust association between mental illness and cigarette smoking in US adults and the decline in smoking in the past decade has been significantly less for those with mental illness compared to those without. This study uses data from the Wave 1 adult dataset of the Population Assessment of Tobacco and Health (PATH) Study to examine differences in patterns of and reasons for smoking among adults with and without mental health problems (n=32,320). All analyses were weighted to adjust for oversampling and nonresponse. Those who endorsed four or more symptoms in the past year on the Global Appraisal of Individual Needs Internalized-



ing Disorder Screener were identified as having mental health problems. Current smokers were respondents who now smoke cigarettes "every day" or "some days." Current smokers with a regular brand were asked about the following reasons for use: cost, tar and nicotine levels, pack design, smoking satisfaction, health reasons, taste, use as a quit method and use of the same brand by others. Multi-variable Poisson regression models examined a) the association between mental health problems and current smoking and b) differences in each reason for use between smokers with and without mental health problems. Models adjusted for demographics, past 30-day use of marijuana and alcohol, and tobacco use norms. Current smoking was significantly more prevalent in adults with mental health problems (40%) vs. without (19%) (APR=1.47, $p<.001$). Smokers with mental health problems had greater odds of endorsing: taste (APR=1.04, $p<.01$), tar and nicotine levels (APR=1.10, $p<.05$), satisfaction (APR=1.07, $p<.001$), and use among people important to them (APR=1.12, $p<.05$) as reasons for use of their regular brand, compared to smokers without mental health problems. Findings support an association between mental health problems and current cigarette smoking. The endorsement of tar and nicotine and satisfaction suggest that smokers with mental health problems may continue to smoke cigarettes due to the mood-stabilizing nature of nicotine. Further research is needed to explore the mechanisms linking mental health problems to cigarette smoking.

FUNDING: Truth Initiative

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POS3-140

PERSUASIVE APPEALS IN ANTI-TOBACCO PRINT ADVERTISEMENTS, 2010-2014

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BACKGROUND: Studies of anti-tobacco advertisements focused on their effects on target audiences. Persuasive appeals used in these ads remain unexplored. METHODS: We requested copies of anti-tobacco print ads, 2010-2014, from health departments in all 50 states. We conducted a content analysis on 519 unique ads. Inter-coder reliability ($n = 61$ ads) ranged from 0.86 to 1.00 using Krippendorff's alpha. RESULTS: Majority of ads were sponsored by state/city health departments ($n = 218$, 42.0%) or non-profit organizations ($n = 134$, 25.8%). Top three campaigns were *Tobacco Stops with Me* ($n = 64$, 12.3%), *Project Filter* and *NYC Quits* ($n = 36$, 6.9%, each). Ads focused primarily on cigarettes ($n = 303$, 58.4%). Providing information on cessation-support resources (e.g., quitlines) ($n = 388$, 74.8%) and consequences of smoking ($n = 298$, 57.4%) were the top used behavioral change techniques. Ads presented substantiated arguments ($n = 307$, 59.2%). Main themes of anti-tobacco ads were health risks ($n = 110$, 21.2%) where long-term consequences were emphasized ($n = 136$, 26.2%) over short-term ($n = 20$, 3.9%). Industry attacks ($n = 50$, 9.6%) and secondhand smoke ($n = 49$, 9.4%) were distant second and third themes. Threat was the main persuasive appeal ($n = 140$, 27.0%) appearing in ads emphasizing health risks and secondhand smoke ($\chi^2 = 653.3$, $p < .001$). Gain and loss frames were equally used ($n = 161$, 31.0%, each) but differed by themes ($\chi^2 = 140.0$, $p < .001$) and appeals ($\chi^2 = 137.9$, $p < .001$) of ads. Gain frames were used with themes marking universal/national observances (e.g., mother's day) and family appeals. Loss frames were frequently used with health risks themes and threat appeals. Fear/fright ($n = 151$, 29.1%) and happiness ($n = 60$, 11.6%) were most common emotions whereas benevolence ($n = 152$, 29.3%) and security ($n = 147$, 28.3%) were most common values. Fear/fright appeared in ads that emphasized benevolence and security values whereas happiness appeared in ads that emphasized achievement ($\chi^2 = 457.5$, $p < .001$). CONCLUSIONS: Communicators can diversify persuasive appeals and techniques used in anti-tobacco campaigns to counter all tobacco product initiation, use, and relapse.

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POS3-141

DEVELOPING A PATIENT-CENTERED, MHEALTH SOLUTION TO SMOKING CESSATION: A FEASIBILITY STUDY

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SIGNIFICANCE: A recent review of commercially-available products concluded that most smoking cessation apps are simplistic, are not evidence-based, and have not taken into consideration user needs, thus identifying a critical gap in mHealth solutions for smokers attempting to quit. The Centre for Addiction and Mental Health (CAMH) and the University of Toronto collaborated to design an evidence-based, patient-centered mobile app for smokers. METHODS: We used an evidence-based workbook offered at a CAMH smoking cessation clinic as the foundation for the content of the app. We employed a descriptive, qualitative approach to analyze emerging participant perspectives from our research program: *Planning*: Four focus groups were conducted – three with patients from our intended audience ($n = 20$), one with clinicians ($n = 4$) – to prioritize which elements of the workbook should be translated into app format, what new features the app should offer, and how the app should appear. *Usability testing, clinic setting*: Once a prototype was developed, we tested the app with patients who participated in the planning stage of development ($n = 7$). Patients navigated the app in a focus group setting and provided feedback on usability, likeability, and appearance. *Pilot testing, real-life setting*: After further refinement of the app prototype, new CAMH patients were offered the mobile app on their personal Smartphones and asked to use the app over the course of approximately one week. Patients were contacted for individual interviews ($n = 16$) to provide feedback on their experiences using the app and what changes would increase the likelihood of the app meeting their smoking cessation needs. RESULTS: Based on patient and clinician feedback across all research stages, the new app offers personalized, positive reinforcement messages; updates on progress; more visual features (vs. text-only); and constructive feedback when patients experience a relapse. Generic, motivational quotes were perceived as unhelpful and removed from the app. CONCLUSIONS: A systematic, qualitative research program engaging multiple stakeholders – patients, clinicians, and researchers – is an effective approach for developing an evidence-based, patient-centered mobile app.

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POS3-142

UNDERSTANDING NICOTINE DEPENDENCE AND ADDICTION AMONG YOUNG ADULTS WHO SMOKE CIGARILLOS: A QUALITATIVE STUDY

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SIGNIFICANCE: Use of cigarillos is increasing, particularly among young adults. Nicotine dependence (ND) is important for understanding smoking behavior and cessation, but measures of ND have been developed and validated for cigarette smokers. We examined smoking patterns, preferences and beliefs of cigarillo users to better understand their experience of addiction and expression of ND symptoms. METHODS: Using purposive sampling, we conducted in-depth interviews with 30 adults aged 18-28 who reported smoking >1 cigarillo per week between June 2015 and January 2016. Interviews were based on a semi-structured guide designed to capture participants' smoking levels and patterns as well as their experiences of smoking and addiction. Interviews were audio-recorded and transcribed. Analysis was guided by a phenomenological approach designed to identify emergent themes. RESULTS: Participants had a mean age of 23, with a majority being female (56%) and African American (80%). Median number of cigarillos smoked per week was 20; 70% of participants also smoked cigarettes, and 43% also smoked marijuana blunts. Interviews highlighted the complexity of measuring cigarillo use due to product manipulation, sharing, and multiple product use. Participants expressed a tendency and preference for smoking in a social group where cigarillos were shared, and not smoking an entire cigarillo at once when alone. Most cigarillo users did not consider themselves to be addicted. CONCLUSIONS: Cigarillo users express unique smoking patterns, practices and beliefs that 1) signify the need for a revised and more product-inclusive measure of



ND and 2) can inform the development of tobacco cessation interventions tailored to cigarillo users.

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POS3-143

EXAMINING DIFFERENCES IN THE PERCEIVED EFFECTIVENESS OF MESSAGES THAT COMMUNICATE INFORMATION ON THE CHEMICALS IN CIGARETTE SMOKE

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INTRODUCTION: Tobacco regulators, such as the Food and Drug Administration (FDA) in the United States (US), have a keen interest in accurately and effectively communicating the risks of cigarette smoke constituents to the public. Yet, there is currently limited research examining what elements of constituent-based messages, the majority of which are seen on tobacco product packaging, are effective at communicating the potential harms of cigarette smoking. In the current study we examined whether the impact of constituent messages varied as a function of specific constituents (e.g., ammonia). METHODS: We administered a survey, either online or by mail, to a national probability sample of 1,730 adults (ages ≥ 18). Participants assessed 7 randomly ordered constituent messages that were chosen based on their demonstrated effectiveness among a larger set of previously tested messages. Each constituent message referenced one of the following constituents: ammonia, arsenic, carbon monoxide, formaldehyde, lead, or uranium. Each message also presented either no additional information or brief health effect and/or found-in information. The primary outcome was a composite score assessing the perceived effectiveness of the message. We used repeated-measures ANOVA to examine the perceived effectiveness of the seven messages. RESULTS: Among adult nonsmokers, there was a main effect of constituent on perceived effectiveness to not smoke ($p < .001$) such that, in comparison to the other constituent messages, carbon monoxide was less effective (all $p < .001$). In stratified analyses, we found that carbon monoxide was found to be a less discouraging message for smokers with high literacy (all $p < .05$), but not for smokers with low literacy. CONCLUSIONS: Our study found that most constituent messages elicited a high level of concern about the risks of smoking with the exception being that the carbon monoxide message was not as discouraging among nonsmokers and smokers with high literacy. Policymakers and interventionists should carefully select constituents for messaging purposes to ensure that the target population accurately perceives the risks of smoking.

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POS3-144

SEXUAL ORIENTATION DISPARITIES IN WILLINGNESS TO USE CIGARETTES AND CIGARETTE INITIATION AMONG ADOLESCENTS

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SIGNIFICANCE: Sexual orientation disparities in cigarette use has been well-documented, and evidence suggests that these higher rates may originate during adolescence. In order to develop effective prevention programs, research must attend to the precursors of the initiation of cigarette smoking, such as cigarette susceptibility among adolescents and the very early milestones of cigarette use initiation (i.e., a few puffs of a cigarette). The goal of this study was to examine early cigarette behaviors and willingness to try cigarettes if offered by a best friend or group of friends among sexual minority youth compared to their heterosexual counterparts. METHODS: The sample was 443 youth (59.5% female, 72.0% White, $M_{age} = 16.7$ years) enrolled in a prospective study of substance use initiation

and progression. Participants self-reported their sexual identity and attraction, current cigarette use willingness (i.e., willingness to use if offered by a best friend or a group of friends), and lifetime history of having ever smoked cigarettes (i.e., ever had a few puffs of cigarette or more). RESULTS: In total, 26.6% of youth were classified as a sexual minority (i.e., youth who self-identified as lesbian, gay, and bisexual or reported any same-sex attraction). While accounting for sociodemographic variables, including sex, socioeconomic status, age, and race/ethnicity, multivariate regression models revealed that sexual minority youth were significantly more likely than non-sexual minority youth to report willingness to try a cigarette if offered by a best friend ($B=0.07$, $SE=0.03$, $p < 0.01$) or by a group of friends ($B=0.12$, $SE=0.06$, $p < 0.05$). Sexual minority youth were also significantly more likely to report cigarette initiation ($AOR=2.42$, 95% CI: 1.31, 4.46, $p < 0.01$) compared to their non-sexual minority counterparts. CONCLUSIONS: Peers may play a role in decisions to use cigarette for sexual minority youth, and may be a contributing factor in explaining tobacco-related disparities among sexual minority adolescent populations. Prevention programs which target close friends and social networks will be discussed to guide effective tobacco control and prevention efforts for sexual minority adolescents.

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POS3-145

THE NEED FOR IMPROVED RECRUITMENT AND SAMPLING METHODOLOGY TO UNDERSTAND AND REDUCE TOBACCO-RELATED HEALTH DISPARITIES AMONG DIVERSE LGBT POPULATIONS

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PURPOSE: Despite a recent increase in attention to lesbian, gay, bisexual and transgender (LGBT) issues, tobacco use among diverse LGBT populations' racial/ethnic minorities is understudied worldwide, particularly in large nationally representative samples. When sexual orientation and gender identity questions are included, they are often faulty, incomplete or not in line with best practices for inclusion of LGBT participants. This study seeks to address this issue by exploring and identifying patterns in tobacco use across diverse LGBT populations. METHODS: We utilize public use data from a nationally representative US sample of youth ages 12-17 ($N=13,651$). Specifically, we explore 8,656 youth aged 14-17, assessing variation in tobacco use across sexual orientation among self-identified heterosexual ($n=8,215$), lesbian/gay ($n=95$), or bisexual ($n=346$) (LGB) participants. Youth who are missing data on sexual orientation ($n=4,995$) are excluded from this analysis, including youth aged <14 who were not asked the question on sexual orientation ($n=4,684$, 93.8%). There was no separate question on gender identity, thus we could not specifically assess transgender tobacco use. We explore ever and past 30 day cigarette use, and ever use of e-cigarettes. Race/ethnicity was dichotomized to Non-Hispanic white (NHW) and racial/ethnic minorities, due to sample size limitations. FINDINGS: LGB participants ever use of cigarettes was 47.7% for NHWs and 32.5% for racial/ethnic minorities; twice as high compared to heterosexual NHWs (19.1%) and racial/ethnic minorities (15.3%). Current cigarette use among NHW LGB (62.1%) was higher than NHW heterosexuals (38.0%). Ever use of e-cigarettes was over two times as high for NHW LGB (38.8%) compared to NHW heterosexuals (16.3%), and higher among racial/ethnic minority LGB (22.2%) compared to racial/ethnic minority heterosexuals. CONCLUSIONS: Differences in tobacco use were observed across binary race/ethnicity and sexual orientation. Descriptive data suggested differences in tobacco use across LGB race/ethnicity groups, which cannot be detected when data is dichotomized into NHW vs. all others. It is essential that separate standardized questions on sexual orientation and gender identity are added to research, so that we can appropriately document and assess diverse LGBT populations varying tobacco use in order to better inform tobacco prevention efforts.

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POS3-146

DEPRESSIVE SYMPTOMS PREDICT CURRENT E-CIGARETTE USE AMONG COLLEGE STUDENTS IN TEXAS

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INTRODUCTION: There have been no studies establishing a potential longitudinal relationship between e-cigarette use and elevated depressive symptoms among young adults. The main objective of the current study was to establish a potential bi-directional relationship between e-cigarette use and elevated depressive symptoms among college students in Texas, across a one year period of time. **METHODS:** The current study used a survey of college students in Texas with 6 month and 1-year follow-ups. Covariates included age, gender, type of college, and other tobacco products used. Longitudinal cross-lagged models were used to examine a bi-directional relationship between e-cigarette use and elevated depressive symptoms across the three study waves. Past 30-day e-cigarette use was considered current e-cigarette use, and depressive symptoms were measured using a 10-item Center for Epidemiologic Studies Depression Scale (CES-D) with a cutpoint of ≥ 10 to measure elevated depressive symptoms. Covariates included age, gender, community college, and other alternative tobacco products used. Longitudinal cross-lagged models were used to consider a bi-directional relationship between e-cigarette use and elevated depressive symptoms. **RESULTS:** E-cigarette use did not predict elevated depressive symptoms at 6 month and 1-year follow-ups. However, depressive symptoms predicted e-cigarette use at both 6 month and 1-year follow-ups. **CONCLUSIONS:** The current study established a longitudinal relationship between e-cigarette use and depressive symptoms among young adults, with depressive symptoms predicting subsequent e-cigarette use. Future studies are needed to replicate the current study and also further establish the mechanisms for causality, which could inform Food and Drug Administration (FDA) regulatory planning.

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POS3-147

E-CIGARETTES FOR SMOKING RELAPSE PREVENTION – QUALITATIVE FINDINGS FROM A UK STUDY

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AIMS: Although many smokers manage to quit, in the general population more than 90% of quit attempts result in eventual relapse to smoking (Etter & Stapleton, 2006). Estimates suggest that 2.6 million adults in Great Britain currently use electronic cigarettes (Ash, 2015). Most current e-cigarette users state that they use e-cigarettes for smoking cessation or to cut down, with an eventual aim of quitting smoking completely (McNeill et al, 2015). However, we know very little about the use of e-cigarettes in supporting continued smoking cessation amongst people in the general population. **METHODS:** Qualitative data collected by 30 individual interviews exploring in-depth participant perspectives on experiences and patterns of e-cigarette use over time in the context of smoking cessation or relapse. The interview sample were e-cigarette users recruited from the general population who report either managing to remain stopped from tobacco smoking, or have relapsed. Data were iteratively analysed according to Grounded Theory principles. **RESULTS:** Important unique aspects of e-cigarettes such as the range and type of devices used, the range and variety of e-liquid flavourings and strengths, and the social context of use that can mimic 'smoking-like' behaviours, offer the ex-smoker a unique substitute experience beyond what is offered by other nicotine replacement therapies. This may make continued smoking cessation easier to sustain for those who choose to quit smoking using e-cigarettes. Aspects related to the devices, their use in social situations, the ritual of preparation, and the interplay between e-cigarette use and social identity are important from a participant perspective. **CONCLUSIONS:** The data presented provides much needed qualitative research evidence on e-cigarette use in relation to smoking relapse. Data aligns closely with the everyday concerns, motivations, and experiences of different profiles of e-cigarette users. We tentatively draw initial conclusions and recommendations

about how people may best be supported to stay stopped from smoking using e-cigarettes, and give examples of how inadequate e-cigarette use may contribute to smoking relapse.

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POS3-148

CITRIC ACID - A PRECURSOR TO A RESPIRATORY SENSITIZER IN E-CIGARETTES?

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Citric acid is sometimes used as a flavour ingredient in e-liquids. Its toxicity profile supports low levels of inhalation exposure. It is generally recognised as safe (GRAS) in the USA, naturally occurs in the body and is used in pharmaceutical inhalation products. However, thermal degradation of citric acid is known to occur at temperatures relevant to the coil temperatures that can be achieved by vaping products. The thermal decomposition of citric acid commences around 203°C resulting in the formation of citraconic anhydride and its isomer itaconic anhydride. Citraconic acid is self-classified in Europe as H334: "May cause allergy or asthma symptoms or breathing difficulties if inhaled". In rat and guinea pig models, maleic and citraconic anhydrides exhibited comparable levels of immune response. The chronic reference exposure level derived by the Californian OEHHA for maleic acid, is 0.7 µg/m³. The NIOSH Immediately Dangerous to Life or Health Concentration is 10 mg/m³. Citric acid mono hydrate was added at 2.90% to an e-liquid and aerosolised with a 1st generation e-cigarette to determine if acid anhydrides are formed under such use conditions. The product was vaped using 35ml puffing volume, 2 seconds square wave puff duration and 30 seconds puff interval. The aerosol was captured using thermal desorption tubes and analysed with gas chromatography coupled to time-of-flight mass spectrometry. Quantification was achieved using a citraconic anhydride standard. Product without citric acid, blank tubes and citric acid controls were included. Additionally, confirmatory analysis was conducted using liquid injection GC-TOFMS. Emissions were sampled using liquid impingers containing diethyl ether. Both methods measure the combined citraconic and itaconic anhydrides because the two isomeric forms are difficult to separate chromatographically and have near-identical mass spectra. The measured acid anhydride puff concentrations ranged between 51 mg/m³ and 98 mg/m³. Based on this case study, it is recommended that the potential for formation of citraconic and itaconic anhydrides should be investigated before commercialisation of e-liquids containing citric acid.

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POS3-149

DOES LOW ADHERENCE EXPLAIN FAILURE TO FIND AN EFFECT OF NICOTINE REPLACEMENT THERAPY BOUGHT OVER-THE-COUNTER ON SMOKING CESSATION IN COMPARATIVE OBSERVATIONAL STUDIES? FINDINGS FROM THE SMOKING TOOLKIT STUDY

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SIGNIFICANCE: Large comparative observational studies in England have not found a benefit of use of over-the-counter nicotine replacement therapy (OTC NRT) but a clear benefit of NRT on prescription (Rx NRT). Lower adherence in the case of OTC NRT has been postulated as a possible reason for the difference. To ascertain this, the present study aimed to compare the usage of NRT purchased OTC and on prescription (Rx) among the general population of recent ex-smokers in England. **METHODS:** We conducted a comparative observational study involving repeat cross-sectional surveys of representative samples of the English population between November 2006 and July 2016 (the Smoking Toolkit Study). The study included 761 adults who had made at least one serious quit attempt in the past year, were currently non-smoking, and had used OTC (n=544), or Rx (n=217) NRT during their most recent quit attempt. Usage was compared: 1) overall, and 2) at different times since the quit attempt started (<1 week, 1-4 weeks, 5-12 weeks, >



12 weeks). The outcomes of interest were self-reported use of NRT: current, daily, 'adequate' use (at least once per day for patches, and at least 5 times per day for other NRT), and frequency of use in the case of non-patch NRT. RESULTS: Overall, OTC use was non-significantly higher than Rx use: current (33.0% vs 24.0%), daily (81.7% vs 74.4%), 'adequate' (48.4% vs 40.4%). Number of items used per day of non-patch OTC NRT was also non-significantly higher than Rx use (means (SD)=5.99 (8.18) vs 4.76 (8.58)). The trends were similar across all time points and persisted in logistic regression models after adjusting for socio-demographic variables, dependence levels, and time since quit attempt. CONCLUSIONS: The apparent failure of over-the-counter nicotine replacement therapy to increase smokers' chances of quitting in England does not seem to be readily explained in terms of inadequate product usage.

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POS3-150

REDUCED RISK MESSAGING FOR A SMOKELESS TOBACCO PRODUCT: PROJECTING LIKELIHOODS OF USE AMONG CURRENT SMOKERS, FORMER SMOKERS AND NEVER TOBACCO USERS

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Tobacco scientists and regulators recognize a risk differential between combusted and non-combusted products, e.g., smokeless tobacco products [STP] present less health risks than cigarettes. Informing smokers of the reduced risks of an STP could encourage switching to the lower risk STP, and thus benefit population health. This benefit must be weighed against the possibility that such messaging may increase tobacco use among non-users and/or reduce quitting among smokers. Using an internet sample of 11,302 US adults, likelihood to use an STP was assessed among current and former smokers, and never tobacco users. Respondents were randomized to view either (a) an STP advertisement stating that smokers who switch completely to the STP "can greatly reduce their risk of lung cancer, oral cancer, respiratory disease and heart disease," and also conveying cautionary messages (e.g., the STP is addictive); or (b) a control advertisement that only described the STP. Respondents indicated their intent to purchase the STP for trial, on a 1-10 scale; these ratings were converted to projected likelihoods of use by an empirically derived algorithm. Projected STP use was significantly higher among current smokers than former smokers or never tobacco users. Importantly, the reduced risk messaging significantly and differentially increased projected use among current smokers (8.2%; 95% CI 6.0-10.9%), while having a minimal effect on former smokers (1.9%; 1.2-3.3%) and never tobacco users (0.5%; 0.3-0.8%). For never tobacco users, projected use was highest among those already susceptible to tobacco use. For current smokers, projected use was significantly lower among those likely to quit (4.2%; 2.9-6.1%) than those not likely to quit (8.7%; 6.5-11.6%). Findings suggest that reduced risk messaging for an STP may increase use among current smokers who are not likely to quit (the group that stands to benefit from a reduced risk product), with minimal potential to increase use among groups who could be harmed by adopting the STP (never tobacco users, former smokers, smokers likely to quit). This suggests an STP with appropriate reduced risk messaging could benefit population health.

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POS3-151

"MINI-BUSINESSES": TOBACCO SUPPLY NETWORKS WITHIN NEW ZEALAND SECONDARY SCHOOLS

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BACKGROUND: Smoking prevalence remains disproportionately high among New Zealand young adults, despite increased tobacco prices and restrictions on tobacco retailing, and peaks among Māori and Pacific peoples. We explored Pacific young adults' experiences of school-based tobacco markets, where young people circumvent legislation and supply their peers with tobacco products. METHODS: We undertook six focus groups with 31 New Zealand daily and intermittent smokers, and susceptible non-smokers, aged between 17 and 25 and explored smoking practices, access to tobacco, and tobacco supply to others. We analysed the data using directed content analysis, where we derived initial codes from the interview guide. RESULTS: Many participants were aware of tobacco sellers within their current or former school; they described sellers as operating "mini-businesses" that were well-known within schools. They reported observing aggressive selling practices to recruit younger, new users as well as on-going supply arrangements with "regular" smokers. Participants believed sellers purchased tobacco for on-selling directly from retailers, or through older friends and family members; prices were typically \$1 or \$1.50 per stick. Although non-smokers described persistent tobacco offers as annoying, they were largely sympathetic to sellers, who they believed needed money to purchase food and transport. CONCLUSIONS: Sales of single cigarettes appear common among schools attended by Pacific young adults and clearly undermine restrictions on commercial sales put in place to deter smoking initiation. Further work is urgently required to explore how widespread school-based tobacco markets are and their reach within individual schools.

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POS3-152

DSM-5 NICOTINE DISORDER AND PSYCHIATRIC COMORBIDITY IN THE US POPULATION: THE ROLE OF COMORBID SUBSTANCE USE DISORDERS

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OBJECTIVE. To identify the role of DSM-5 substance use disorders (SUD) (alcohol-AUD; illicit drugs-ILSUD) on the association between nicotine use disorder (NUD) and psychiatric disorders. METHODS. Data are from the 2012-2013 National Epidemiologic Survey on Alcohol and Related conditions-III (NESARC-III) (N= 36,309). NUD included cigarettes, cigars, pipes, chewing tobacco, snuff, e-cigarettes. We examined the prevalence of psychiatric disorders (last 12-month mood, anxiety, antisocial personality, lifetime posttraumatic stress, any) among never nicotine users; ever users, not last 12 months; 12-month users, no NUD; 12-month users, NUD; 12-month users, NUD+SUD. Logistic regressions estimated the unique effects of NUD, ILSUD, AUD on psychiatric disorders controlling for 5 demographic variables. RESULTS. Among last 12-month nicotine users, 73.7% met NUD criteria. SUD rate was 33.7% (28.7% AUD, 11.9% ILSUD) for 12-month nicotine users with NUD, 21.6% for those without NUD, 10.0% former nicotine users, 10.2% never users. Of those with SUD, 81.4% met criteria for NUD. Among 12-month nicotine users, 46.8% of those with NUD met criteria for a psychiatric disorder versus 25.9% of those without NUD, 30.0% of former users, 22.7% of never users. These rates were 59.7% for nicotine users with NUD+SUD (73.6% ILSUD, 57.9% AUD), 40.2% for NUD without SUD, 37.9% for nicotine users with SUD (56.5% ILSUD, 38.0% AUD) only, 22.7% for those without NUD or SUD. Associations between NUD and psychiatric disorders were the same for both genders, although women had higher rates of disorders than men, except for antisocial personality. In multiple regressions, NUD retained significant effects on psychiatric disorders (AOR for any disorder=2.1, 95%CI=1.8-2.3), higher than AUD effects (AOR=1.7, 95%CI=1.5-2.0), but lower than ILSUD effects (AOR=3.2, 95%CI=2.6-3.9). Effect of NUD+ILSUD (AOR=7.2, 95%CI=5.5-9.5) was 3.4-fold, of NUD+SUD 5-fold (AOR=10.5, 95%CI=8.1-13.7) the effect of NUD only (AOR=2.1, 95%CI=1.8-2.5). CONCLUSION. The association between NUD and psychiatric disorders is greatly increased when NUD is comorbid with ILSUD or AUD. Treatment of NUD must take this comorbidity into account.



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POS3-154

HETEROGENEITY IN THE PROTECTIVE EFFECTS OF PHYSICAL ACTIVITY AGAINST ADOLESCENT SMOKING: A SEQUENTIAL PROCESSES GROWTH MIXTURE MODELING (SPGMM) STUDY

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SIGNIFICANCE: Adolescence is a key period for the initiation of cigarette smoking (smoking) and progression to a regular smoking habit. Nine of 10 adult smokers initiated smoking by age 18. One factor that may protect adolescents from smoking initiation and progressing to a regular habit is physical activity (PA). Yet, not all PA may be equally protective. We sought to better understand the PA-smoking relation by testing for developmental heterogeneity in the relation. **METHODS:** Participants were 1361 high school students (50% female; 73% White) taking part in a prospective study (4 years, 8 measurement waves) of the relation between adolescent PA and smoking. We employed Sequential Processes Growth Mixture Modeling (SPGMM) to analyze our data. SPGMM allows for identification of homogeneous sub-populations (conjoint classes) on repeated measures of ≥ 2 variables (e.g., smoking and PA), and characterizing the classes on select covariates with multinomial logistic regression. We employed Bayesian Information Criterion (BIC), Adjusted BIC (aBIC), Bootstrap Likelihood Ratio Test (BLRT), average probability of correct classification, and substantive criteria to identify the correct number of conjoint classes. **RESULTS:** Four classes were identified: High PA/Low smoking (HPA/LS); Low PA/Consistently high smoking (LPA/CHS); Low PA/Increasing smoking (LPA/IS); moderate PA/Low smoking (MPA/LS). Having greater expectations of the benefits of smoking was associated with an increase in the odds of belonging to all other classes compared to HPA/LS. Participation in alternative PA (e.g., skateboarding) was associated with an increase in the odds of being in LPA/CHS and LPA/IS compared to HPA/LS. Using alternative tobacco products and having peers who smoke were each associated with an increase in the odds of belonging to LPA/CHS and LPA/IS versus HPA/LS. By contrast, having PA support and positive expectations of the benefits of PA were associated with a decrease in the odds of belonging to LPA/CHS versus HPA/LS. **CONCLUSIONS:** The findings of this study suggest the existence of multiple patterns for the relation of smoking and PA, and that the best predictors of higher smoking and lower PA are smoking expectations and White race. Finally, not all PA is equally protective against smoking. Some physical activities (e.g., skateboarding) may actually increase the odds of smoking. Further research is necessary to better understand these relations.

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POS3-155

THE LITTLE CIGAR MICROBIOTA IS CHARACTERIZED BY A DISTINCT AND DIVERSE BACTERIAL COMMUNITY

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Microbial constituents of tobacco products, such as little cigars, have been thus far largely ignored. However, micro-organisms associated with tobacco products may play a critical role in infectious and chronic diseases, and in the production of tobacco-specific *N*-nitrosamines (TSNAs). In this study, we characterized in time-series experiments the bacterial communities in four little cigar products: Swisher Sweets Cigarillos, Swisher Sweets Little Cigars - Sweet Cherry, Cheyenne Cigars Full Flavor 100's, and Cheyenne Menthol Box. Three lots of each product were incubated for two weeks under three different temperature and relative humidity conditions to mimic pocket, refrigerator or room storage conditions.

On days 0, 5, 9 and 14, subsamples were DNA extracted, the V3V4 region of the 16S rRNA gene was PCR-amplified and sequenced using Illumina MiSeq, and analysed using the QIIME and Phyloseq software packages. Sequence analyses revealed ~2,400 species-level operational taxonomic units, a level of bacterial community complexity similar to that of cigarette products. However, bacterial diversity (Shannon) and richness (Observed OTUs) was higher in the little cigar tobacco compared to the wrapper in each product. Beta-diversity analyses revealed that the little cigars bacterial communities are significantly different from that of cigarette products. In addition, little cigar wrappers and tobacco have very distinct bacterial communities, which also varies significantly depending on product lots. Independently of temperature and RH storage conditions, a single bacterial phylum, Firmicutes, was found to dominate in the wrapper. Among these, bacteria from the *Bacillus* and *Lactobacillus* genera were the two dominant groups. For the tobacco filling, bacteria from the phylum Proteobacteria were found to be dominant, mostly represented by two genera: *Staphylococcus* and *Pseudomonas*. These two groups of bacteria comprise well-known opportunistic human pathogens, which are usually very low abundant or absent in the microbiome associated with cigarettes. This study is the first to characterize a key component of potentially harmful constituents in little cigars. Our findings have critical implications in term of exposure to bacterial pathogens which may impact the health of little cigar users.

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POS3-156

PROMOTION AND BRIEF INTERVENTION OF SMOKING CESSATION AT THE SMOKING HOTSPOTS

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BACKGROUND: Promoting smoking cessation in the community is essential to motivate more smokers to quit and reduce smoking prevalence. The study aimed to examine the feasibility of promoting smoking cessation at smoking "hotspots" - the outdoor areas with many smokers who gather to smoke and a rubbish bin for cigarette butts' disposal. A total of 14 hotspots located at bus stops, entrances of commercial buildings and shopping malls were selected for the observation and delivery of brief intervention. **METHODS:** Two half-day training sessions were organized to deliver knowledge of tobacco control and counseling skills to 40 undergraduate student ambassadors. They proactively approached the smokers to deliver souvenirs (a pack of tissue which showed quitting advice to attract smokers), measure their exhaled carbon monoxide level, deliver brief advice (about 5 minutes) and invite them to receive telephone follow-up. The brief advice was a well-structured protocol using AWARD model, including asking the smoking status, warning about smoking harms, advising on quitting, referring to telephone follow-up and do-it-again by repeating the advice again. No cessation medication was provided, but the participants could obtain free NRT from the smoking cessation clinics. **RESULTS:** In the 108-hour intervention sessions from January to August 2015, 3,096 smokers were approached and 1,285 of them (41.5%) accepted our souvenirs. The 'AWARD' advice was delivered to 916 smokers, in which 430 (46.9%) received the complete advice. 210 smokers consented to accepting further telephone follow-up, while 60.0% of them (n=126) were successfully contacted at 1-week follow-up. In the smokers who were successfully contacted at 6-month follow-up (n=109), 16 (14.8%) had quit smoking, and 9 (8.3%) reported reduction of their cigarette consumption by at least 50%. Among those who continued to smoke (n=92), 12.4% had attempted abstinence for at least 24 hours and 71.7% had intention to quit at 6-month follow-up. **CONCLUSIONS:** The findings show the feasibility and preliminary effectiveness of promoting smoking cessation and delivering brief intervention to the smokers at smoking hotspots. Smoking hotspot can be developed as an important channel for promotion and intervention of smoking cessation.

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POS3-157

UNDERLYING MECHANISMS LINKING CONTINGENCY MANAGEMENT WITH SMOKING CESSATION IN A SOCIOECONOMICALLY DISADVANTAGED POPULATION

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OBJECTIVES: Little is known about the mechanisms linking contingency management (CM) treatment with smoking abstinence. The opportunity to earn financial incentives for abstinence might increase self-efficacy for quitting and encourage individuals to seek social support during a quit attempt. The current study investigated self-efficacy and social support as potential mechanisms through which CM treatment influences smoking cessation. **METHODS:** Participants ($N=146$) were primarily Black (62.3%) and female (57.5%) adults enrolled in a smoking cessation program at a safety-net hospital. They received usual care (UC), which included pharmacotherapy and counseling sessions ($n = 71$) or a CM intervention (UC + 4 weeks of financial incentives; $n = 75$). Social support and self-efficacy for quitting were measured on the quit date with the Interpersonal Support Evaluation List (ISEL) and the Self-Efficacy Scale/Confidence (SESC) scales. Mediation analyses were conducted to evaluate the indirect effects of treatment group on biochemically-verified abstinence (1 and 4 weeks post-quit) through social support and self-efficacy. Gender was evaluated as a moderator of the indirect effects. **RESULTS:** Analyses revealed a significant indirect effect of treatment group on smoking cessation at 1 and 4-weeks post-quit through the ISEL tangible subscale (but not the ISEL appraisal, ISEL belonging, or SESC scales). Moderated mediation analyses revealed that all subscales of the SESC (but not the ISEL) significantly mediated the relationship between treatment group and smoking cessation (1 and 4 weeks post-quit) among females, but not males. Women in the CM group had significantly higher self-efficacy on the subscales of the SESC than women assigned to the UC, and higher self-efficacy was associated with a greater likelihood of abstinence. Among males, the treatment groups did not differ on self-efficacy. **CONCLUSION:** Findings suggest that social support is an underlying mechanism through which CM treatment impacts smoking cessation. CM treatment may also increase self-efficacy, which leads to positive smoking cessation outcomes, specifically among females.

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POS3-158

DUAL TOBACCO CIGARETTE AND E-CIGARETTE USE: PATTERNS AND PERCEPTIONS OF USERS IN CANADA

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SIGNIFICANCE: In Canada, despite a restriction on nicotine-containing e-cigarettes (ECs), products with and without nicotine are widely available and accessible. Dual use of ECs and tobacco cigarettes (TCs) is the most common pattern of use among EC users (78%); however, little is known about dual users' patterns of use and product perceptions. **METHODS:** A sample of adult dual users (smoking at least 5 TCs per day and using ECs at least 5 times per day) were recruited in Kitchener-Waterloo and Toronto, Ontario. Participants completed a questionnaire examining their patterns of use and product perceptions. **RESULTS:** Dual users ($n=49$) were 35.8 (± 11.6) years of age, mostly male (71.4%), and exhibited moderate nicotine dependence (FTCD: 4.7 (± 1.9)). Respondents had smoked and vaped daily for 17.3 (± 12.1) and 1.2 (± 0.9) years, respectively, and all reported initiating use of TCs prior to ECs. Respondents reported smoking 13.6 (± 5.7) TCs per day and using ECs 10.9 (± 11.3) times per day. More dual users reported smoking TCs within the first hour of waking (98%; vs 57% for ECs), and more reported intentions to quit smoking TCs (92%; vs 57% for ECs). A large majority of dual users reported using tank systems (91.8%) and ECs with nicotine (79.6%). The most commonly reported reasons for using ECs included: to smoke fewer TCs (79.6%), to deal with cravings for TCs (71.4%), and because of their belief that ECs are less harmful than TCs (71.4%). Although dual users used both TCs and ECs in similar places (e.g., home, bar), ECs were more frequently used indoors. From the time they began vaping daily, 75.5% of dual users reported smoking fewer TCs. Compared to TCs, ECs were considered: more socially acceptable (65.3%), less satisfying (67.4%), less pleasurable (62.5%),

less harmful (87.5%), and less expensive (81.7%). **CONCLUSIONS:** The majority of dual users in this sample used tank systems containing nicotine, and appear to be partially substituting ECs for TCs. The findings suggest that dual use behaviour is similar to that in other jurisdictions, despite Canada's restrictive regulatory framework for these products.

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POS3-159

PREDICTING YOUTHS' SHARING OF TOBACCO AND E-CIGARETTE-RELATED INFORMATION AND THE VALENCE WITH WHICH THEY SHARE

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BACKGROUND: While personal conversations have been shown to influence smoking-related outcomes, there is a need for a concept of interpersonal communication that covers both one-way and two-way forms of person-to-person communication, occurring on both online and offline platforms. This study puts forth 'sharing' as such a concept, and examines different predictors of overall sharing about tobacco (TOB) and e-cigarettes (ECIG), as well as of the specific valences of TOB and ECIG sharing, among youth. **METHODS:** In a nationally representative rolling cross-sectional ($n=7094$) and recontact ($n=1651$) survey of 13-25 year olds, we measured level and valence of (negative, positive, mixed) sharing, current use and use intentions, information exposure, and perceived norms with regard to TOB and ECIG. Multivariate logistic regressions and multinomial logistical regressions examined predictors of overall sharing and valence of sharing, respectively. Additional multinomial regressions with interaction terms tested the moderating effect of perceived norms on the association between use/intentions and valence of sharing. All analyses were done at cross-sectional and lagged levels, using weighted data. **RESULTS:** Sharing behavior was moderate (17% for TOB; 11% for ECIG), and varied in valence (57% negative for TOB; 29% for ECIG). Overall sharing behavior was predicted by current use, intentions, and exposure to information ($p<.05$). Pro-TOB and pro-ECIG sharing (compared to no sharing) was predicted by current use, intentions, and descriptive and injunctive norms ($p<.05$). Current intentions and descriptive norms interacted in their effect on sharing, such that perceiving smoking or vaping as prevalent among friends/peers at Time 1 reduced the effect of intentions on the valence with which youths shared about TOB (at Time 1) and about ECIG (at both Time 1 and Time 2) ($p<.05$). **CONCLUSIONS:** Sharing happens among a minority and is a function of current use, intentions, recent exposure to information, and in particular, perceived norms. These findings, in conjunction with research that examines the actual effects of sharing, may be relevant to future tobacco control interventions.

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**POS3-160****DISPARITIES IN US HEALTHCARE PROVIDER SCREENING AND ADVICE FOR CESSATION ACROSS CHRONIC MEDICAL CONDITIONS AND TOBACCO PRODUCTS**

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SIGNIFICANCE: Disparities in tobacco use are worsening in the US, disproportionately affecting those with chronic medical conditions. One possible contributor is that physicians may not screen and advise cessation uniformly across patients and/or tobacco products. This study examined physician communications regarding cigarette and non-cigarette tobacco products among adults with chronic conditions. **METHODS:** Data were drawn from two waves (2013-2014) of the National Survey on Drug Use and Health. Adult (≥ 18 years) tobacco use included past year use of cigarettes, cigars, or smokeless tobacco. Chronic conditions included asthma, anxiety, coronary heart disease, depression, diabetes, hepatitis, HIV, hypertension, lung cancer, stroke, and substance abuse. Data were analyzed using logistic regression, controlling for basic socio-demographics and number of provider visits. **RESULTS:** Adults with anxiety, depression, and substance use disorders had the highest prevalence of past year cigarette (37.2-58.2%), cigar (9.1-28.0%), and smokeless tobacco (3.1-11.7%) use. Patients with all chronic conditions were more likely to receive advice to quit than those without a condition (OR 1.21-2.37, $p < .01$), although odds were lowest among adults with mental health and substance use disorders (OR 1.21-1.35, $p < .01$). Cigarette smokers were more likely to report being screened and advised to quit than non-cigarette tobacco users (OR 1.54-5.71, $p < .01$). **CONCLUSIONS:** Results support the need for provider training to expand screening and cessation interventions to include the growing spectrum of tobacco products. Screening and referral to interventions are especially needed for those with mental health and substance use disorders to reduce the disparate burden of tobacco-related disease and death.

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POS3-161**PERSONAL SMOKEFREE POLICIES AMONG COMMUNITY COLLEGE SMOKERS**

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SIGNIFICANCE: Personal smokefree policies (home and vehicle) among smokers reduce exposure to secondhand smoke, improve health, and increase smoking cessation. Overall, 83.0% and 78.1% of the general population in the US report smokefree homes and vehicles, respectively. However, there is little information about such policies among 2-year community college (CC) students, who represent a large, diverse population with higher smoking rates and lower negative attitudes towards smoking than 4-year college students. **METHODS:** Prevalence of, and factors associated with, personal smokefree policies were examined for 2,486 CC smokers enrolled in a national trial of web assisted tobacco intervention (WATI). **RESULTS:** Few students had smokefree home policies (20.7%), smokefree vehicles (17.0%), both smokefree home and vehicle (4.3%), or any policy (home or vehicle; 31.2%). In logistic regression models, having children was associated with a smokefree home or any policy but not with a smokefree vehicle policy, though of the 40% of subjects who had children, only about half reported a smokefree home, and only 15% had a smokefree vehicle. Additionally, not living with other smokers, living with parents or roommates/siblings (vs. alone), smoking later than 30 minutes after awakening, believing that smoking affects the health of others, and confidence in quitting were associated with the presence of a smokefree home or any policy. No variables were significantly associated with presence of a smokefree vehicle. **CONCLUSIONS:** CC students represent a priority population for intervention regarding smokefree homes and vehicles. Such intervention

can decrease exposure to others, including children, and potentially increase the likelihood of quitting in this high risk population.

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POS3-162**TRENDS OF E-CIGARETTE USE IN VETERANS ENROLLED IN TOBACCO-DEPENDENCE TREATMENT, VETERANS AFFAIRS LOMA LINDA HEALTHCARE SYSTEM, LOMA LINDA, CA, 2015-2016**

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SIGNIFICANCE: Electronic-cigarette use increased in US adult population from 3.3% to 8.5% (2009- 2013). Current smokers who ever used e-cigarettes (EC) increased from 9.8% to 36.5% (2010-2013; ref. CDC, 2014). Even though reasons for use of EC are primarily motivated to decrease smoking to reduce harm or quit smoking (Rutten, 2015), they actually are less likely to quit (Al-Delamy, 2015). We examined prevalence and characteristics of EC use among all Veterans newly enrolled in tobacco treatment from 2015 to 2016 at the Veterans Affairs Loma Linda Healthcare System. Our secondary aim was to evaluate history of abstinence attempts, severity of tobacco addiction, depression scores, self-efficacy or reasons for smoking in those using EC compared to the whole smoking population. Our tobacco treatment protocol does not promote use of ECs. **METHODS:** All veterans enrolling in tobacco treatment answered 4 items on e-cigarette use from March 2015 to March 2016. We analyzed their responses about prevalence of EC use using descriptive statistics along with demographics, abstinence outcomes and risk profile. T-tests were used to compare continuous variables and chi-square tests for categorical variables. **RESULTS:** Data from 434 smoking veterans indicate that 51% (221/434) report ever using ECs. The mean age for EC users is 50.4 years vs. non-users 58.4 years ($p < 0.001$). The mean age when starting smoking among the EC users was 17.6 years and among non-users 19.2 years ($p = 0.005$). There was no significant difference between EC users vs. non-users on: Fagerstrom Score, depression screening, self-efficacy, or "Why I Smoke" scores. E-cig users are more likely to have more than 4 lifetime quit attempts (97 vs. 50, $\chi^2 p < 0.001$). The majority of EC users were dual users (64%) and couldn't completely quit tobacco even briefly while "vaping". **CONCLUSION:** Half of all Veterans currently enrolled in tobacco treatment have unsuccessfully tried EC to stop smoking. Veterans who have used ECs tend to be younger, started smoking earlier and have made more unsuccessful lifetime attempts to stop compared to never users. The millennial veteran generation may need specific education about ECs.

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POS3-163**A PILOT CLINICAL TRIAL OF CONTINGENCY MANAGEMENT AND PHARMACOTHERAPY FOR SMOKING CESSATION IN THE WORKPLACE**

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SIGNIFICANCE: National survey data indicate smoking rates are declining less rapidly among populations with lower income or education. Providing smoking cessation services at the workplace may be one option to increase access to treatment and promote cessation. The current study evaluated the feasibility and efficacy of providing tailored smoking cessation services to university employees at their workplace. **METHODS:** Employees from six paired dining halls (3 test and 3 control sites) were offered comprehensive treatment including individual counseling, free pharmacotherapy (dual nicotine replacement therapy or varenicline), and 5 weeks of contingency management that reinforced abstinence or reductions in



smoking based on expired breath carbon monoxide to encourage progress toward quitting. We used a dynamic waitlist design of matched dining hall sites where the control site began treatment 6 weeks after the test site. Primary measures included a smoking status survey administered at baseline and 6 weeks later to compare rates of quit attempts and successful abstinence for at least 24 hours between the test and control sites. RESULTS: We surveyed 64 employees (51.6% female) across 6 sites. Of these, 40.6% were current smokers, smoking an average of 9.9 cigarettes per day (SD=5.0). On average, 87% of the surveyed smokers enrolled in treatment. The majority of enrolled participants were single (76.0%), Black (68.0%), and 20.0% reported less than a high school education, while 52.0% reported completing a GED or equivalent. At baseline, few smokers had ever used evidence-based pharmacotherapy (<25%). Following the intervention, smokers in the test sites compared to the control sites reported significantly higher rates of quit attempts [66.7% vs. 12.5%; $\chi^2(1, n=23)=6.14, p=.01$] and success quitting for at least 24 hours [60.0% vs. 12.5%; $\chi^2(1, n=23)=4.79, p=.02$]. Participants rated the program as very helpful overall (4.1 out of 5). CONCLUSIONS: These results support the feasibility and efficacy of providing smoking cessation services in the workplace. Lessons learned and suggestions for improving treatment implementation in the workplace will be discussed.

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POS3-164

IDENTIFYING BEHAVIOURAL CLUSTERS OF TOBACCO PRODUCT AND E-CIGARETTE USE: A REPEAT CROSS-SECTIONAL ANALYSIS

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INTRODUCTION: A variety of tobacco products and e-cigarettes are currently available for youth to use, such as cigarettes, cigarillos or little cigars (C/LC), roll-your-own (RYO) cigarettes, smokeless tobacco, waterpipe and e-cigarettes. However, there is a lack of evidence for the combinations of tobacco products and e-cigarettes commonly used by youth and whether youth from different usage classes share similar characteristics. METHODS: A cohort of 9th grade students was identified in the 2013-14 year of the COMPASS study. Clusters of youth that currently use similar combinations of tobacco products and e-cigarettes were identified one year later in 2014-15 and again in 2015-16 using latent class analysis. Multinomial logistic models identified characteristics of youth in tobacco and e-cigarette usage classes relative to youth in non-current usage classes. RESULTS: In 2013-14 and 2014-15 a four-cluster model best fit the data and described a non-current use group; an e-cigarette only group; a tobacco cigarette, C/LC and e-cigarette group; and a poly-use group at high probability of using all products. In 2015-16 a five-class model best fit the data and described a non-current use group; a tobacco cigarette and RYO cigarette group; a tobacco cigarette and e-cigarette group; a tobacco cigarette, C/LC, cigar and e-cigarette group; and a poly-use group. Across years, youth from different tobacco and e-cigarette usage classes shared many characteristics in common, including having more friends that smoked, being current binge drinkers, and being current marijuana users, relative to youth in non-current usage classes. DISCUSSION: This study identified different cross-sectional clusters of tobacco product and e-cigarette use across waves of a large longitudinal study. A poly-use group was present across all three survey waves and the prevalence of this group increased over time. E-cigarettes were more likely to be used with other tobacco products than on their own. Given that many youth in this study used more than one tobacco product or e-cigarette, prevention and cessation activities should address the use of multiple tobacco products and e-cigarettes.

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POS3-165

PHYSICIAN COMMUNICATION AGAINST SMOKING AND ADOLESCENT DISCLOSURE OF TOBACCO USE

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SIGNIFICANCE: Physicians have been asked to use a five step approach to reduce smoking among teens: Ask, Assess, Advise, Assist, and Arrange. Previous research has shown that when physicians follow these steps, adolescents reduce their intentions to smoke, and those who are already smokers become more likely to quit. However, some physicians avoid addressing tobacco use because they do not believe that teens will truthfully disclose smoking. To our knowledge, this is the first study to examine the relations between physician communication about smoking and the odds of adolescent disclosure of tobacco use. METHODS: This study used data from the Memphis Health Project, a longitudinal study of risk factors for smoking onset. Items were drawn from a survey administered when the cohort was in the eleventh grade. Two questions assessed physician communication about tobacco use. The first of these asked teens whether a doctor had ever asked them if they smoked (yes/no). Next, students were asked whether a doctor had ever told them not to smoke (yes/no). The likelihood of disclosure was measured as follows: "If you were alone (without your parents) in your doctor's office, would you admit that you smoke if the doctor asked you?" (yes/no). For this report our sample was limited to 488 teens who smoked. Of this group, 46.1% were African American and 53.9% Caucasian. Overall, 55.2% of the teens reported that they have been asked about smoking by their doctor, and 46.1% indicated that they had been advised against smoking by their physician. Fully 87.63% of the smokers reported that they would tell their doctor they smoked if asked. RESULTS: Logistic regression revealed that teens who reported having been asked whether they smoke were 2.73 times as likely to report they would disclose smoking when compared with those who were not asked about tobacco use, $p = .001$. Similarly, teens who reported that a doctor had advised them against smoking were 2.26 times as likely to report that they would disclose tobacco use than those who were not advised against smoking, $p = .007$. CONCLUSIONS: This is the first study to find a relation between physician communication about smoking and adolescent beliefs about the likelihood that they would disclose smoking. Although the causal direction is unknown, it is clear that teens who are asked and advised about tobacco use are also more likely to believe they can disclose smoking to their doctors. These findings should encourage physicians to ask and advise all teens against smoking.

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POS3-166

DEVELOPING A COMPREHENSIVE SMOKING CESSATION PROGRAM IN A COMMUNITY CANCER CENTER: LESSONS LEARNED

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BACKGROUND: Smoking cessation in oncology patients can lead to significant reductions in cancer-related complications and mortality. Providing smoking cessation interventions in oncology settings can engage patients and help them make a serious quit attempt. OBJECTIVES: The primary objective included the implementation of a comprehensive smoking cessation program in a community cancer center. To this end, psychology staff developed multiple resources to tailor smoking cessation to patients and aimed to solicit program buy in from patients, administration, and healthcare staff. OUTCOMES: First steps included electronically identifying and tracking smoking patients and their willingness to be contacted about help with quitting. During the initial nine month tracking period 1,057 smoking patients were identified. Of these patients 55.47% were not willing to be contacted about quitting. Next, tailored individual interventions, group support, and dissemination of local and national resources were employed. Finally, cessation staff evaluated program successes and areas of improvement. BARRIERS: Resistance of patients, even those that reported willingness to be contacted for help with quitting, in attending cessation services appointments. Resistance by medical staff to referring patients for cessation services and resistance to prescribing medication to aid in cessation. Patients in active treatment often had numerous medical appointments to keep and felt burdened by adding a cessation appointment.



ment, particularly when conflicts with transportation and outside responsibilities arose. LESSONS LEARNED: Though over half of patients were not interested in cessation services, a large proportion did want help quitting. Direct referrals from medical and psychology staff were found to be more effective than having cessation staff call patients to schedule appointments. Scheduling appointments directly before or after other oncology-related medical appointments eased appointment fatigue and reduced transportation concerns. NEXT STEPS: Increasing direct referrals for cessation services, increasing group attendance, and making cessation medications more accessible to patients.

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POS3-167

CIGARILLO KNOWLEDGE, RISK PERCEPTIONS, AND NORMS AMONG A NATIONAL SAMPLE OF ADOLESCENTS & YOUNG ADULTS

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BACKGROUND: Cigarillo use continues to increase among adolescents and young adults. Little is known about how knowledge, risk perceptions, and normative beliefs are associated with cigarillo use, yet understanding these mechanisms may inform prevention efforts. **METHOD:** In Spring 2016, we conducted a nationally-representative online survey of 1,297 adolescents (ages 13-17) and 2,214 young adults (ages 18-25) to assess cigarillo knowledge, risk perceptions, and social norms. **RESULTS:** The sample was 54.9% female, 74.2% white, and 19% Hispanic, with 5.2% being current cigarillo users and 11.6% lifetime (not current) users. Overall, 65% of adolescents and 42% of young adults reported that they did not know what a cigarillo was and only 19% of adolescents and 37% of young adults correctly identified a cigarillo. Among current users, 55.2% either did not know or were wrong about what a cigarillo was. After being provided with an accurate cigarillo definition and picture, participants were asked about their use. Next, they were asked about cigarillo relative risk compared to cigarettes. Fewer current users (73.0%) accurately reported that cigarillos are at least as harmful as cigarettes than lifetime users (83.8%) and never users (89.9%). More current users reported that at least some of their friends were also cigarillo users (58.8%), compared to lifetime users (14.6%) and never users (5.5%). Current cigarillo users perceived that important others had fewer negative opinions (47.9%) about cigarillo smoking compared to lifetime users (60.1%) and never users (72.8%). **CONCLUSIONS:** Over half of the sample either did not know or were wrong about what a cigarillo is, indicating that measurement research is needed. Also, adolescents and young adults generally perceived cigarillo smoking to be at least as harmful as cigarette smoking, but differences emerged among user groups, with current users less likely to hold this belief. Perceptions about peer opinion and use of cigarillos were associated with use status. These perceptions may be an important target for interventions to reduce cigarillo use.

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POS3-168

A RANDOMIZED TRIAL EVALUATING TWO APPROACHES FOR PROMOTING PHARMACY-BASED REFERRALS TO THE TOBACCO QUITLINE

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SIGNIFICANCE: Community pharmacies have the potential to reduce the prevalence of tobacco use, yet most do not integrate cessation activities into routine practice. This study aimed to estimate the impact of two intervention approach-

es for increasing pharmacy-based referrals to the tobacco quitline. **METHODS:** Pharmacists and technicians, representing 64 community pharmacies in Connecticut (n=32) and Washington (n=32), enrolled in a randomized trial to compare an academic detailing (AD) intervention to a mailed-materials (MM) intervention to engage community pharmacy personnel in generating patient referrals to the tobacco quitline. Monitoring of pharmacy-based referrals to the quitline [collected by the quitline] occurred for a period of 5 months prior to launch of the interventions and continued for 12 months post-launch. Analyses compared changes in the number and percentage of quitline registrants who reported hearing about the quitline from a pharmacy during the baseline period versus (a) the 12-month follow-up period and (b) a parallel time period, one year later, to control for potential seasonality effects. **RESULTS:** Compared to the 5-month pre-launch period, the percent of all quitline callers who reported having heard about the quitline from a pharmacy increased significantly, from 2.1% (142 of 6,769 callers) to 3.8% (637 of 16,690 callers) post-implementation (p<0.0001). In analyses conducted to control for seasonality effects, the percent of callers who heard about the quitline from a pharmacy increased from 2.1% to 4.1% (401 of 9,808 callers; p<0.0001). Of calls that were linkable to the 64 study pharmacies, 55% were from the AD group and 45% were from the MM group (NS). **CONCLUSIONS:** Pharmacy personnel can be effective advocates for tobacco quitlines. Collectively, the interventions led to increases in quitline referrals, although no significant difference was identified by intervention group. Implementing Ask-Advise-Refer more broadly in community pharmacies could lead to meaningful increases in quitline call volume.

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POS3-169

CONTINUING DISPARITIES AMONG YOUNG STUDENT SMOKERS IN NEW ZEALAND

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SIGNIFICANCE: Persistent disparities remain through continuous decline in smoking amongst 14-15 year olds in New Zealand remain. Smoking rates amongst indigenous Māori and Pacific are higher than for the general population over time. **METHODS:** This study explores the decline in smoking over time for ethnic groups, and the extent of the disparities amongst indigenous Māori and Pacific young smokers as observed in New Zealand (NZ). It utilizes the ASH Year 10 Snapshot, an annual cross-sectional tobacco-use survey that involves between 21,000 – 33,000 Year 10 students, aged 14 and 15 years old. Prioritised ethnicity was used to allocate students who identify with more than one ethnic group into a single category for analysis. Students who ticked more than one category were prioritised as Māori, Pacific, Asian, Other, and then NZ European. **RESULTS:** Daily smoking overall fell from 15.2% in 2000 to 2.5% in 2015. Māori daily smoking has fallen from 31.1% in 2000 to 6.0% in 2015, yet Māori students are still more than 4 times more likely to smoke daily compared to NZ European or Asian students. Daily smoking among Pacific students fell from 18.1% in 2000 to 3.5% in 2015, but reduction rates for Pacific slowed considerably between 2013-2015. Regular smoking dropped from 26.2% to 3.8% for NZ European, 42.9% to 11.2% for Māori, 28.2% to 7.04% for Pacific and 12% to 1.4% from 2000 to 2015 for each group. Māori regular smoking is 3-4 times higher compared to NZ European and 8 times higher compared to Asian. Never smokers rose from 33.6% for NZ European in 2000 to 84.6% in 2015, 16.2% to 59.2% for Māori, 35.2% to 70.5% for Pacific and 62.4% to 91.7% for Asian respectively. **CONCLUSIONS:** Ethnic disparities in smoking are still significant. Clearer solutions are needed to address Māori and Pacific youth smoking rates that remain higher than overall youth smoking rates. The findings may inform efforts to monitor and track smoking amongst other indigenous and minority population groups to assist countries at earlier stages of data analysis of the tobacco epidemic and not to replicate the lack of focus on effective interventions to reduce disparities among young student smoking in NZ.

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**POS3-170****CONTENT VALIDITY FOR THE INSTRUMENT ON KNOWLEDGE, ATTITUDE AND BEHAVIOR (KAB) TOWARDS SMOKING CESSATION INTERVENTION AMONG HEALTHCARE PROVIDERS.**

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INTRODUCTION: Healthcare providers play an important role in smoking cessation intervention. To date, there is no validated instrument available to evaluate Knowledge, Attitude and Behavior (KAB) of healthcare providers regarding their smoking cessation intervention in our Malaysian population. **AIM:** To determine the content validity of an instrument designed to evaluate KAB towards smoking cessation intervention among healthcare providers. **METHOD:** KAB was developed based on literature review, modification of an existing instruments and input from tobacco control experts. The instrument contains three domains such as Knowledge (20 items), Attitude (8 items) and Behavior (26 items). The questionnaires were tested for content validity by expert panels which composed of 7 well-known national and international professionals who are involved in tobacco control program in their respective countries. Each items were evaluated based on four characteristics, i.e. consistency, representativeness, relevance and clarity. The content validity index (CVI) and Kappa Modified Coefficient were calculated and the items showed a CVI ≥ 0.80 and Kappa ≥ 0.75 , which is considered valid. **RESULTS:** For knowledge and attitude domains, all items demonstrated excellent content validity for the characteristics of consistency, representativeness, relevance and clarity (CVI=0.86-1.00 and Kappa = 0.85-1.00). For behavior domain, 20 items showed excellent content validity for consistency (CVI=0.86-1.00 and Kappa = 0.85-1.00) and 21 items showed excellent content validity for representativeness, relevance and clarity (CVI=0.86-1.00 and Kappa = 0.85-1.00). **CONCLUSION:** Content validity is satisfactory for this instrument. However, other psychometric test for the items need to be evaluated. This instrument can help researchers to evaluate healthcare provider's KAB regarding smoking cessation.

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POS3-171**ASSOCIATIONS BETWEEN PARENTAL MOVIE RESTRICTIONS AND ADOLESCENT SMOKING SUSCEPTIBILITY AND CIGARETTE SMOKING**

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Research consistently supports media's influence on youth health risk behavior including cigarette smoking. Content analyses show smoking to be most prevalent in R-rated movies, highlighting the importance of monitoring youth exposure to age-restricted media. Previous work shows associations between parental movie restrictions and smoking susceptibility and smoking, but studies to date have relied on cross-sectional data and failed to control for other parenting behaviors and actual exposure to smoking in the media. The present study examined whether parental restriction of R-rated movies in early adolescence was associated with three smoking indices in later adolescence: susceptibility, ever puffed a cigarette, and ever smoked a full cigarette and whether associations held while controlling for known correlates of smoking in both parenting and media domains. Participants were 881 middle schoolers enrolled in a prospective study (55% female; 16% non-White, 12% Hispanic) who completed a series of web surveys over a 3-year period. Parental restriction was indicated by whether or not parents/guardians permitted youth to watch R-rated movies without adult supervision. We tested whether parental restriction prospectively predicted susceptibility, onset of puffing, and onset of a full cigarette, over and above exposure to smoking in films (using the Beach method based on content coding of films viewed), parental knowledge (child disclosure, parent solicitation, parental control), maternal and paternal conflict and support, and sex, age, sensation seeking, perceived availability of cigarettes, and family SES. Findings revealed a strong association between parental restrictions and ever smoking a cigarette (unadjusted odds ratio, OR=0.18, $p<0.001$; adjusted odds ratio, adjOR, OR=0.38, $p<0.01$), and ever puffing (unadjusted only: OR=0.47, $p<0.001$; adjOR=1.07), but not susceptibility (OR=0.95; adjOR=1.08). Parental restriction of R-rated movies was a consistent risk factor for onset of smoking and may be an effective target for prevention programs. Future

research should determine the mechanisms that underlie this association (e.g., proneness to deviant behavior, modeling).

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POS3-172**DISPARITIES IN CURRENT MENTHOL CIGARETTE USE AND INTENTIONS TO QUIT AMONG ADULT SMOKERS: EVIDENCE FROM THE 2013-2014 NATIONAL ADULT TOBACCO SURVEY**

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SIGNIFICANCE: The 2009 Family Smoking Prevention and Tobacco Control Act (FSPTCA) prohibited select characterizing flavors, including fruit, candy, or clove in combustible cigarettes. However, the FSPTCA did not ban menthol flavorings and the Food and Drug Administration (FDA) is considering the scientific evidence to inform the decision-making process concerning the potential menthol ban. The purpose of this cross-sectional study is to inform FDA's decision-making process and examine correlates of (a) current menthol cigarette consumption, and (b) intentions to quit among a nationally representative sample of adult smokers aged ≥ 18 years. **METHODS:** We estimated current menthol cigarette consumption among U.S. adult smokers ($n=10,121$), using data from the 2013-2014 National Adult Tobacco Survey, a national landline and cellular telephone survey of non-institutionalized U.S. adults aged ≥ 18 years. Data are analyzed using logistic regression, including ordered logistic regression and adjusted for sex, age, race/ethnicity, sexual identity in order to model menthol status and intentions to quit. **RESULTS:** Among all current cigarette smokers, 52.8% reported some degree of menthol cigarette use, from rarely, to all of the time. Following adjustment, menthol cigarette use was significantly ($p<0.01$) higher among young adults aged 18-25 years, women and non-Hispanic Blacks. Additionally, sexual minority adult smokers had moderately greater odds ($p<0.10$) of current menthol cigarette use than non-sexual minority adult smokers. Further, intentions to quit smoking among menthol users was significantly ($p<0.05$) higher among adults aged 26-34 years and non-Hispanic Blacks. Intentions to quit were less likely ($p<0.05$) among sexual minority adult smokers than non-sexual minority adult smokers. **CONCLUSIONS:** These findings are consistent with existing scientific evidence and underscore the need for targeted tobacco prevention and cessation efforts. This study has important implications for public health practice and policy, particularly the FDA, concerning the potential menthol ban.

FUNDING: Truth Initiative

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POS3-173**E-CIGARETTE AND OTHER TOBACCO PREVALENCE AMONG LGBTQ IN SOUTHEASTERN UNITED STATES**

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SIGNIFICANCE: The rapid rise of electronic cigarettes (e-cigarettes) threatens to undo public health gains of the past half century. Despite decline in smoking rates, tobacco use remains the leading cause of premature and preventable death in the United States (US). The situation is especially dire for lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals who smoke more and experience poorer health outcomes, due in part, to various social, economic, behavioral, and societal factors. It is important to understand determinants and correlates of e-cigarette use to prevent it. The purpose of this study is to assess the prevalence and cultural and sociodemographic correlates of e-cigarette and other tobacco use among LGBTQ adults in Southeastern US. **METHODS:** We use data from health needs assessment of the adult LGBTQ individuals ($N=436$) living in the Southeastern United States. It measured the prevalence of e-cigarette and other tobacco use, socio-demographic, cultural, and behavioral factors associated with smoking and other risky behaviors. **RESULTS:** Results from this study show that 32% currently use tobacco products of which about half are poly-tobacco users, 29% use



cigarettes, and 13% use e-cigarettes. In contrast, results from the 2014 National Adult Survey indicate that 22% of lesbian, gay and bisexual individuals currently smoke cigarettes and 11% use e-cigarettes. In our study, cigarette and e-cigarette use was greatest among respondents who were trans men (39%, 14%), cisgender males (30%, 13%), and queer-identified individuals (42%, 33%). Those who were younger, less educated, and have lower incomes also reported increase prevalence of cigarette and e-cigarette use. Non-Hispanic white and black respondents reported higher cigarette use, while e-cigarette use was higher among other races. CONCLUSIONS: Slightly elevated smoking rates were reported in our sample compared to most recent national estimates. Large differences in e-cigarette and other tobacco use among LGBTQ subgroups exist and the high rates of poly-tobacco use are especially concerning. Targeted cessation campaigns tailored towards sexual minorities in smaller cities are warranted.

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POS3-174

AN ORGANISATIONAL CHANGE INTERVENTION TO INTEGRATE SMOKING CESSATION CARE IN A MEDICALLY SUPERVISED INJECTING CENTRE FOR PERSONS WHO INJECT DRUGS

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SIGNIFICANCE: Among persons who inject drugs (PWIDs) the prevalence of tobacco smoking is estimated to exceed 90% making this population particularly susceptible to tobacco-related illnesses and in need of smoking cessation intervention. One approach is to target these individuals in medically supervised injecting centres (MSICs) however the acceptability of a smoking cessation care (SCC) intervention in this setting is unknown. This study aimed to assess the acceptability of an organisational change intervention to integrate SCC into usual care practices at a MSIC. In addition, the provision of SCC as reported by staff and clients was also explored. METHODS: A pre-post study of an organisational change intervention based on the Systems Change approach and Addressing Tobacco Through Organisational Change (ATTOC) model was delivered to an MSIC located in Sydney, Australia. Online cross-sectional surveys with staff and clients were conducted. RESULTS: Over 85% of staff agreed that it was acceptable to address client smoking as part of usual care. From pre to post-intervention staff became more systematic in their decision making to provide SCC to every client who smokes ($p=0.010$), self-reported delivery of SCC strategies significantly increased for the provision of verbal advice ($p=0.001$), offer of free nicotine replacement therapy ($p<0.001$), referral to a GP ($p=0.008$) and follow-up to check on quit smoking progress ($p=0.005$). Nearly all (94%) clients agreed that it was acceptable to be asked by staff about their tobacco smoking and that it would also be acceptable at a future visit. The majority held positive attitudes towards receiving SCC, agreeing that it was helpful to talk to staff about their smoking (89%) and that it made them think about quitting. In the post-intervention period, more clients reported receiving SCC ($p<0.05$). CONCLUSIONS: Given the demonstrated acceptability and potential to improve the provision of SCC further research to determine the effectiveness of organisational change interventions in MSICs are warranted.

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POS3-175

SMART PHONE OWNERSHIP IS NOT A BARRIER TO STUDY PARTICIPATION: RESULTS FROM A STUDY OF ADULT SMOKERS IN WASHINGTON, D.C.

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SIGNIFICANCE: Rather than providing participants with study-specific devices, individuals' own smart phones are increasingly used as a means for collection of ecological momentary assessment (EMA) data. The purpose of this study was to examine how smart phone ownership and utilization inclusion criteria affected study eligibility. METHODS: The Moment Study (R21DA036472) is a mixed methods study examining the effects cigalike e-cigarettes on cigarette use among adult smokers. This complex study included EMA and geotracking, both collected via participants' cell phones. An online survey was used as the initial method of screening potential participants. Individuals were recruited via Craigslist, word of mouth, and advertisements placed in public spaces. The online survey screened for twenty-eight inclusion criteria. These inclusion criteria fit into three categories: 1) cell phone use; 2) tobacco use; and 3) health. Prior to being enrolled in the study, participants deemed eligible by the online screener were re-screened via telephone to confirm that they met all of the inclusion criteria. RESULTS: A total of 1,003 individuals took the online screener. The majority of respondents were Non-Hispanic African American (60.4%), male (51.3%), and had a median age of 35 years (IQR 26-50). Approximately half (49.5%) were unemployed. Most smoked menthol cigarettes (69.7%), and had smoked for a median of 11 years (IQR 5-21). The majority owned a smartphone (73.7%), and of those with cell phones, 86.8% could install apps, 89.5% used their cell phone daily, and 86.8% and had an unlimited SMS plan. Of those who took the online screener, 302 were eligible to participate in the study, 163 were eligible after being rescreened, and 117 were enrolled in the study. CONCLUSION: While the inclusion criteria consisted of strict qualifications, such as having a smart phone with an unlimited SMS text message plan and the capabilities to install apps, over 70% individuals who took the screener met qualifications. Inclusion criteria requiring that participants use their own cell phones for data collection, including geotracking and text messaging, was not a barrier to study participation.

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POS3-176

DEVELOPMENT AND DISSEMINATION OF A SHARED TOBACCO CESSATION CURRICULUM FOR CURRENT AND FUTURE HEALTHCARE PROFESSIONALS

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SIGNIFICANCE: In response to a documented need for enhanced tobacco cessation training among health professionals of all disciplines, an evidence-based curriculum (Rx for Change) was developed in 1999. Using Rogers' Diffusion of Innovations as a guiding framework, the various discipline- and disease-specific versions of this educational program have been disseminated in the US and internationally for a period of 17 years. This study aimed to characterize users and the extent of curricular dissemination. METHODS: Dissemination of curricular materials is tracked via a curriculum website (<http://rxforchange.ucsf.edu>), which assesses the number and characteristics of users, intended use of the curricular content, website access, and download data for each of the various teaching tools provided by the program. RESULTS: A total of 12,145 users representing 86 countries and territories (including all 50 states in the US) are registered users on the Rx for Change website, and a total of 223,385 curricular files have been downloaded. Past-year registrations and logins averaged 154 and 381 per month, respectively. Students and clinicians from a broad range of disciplines are represented among user groups: pharmacy (39%), nursing (18%), health educator/



peer counselor (12%), medicine (6%), respiratory care (3%), dentistry (2%), and social work (1%). Most non-student registered users indicated that they planned to use the Rx for Change materials to enhance their own knowledge and skills (72%) and to teach licensed health professionals (37%) or health professional students (31%). Most users heard about the program through faculty member/colleagues (50%). Other dissemination methods included internet searches/listservs (18%), conferences, meetings, and workshops (12%), and newsletters or publications (5%). The most commonly utilized versions of the curriculum were: 5 A's (78% of users), Ask-Advise-Refer (68%), psychiatry (32%), and mental health peer counselor (27%). CONCLUSIONS: A shared curriculum can achieve broad, sustained interprofessional reach for teaching tobacco cessation to current and future healthcare professionals.

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POS3-177

LINKS BETWEEN SUBJECTIVE SOCIAL STATUS AND FACTORS RELEVANT TO PERSISTENT SMOKING

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SIGNIFICANCE: The perception of one's place in a social hierarchy stems from multiple factors such as income, occupation, wealth, racialization, educational background, and others. A self-reported estimate of this "social status" may have more relevance than any single socio-economic status variable to health and health behaviors such as tobacco use. Given this, we sought to examine how subjective social status might be linked to behaviors and environments that are known to impede or enhance the initiation of smoking cessation attempts and their success. METHODS: We analyzed baseline and follow-up data from a randomized clinical trial of proactive tobacco cessation outreach and care in a population-based sample of smokers recruited using the Department of Veterans Affairs electronic record. Participants completed a survey which included a measure of social status, the MacArthur Scale of Subjective Social Status (SSS) "SES ladder," where respondents indicated their perception of where they are in the US social hierarchy by selecting one of 10 rungs on a ladder. Smoking characteristics, behaviors, and environmental factors of interest were also measured via survey questions. Models controlled for survey design, site, and treatment group. RESULTS: Smokers who were daily smokers (versus less frequent), had less confidence in quitting, or had a shorter time to first cigarette after waking reported lower SSS. Those without household rules barring smoking indoors, those who reported living with smokers, or participants with greater proportions of friends who smoked indicated that they were lower on the SSS scale. Participants who agreed that other important people in their lives wanted them to quit smoking tended to have higher SSS scores. All p-values for results reported were ≤ 0.01 . CONCLUSIONS: Measuring Subjective Social Status, a relatively expedient and acceptable way to capture someone's perceived status in the social hierarchy, may have great relevance for determining which smokers likely have greater barriers to quitting, and thus may require extra assistance and outreach. Further, addressing a lack of access to certain resources (such as social support), which may drive low SSS, could have positive, cascading implications in other aspects of individuals' health.

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POS3-178

E-CIGARETTE RELATED MEDIA EXPOSURE AND ITS ASSOCIATION TO ATTITUDE AND BEHAVIOR

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SIGNIFICANCE: E-cigarette companies advertise their products through traditional media outlets such as TV and radio, in retail outlets, and through social

media. There have been few restrictions on such advertising with the exception that companies are not allowed to claim their product helps smokers quit smoking. There has also been substantial media coverage of the rising popularity of e-cigarettes. This study examined exposure to advertisement and media coverage of e-cigarettes and their relationships to attitudes about e-cigarette policies and whether individuals have recommended or bought e-cigarettes for others. METHODS: A U.S. population with a national probability sample (N=8619) was conducted between February 28 and March 31, 2014. Survey respondents were asked about their smoking status and about e-cigarettes including their use of them, exposure to advertisements and news stories, attitudes about e-cigarette policies, and whether they have recommended or bought e-cigarettes anyone. RESULTS: More smokers reported exposure to ads (46.2%) and news stories about e-cigarettes (22.6%) than nonsmokers (28.0% and 18.2%, respectively). Those exposed to ads had more favorable attitudes toward e-cigarettes; they were less likely to say e-cigarettes should be illegal in public (59.2%), fewer favored advertising restrictions (60.7%), or thought they should be banned (31.4%) than those not exposed (67.2%, 68.4%, 39.0%, respectively). People who viewed news stories about e-cigarettes felt the stories were mainly negative yet they were more likely to recommend e-cigarettes to someone than those who had not (17.5% vs. 11.9%). Likewise, those exposed to ads were more likely to recommend them than those who were not (14.9% vs. 11.9%). However, only viewing news stories about e-cigarettes was associated with buying them for someone (9.3% vs. 3.4%); exposure to ads was not (3.6% vs. 3.4%). CONCLUSION: Exposure to news stories about e-cigarettes was related to buying them for others in a way that exposure to ads was not. Despite being rated as mainly negative, news stories are likely to mention that e-cigarettes are used to help with quitting smoking, a claim that e-cigarette companies are not allowed to make.

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POS3-179

EXAMINING SERUM COTININE AND HEALTHCARE UTILIZATION AMONG US CHILDREN FROM THE 2009-2012 NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY

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BACKGROUND: A better understanding of the relationship between serum cotinine, an objective measurement of tobacco smoke exposure (TSE), and healthcare utilization is critical to prioritize limited healthcare resources and provide pertinent information to healthcare professionals and policy makers. OBJECTIVE: The aim of the present study was to assess the relationship between serum cotinine levels and healthcare utilization among children with varying levels of TSE using data from the 2009-2012 National Health and Nutrition Examination Survey. METHODS: We performed a secondary data analysis including children aged 3 to 19 years (N=6,500). The associations between TSE and having a routine place for healthcare, type of place, and hospital utilization were examined by testing logistic regression models. We conducted a Poisson regression analysis to assess the relationship between TSE and number of hospital admissions. We also examined the relationship between TSE and acute care visits related to asthma among asthmatic children. RESULTS: TSE level did not differ by having a routine place for healthcare, although children with high TSE (serum cotinine >3 ng/mL) were 3.49 times (95%CI=1.77-6.89, $p<0.001$) more likely to use a hospital emergency room. Children with high TSE were 2.85 times (95%CI=1.87-4.34, $p<0.001$) more likely to have had an overnight hospital stay. Poisson regression results showed that children with high TSE had 2.05 times (95%CI=1.46-2.87, $p<0.001$) the risk to have higher number of hospital admissions for overnight stays compared to children with no TSE (serum cotinine $<.05$ ng/mL). Among asthmatic children, those with high TSE (OR=4.74, 95%CI=1.93-11.68, $p<0.001$) and low TSE (serum cotinine $.05-2.99$ ng/mL; OR=2.17, 95%CI=1.93-11.68, $p<0.01$) were more likely to have a visit to an emergency room or urgent care center related to asthma than children with no TSE. CONCLUSIONS: Healthcare settings with high volume of tobacco smoke-exposed children should be considered an important public health opportunity to routinely offer cessation and TSE reduction interventions.

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POS3-180

TOBACCO USE, AWARENESS AND ORAL HEALTH AMONG MALAYALI TRIBES, YELAGIRI HILLS, TAMIL NADU, INDIA

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BACKGROUND: Health is a state of complete wellbeing free from any discomfort and pain. Despite remarkable world-wide progress in the field of diagnostic, curative and preventive medicine, still there are large populations of people living in isolation in natural and unpolluted surroundings far away from civilisation, maintaining their traditional values, customs, beliefs and myths. India has the second largest tribal population of the world next to the African countries. About half of the world's autochthonous people live in India, thus making India home to many tribes which have an interesting and varied history of origins, customs and social practices. The present study was conducted to assess the tobacco use, awareness and its effect on health among Malayali tribes, Yelagiri Hills, Tamil nadu, India. **METHOD- OLOGY:** The inhabitants of the 14 villages of the Yelagiri hills, who have completed 18years and residing for more than 15years present on the day of examination and who were willing to participate in the study were included. Data was collected from a cross-sectional survey, using a Survey Proforma, clinical examination and a pre-tested questionnaire which included Demographic data, tobacco habits. An intra-oral examination was carried out by a single examiner to assess the Oral Health Status using WHO Oral Health Surveys – Basic Methods Proforma (1997). SPSS version 15 was used for statistical analysis. **RESULTS:** Results showed that among 660 study population, 381 (57.7%) had no formal education. Among the study population 75% had the habit of alcohol consumption. Of those who had the habit of smoking, 26% smoked beedi, 10.9% smoked cigarette, 65% chewed raw tobacco, 18% chewed Hans and 28% had a combination of smoking and smokeless tobacco usage. The reason for practicing these habits were as a measure to combat the cold, relieving stress and body pain after work, and the lack of awareness of the hazards of the materials used. Prevalence of oral mucosal lesions in the study population was due to tobacco usage and alcohol consumption and lack of awareness regarding the deleterious effects of the products used. **CONCLUSION:** From the results of this study it may be concluded that the Malayali tribes were characterized by a lack of awareness about oral health, deep rooted dental beliefs, high prevalence of tobacco use and limited access to health services.

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POS3-181

TO VAPE OR NOT TO VAPE? EFFECTS OF EXPOSURE TO CONFLICTING INFORMATION ABOUT ELECTRONIC CIGARETTE USE: RESULTS FROM A RANDOMIZED CONTROLLED EXPERIMENT

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INTRODUCTION: News coverage of tobacco products including e-cigarettes and smokeless tobacco includes both positive and negative slants about their use. This study assesses the impact of media exposure to conflicting health information about e-cigarette use on consumers' beliefs about harms and benefits of e-cigarette use. **METHODS:** In February 2016, we conducted a one-way between-subjects randomized controlled experiment comparing the effects of viewing either 1) positive, 2) negative, or 3) mixed positive and negative news headlines about the safety of using e-cigarettes versus a no-message control. Participants were 2,056 adults aged 18 and older from an online opt-in survey panel. Outcome measures were beliefs about harms (3-item scale, $\alpha=0.76$) and benefits (3-item scale, $\alpha=0.82$) of using e-cigarettes. We utilized linear regression to predict each outcome based on experimental condition among e-cigarette never, ever, and current users. **RESULTS:** Among never e-cigarette users, those who viewed negative headlines ($b=0.222$, $p=0.019$) and the no-message control ($b=0.167$, $p=0.039$) reported stronger beliefs about harms compared with the positive headline condition. Never users who viewed negative headlines ($b=-0.318$, $p=0.002$), mixed positive and negative headlines ($b=-0.223$, $p=0.029$), and the no-message control ($b=-0.206$, $p=0.019$) reported weaker agreement about benefits than the positive headline

condition. Among ever and current e-cigarette users, there were no significant differences in beliefs about harms and benefits across conditions. **CONCLUSIONS:** To our knowledge this is the first study assessing the impact of exposure to conflicting news on public beliefs of tobacco products using an experimental design. Results suggest that conflicting news exposure could impact e-cigarette never users by reducing their beliefs about the benefits of e-cigarette use.

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POS3-182

EFFECTIVENESS OF VILLAGE HEALTH WORKER COUNSELING ON CESSATION OUTCOMES AMONG VIETNAMESE SMOKERS

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BACKGROUND: Vietnam has the second highest smoking prevalence among the Southeast Asian countries, yet treatment is not readily available to smokers in low middle-income counties like Vietnam. This NIH funded study is comparing the effectiveness of two system-level strategies for implementing evidence-based guidelines for the treatment of tobacco use in 26 commune health centers (CHCs) in Vietnam. **METHODS:** 26 CHCs were randomized to receive 12 months of 1) training, reminder system and tool kits (ARM 1) vs 2) ARM 1 + referral to a Village Health Worker (VHW) for three in person counseling sessions (ARM 2). Using a quasi-experimental design, we compared the difference in the primary outcome—biochemically validated smoking abstinence measured 6 months after receiving the intervention—among patients with a visit to the ARM 1 CHCs vs ARM 2 CHCs during the intervention period. **RESULTS:** There were 722 participants in the total sample with 252 (34.9%) in ARM 1 and 470 (65.1%) in ARM 2. At 6-months following the intervention, 42.1% of participants in ARM 2 had not smoked in the last 7 days compared to 20.2% of participants in ARM 1. There was a statistically significant difference in the smoking abstinence ($p < .0001$). **CONCLUSION:** Findings suggest that the addition of the VHW to the standard training plus clinical reminder system is an effective intervention for this population and may lead to higher rates of smoking abstinence.

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POS3-183

CAN SHARING ABOUT TOBACCO AND E-CIGARETTES AFFECT BEHAVIOR AMONG YOUTH, ABOVE AND BEYOND INTENTIONS?

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BACKGROUND: Sharing tobacco or e-cigarette-related content with others may represent an act of public commitment to what has just been shared. This study examines whether sharing, then, can affect future smoking or vaping-related behavior among youth. It further examines whether sharing consistently or inconsistently with one's intentions will affect whether one implements those intentions as behavior subsequently. **METHODS:** In a nationally representative rolling cross-sectional ($n=7094$) and recontact ($n=1651$) survey of 13-25 year olds, we measured level and valence of sharing, intentions, and behavior with regard to



tobacco and e-cigarettes, along with potential confounders. Multivariate logistic regressions tested the main effects of positive, negative, or mixed sharing on behavior. Additional regressions with interaction terms assessed the moderating effect of sharing on the association between current intentions at Time 1 (T1) and subsequent behavior at Time 2 (T2); valence categories were recoded and relabeled as representing consistent or inconsistent sharing with one's pre-existing intentions. All analyses were done at cross-sectional and lagged levels, using weighted data. RESULTS: Pro-tobacco sharers at T1 were more likely to be smokers, compared to non-sharers, at T1; pro-e-cigarette sharers at T1 were more likely to be e-cigarette users, compared to non-sharers, both at T1 and T2, adjusting for T1 behavior ($p < .05$). Significant interactions suggested that T1 sharing consistently with one's T1 smoking or vaping intentions increased and sharing inconsistently reduced the likelihood of implementing those intentions at T2 ($p < .05$). Thus 71% of consistent sharers but 29% of inconsistent sharers reported T2 smoking behavior that was consistent with T1 intentions; e-cigarette-related sharing showed similar effects. CONCLUSIONS: The findings suggest that among youth and young adults, the way one shares about tobacco or e-cigarettes may affect one's actual tobacco and e-cigarette use, above and beyond pre-existing intentions. The findings of this study may be used in future intervention efforts that incorporate sharing as a tool for youth-targeted tobacco control.

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POS3-184

EXPLORING THE PATHWAYS THROUGH WHICH CAMPAIGN AD AWARENESS DECREASES THE INTENTION TO SMOKE

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SIGNIFICANCE: Preliminary evidence suggests that the current truth® Campaign leads to decreases in the intent to use tobacco in youth and young adults (ages 15-21). Because campaign strategies are multifaceted and evoke a myriad of beliefs, the link from ad awareness to intentions to smoke may not be direct. The purpose of this study is to examine the pathways through which awareness of campaign ads is related to intentions to smoke. METHODS: Using four waves of a probability-based, nationally representative, online longitudinal cohort of 9,720 youth aged 15 to 21, key mediators of the relationship between ad awareness and intentions to smoke were examined among those who participated in all four waves of the study ($n = 7,536$). To investigate whether anti-industry sentiments, independence, and perceived prevalence of smoking in the United States mediates the relationship between ad awareness and intentions to smoke. RESULTS: Analyses indicated that there was a direct relationship between ad awareness and intentions to smoke (estimate = -0.06 , $p < .05$); however, this relationship seems to work indirectly through anti-industry sentiments, independence, and social movement. Those who were aware of any ad had higher mean independence (estimate = 0.16) and anti-industry scores (estimate = 0.10). Furthermore, those who had higher independence and anti-industry scores also had higher social movement scores (estimates = 0.38 and 0.44 , respectively). Finally, the odds of intentions to smoke were decreased for those with higher social movement, independence, and anti-industry scores (estimates = -0.32 , -0.16 , -0.05). As expected, the indirect effect was significant (estimate = 0.08 , $p < .05$). CONCLUSIONS: The indirect relationship between ad awareness and intentions to smoke suggests that campaign strategies should aim to change knowledge and attitudes first in order to change attitudes on intentions to smoke. By influencing an individual's intention to smoke, overall behavior change should also be influenced.

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POS3-185

A PROPOSED METHOD FOR CLASSIFYING E-CIG LIQUID FLAVORS

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Along with the growth in popularity of electronic cigarettes devices (e-cigs), the variety of electronic cigarette liquids available to users (e-liquid) has also grown. Although some studies have published data about the use of e-liquid flavors, there is no standardized way to group e-liquid flavors making it difficult to interpret the data and replicate results across studies. Therefore, the current study suggests a method to classify user-reported e-liquid flavors. 3,490 participants completed an online survey about their e-liquid use by responding to the following open-ended question, "What is your favorite flavor and what brand of flavored liquid do you prefer?" If the participant provided only a brand name and the liquid flavor could not be determined, the brand names were entered into an online search engine (Google Chrome or Internet Explorer) and the liquid flavor was identified. Once all liquid flavors were identified, researchers met to determine the most appropriate groupings using the constant comparative method. A coding scheme was determined that delineated how to classify flavors with mixed components (e.g., cinnamon Red Hots as a candy not a spice).

The resulting classification scheme and proportions of e-liquids in each category are as follows:

1. Tobacco ("regular", "classic"), 31.9%
2. Menthol/mint ("cool rush", "mint"), 15.7%
3. Fruit ("blueberry", "fruit"), 21.4%
4. Dessert/sweets ("apple pie", "key lime pie"), 14.6%
5. Alcohol ("butter rum", "captain jack"), 2.6%
6. Nuts/spices ("vanilla", "almond", "coconut", "cinnamon"), 2.2%
7. Candy ("SweetTart", "licorice", "cotton candy"), 2.2%
8. Coffee/tea ("espresso", "tea"), 4.4%
9. Beverages ("energy drink", "coke"), 4.0%

As researchers work to understand use patterns and perceptions of modified risk tobacco products such as e-cigs, standardized methods should be employed so that data can be easily interpreted and compared across studies. This study specifically offers a method for grouping most e-liquids commonly used by e-cig users.

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POS3-186

ACTUAL AND POTENTIAL USE OF GOOGLE STREET VIEW FOR STUDYING TOBACCO ISSUES: A REVIEW

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SIGNIFICANCE: Google Street View (GSV) is an increasingly used data collection method for objectively measuring features of the environment (as per the review by Schootman et al, *IJHG* 2016). But as its potential for studying tobacco control-related issues has never been reviewed, we aimed to perform this. METHODS: Searches were conducted using PubMed for articles using the term "Google Street View" (to July 2016) and from these articles, additional ones were identified in bibliographies. RESULTS: We identified 36 Medline-indexed articles relating to GSV. Of these, four tobacco control issues were specifically covered in three stud-



ies: (i) smokefree signage at school grounds which reported that GSV was efficient and had high specificity (97%), but modest sensitivity (44%); (ii) hospital ground smokefree signage (100% sensitivity and specificity but for a small sample); (iii) tobacco litter (0% sensitivity); (iv) tobacco-advertising billboards (0% sensitivity but a small sample). Other research on non-tobacco topics suggested utility of GSV for identifying: signage/advertising (n=10 studies), retail outlets/stores (n=9), and bars (n=4). The results were more mixed in terms of the value of identifying litter (n=15 studies). One study included health promotion signage (alcohol-related) but this was poorly detected in GSV (5% of that found by field observations). There were no studies that could inform the utility of GSV in identifying ashtrays or tobacco packs on outdoor café/restaurant tables, or of actual smoking. However, one study counted alcohol drinkers with limited success, partly due to the human face blurring algorithm used in GSV. CONCLUSIONS: Google Street View appears to have some utility for studying smokefree signage. Based on non-tobacco research, it could potentially be used for studying: the location and density of tobacco retail outlets, tobacco advertising, and areas with concentrated outdoor smoking (eg, bars). If Google continues to expand "footpath views" and views with higher resolution, the visibility of small items such as litter and identifying active smokers and the presence and orientation of tobacco packs on tables may also improve.

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POS3-187

ASSERTIVE COMMUNICATION ABOUT OTHERS' SMOKING AND VAPING IN PUBLIC VENUES—PREVALENCE AND CORRELATES FROM A NATIONAL SURVEY OF US ADULTS

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BACKGROUND: No recent data is available on the public's willingness to speak up about secondhand smoking and vaping in public venues. This study describes the prevalence and correlates of US adults' intentions to engage in assertive communication about others' smoking (ACS) and others' vaping (ACV) at restaurants, bars, and parks. METHODS: Data were from an online nationally representative survey of 1449 U.S. adults, conducted in October-December 2013. Participants reported their intentions to ask other people not to smoke (ACS) and not to vape (ACV), if they could not move away, in three public venues (restaurants, bars/casinos/nightclubs, parks) on a 5-point scale ('very unlikely' to 'very likely') that was dichotomized to either 'unlikely' or 'likely'. We examined the weighted prevalence of ACS and ACV in each venue and conducted weighted logistic regression to examine demographics and tobacco use as correlates of ACS and ACV in each venue. RESULTS: Weighted prevalence of ACS in restaurants (47%), bars/casinos/nightclubs (35%), and parks (32%) were higher than ACV in these venues (17%, 15%, and 13%, respectively). Consistently across ACS and ACV, more people were likely to speak up in restaurants compared with bars/casinos/nightclubs and parks. Being older was consistently associated with higher odds of ACV across all venues. Other significant correlates of ACS and ACV in one or more venues were current smoking status, ever trying e-cigarettes, gender, health status, political ideology and party identification. CONCLUSIONS: Almost half to two-thirds of US adults indicated they were not likely to ask someone not to smoke and the majority were not likely to ask someone not to vape (83 to 87%) in public venues. US adults were more willing to ask others not to smoke than to ask others not to vape in public venues. Intentions to engage in assertive communication about smoking and vaping differed by demographics, tobacco use and other individual factors. These findings help establish an evidence base to inform state and local policymakers in developing strategies to promote compliance with smoke-free and vape-free laws.

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POS3-188

THE INFLUENCE OF SMOKING-RELATED STIGMA ON SMOKING CESSATION OUTCOMES

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BACKGROUND: Tobacco control policies and other denormalization strategies may reduce tobacco use by stigmatizing smoking. This raises an important question: Does smoking-related stigma contribute to a smoker's decision to quit? The aim of this study was to evaluate if smoking-related stigma was associated with smoking cessation outcomes among smokers in Mexico and Uruguay. METHODS: We used data from a panel of adult smokers who participated in the 2008- 2012 administrations of the International Tobacco Control Policy Evaluation Surveys in Mexico and Uruguay. We defined two analytic samples of participants: the quit behavior sample (n=3896 Mexico; n=1525 Uruguay) and the relapse sample (n=596 Mexico). Generalized estimating equations were used to evaluate if different aspects of perceived stigma (i.e. discomfort, marginalization, and negative stereotype) were associated with smoking cessation outcomes. We ran two sets of models: for the first set, we used a lagged variable to evaluate smoking behavior at time t_{i+1} as function of smoking-related stigma at time t_i , in the second set we did not lag the exposure variable. RESULTS: In both the lagged and unlagged models, we found that smoking-related stigma was associated with a higher likelihood of making a quit attempt in both Mexico and Uruguay. Smoking-related stigma (negative stereotype) was also associated with less relapse among Mexican respondents. However, results for our lagged and unlagged models were in the opposite direction in the case of successful quitting in Mexico. Smoking-related stigma was associated with a higher likelihood of successful quitting among Mexican participants in our unlagged models, but associated with a lower likelihood of successful quitting in the lagged models. CONCLUSIONS: This study suggests that smoking-related stigma is positively associated with cessation outcomes. However, it may impede cessation under some circumstances. It is possible that once stigma is internalized by smokers, it may function as a damaging force. Future studies should evaluate the influence of internalized stigma on smoking behavior.

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POS3-189

USE, KNOWLEDGE, AND BELIEFS ABOUT CIGARETTES AND ALTERNATIVE TOBACCO PRODUCTS AMONG DENTAL STUDENTS AT ONE US INSTITUTION

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SIGNIFICANCE: Due to the large number of negative oral health outcomes associated with smoking cigarettes and alternative tobacco products (ATPs) such as water pipes and e-cigarettes, dental health professionals have a unique opportunity to counsel patients in tobacco product cessation. We describe dental and dental hygiene students' use, knowledge, and beliefs about cigarettes and ATPs, including student education about tobacco cessation and counseling. METHODS:

An online confidential survey of dental and dental hygiene students at one US dental institution was conducted in 2016. The Wilcoxon signed rank test, the Kruskal Wallis test, and the Fischer exact test were used to compare differences in student responses regarding cigarettes and ATPs, variation in responses by year of training, and differences in binary responses, respectively. Frequency analyses were also conducted for overall use, knowledge, beliefs, and socio-demographic variables. RESULTS: 146 students (20.1%) reported ever using cigarettes, while 253 (35.7%) reported ever using any ATP. Students reported feeling they had not received enough training on ATP cessation, were neutral about having received enough training on cigarette cessation, and reported being "somewhat confident" and "not so confident" about being able to counsel a cigarette smoker or ATP user (respectively) to quit. By their fourth year of dental school, 77.8% of students had counseled someone to stop smoking cigarettes, but only 40.7% had counseled someone to stop using ATPs. Additionally, students felt more confident and reported receiving more education on cigarette cessation interventions than ATP cessation interventions ($p < 0.001$). CONCLUSION: In this sample, dental students report having low confidence to help people quit using tobacco products, and did not feel they had received enough training on tobacco cessation interventions. These findings call for a revised tobacco education curriculum for dental students, focused on building knowledge and confidence for promoting tobacco cessation.

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POS3-190

ALTERNATIVE TOBACCO USE AND POLY-USE AMONG BLACK COLLEGE STUDENTS: WHAT INSIGHT CAN HEALTH LITERACY ADD?

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SIGNIFICANCE: US racial minorities bear a disproportionate burden of tobacco-related health disparities. Black Americans experiment with tobacco use primarily during young adulthood, a critical risk period concurrent with the college years. Patterns of alternative tobacco product (ATP) or poly-use among Blacks and young adults are well documented and, given the increase of nicotine delivery products in the market, health literacy is vital to making optimal tobacco-related decisions. Therefore, this study explored the relationship between health literacy level and tobacco use status by product in Black college students. METHODS: Eligible undergraduates ($N=298$), age 18–24, were recruited from enrollment lists at two southeastern US universities. Participants completed an electronic survey including self-report measures: demographics, ever use, first use, current (past 30 days) use by tobacco product, overall health literacy and three health literacy sub-dimensions (functional, interactive, and critical). Tobacco product included cigarettes, cigars (small and large), hookah, or electronic nicotine delivery systems (ENDs). RESULTS: Of the 298 participants, 61.1% ($N=181$) reported ever using tobacco, and 53.0% ($N=96$) of ever users reported first use during college. Eighteen percent ($N=54$) of participants reported current tobacco use. Prevalence was higher for ATPs [cigar, 10.4%; hookah, 9.4%; electronic nicotine delivery system (ENDs), 7.4%] than for cigarettes (5.4%). Cigar users and ENDs users were more likely to report low critical health literacy than non-cigar [$\chi^2(1, 298) = 5.52, p < .05$] or non-ENDs users [$\chi^2(1, 298) = 3.83, p < .05$]. Moreover, 60.7% of hookah users reported low interactive health literacy as compared to 35.6% of non-hookah users [$\chi^2(1, 298) = 6.82, p < .01$]; and 66.7% of ENDs users reported low overall health literacy compared to 42.2% of non-ENDs users [$\chi^2(1, 298) = 4.73, p < .05$]. Additionally, poly-users (two or more products) were more likely to report low interactive health literacy than non-users [$\chi^2(2, 298) = 6.67, p < .05$]. CONCLUSION: This is the first study to examine the relationship between ATP use, poly-use, and health literacy in Black college students. Findings from this study suggest that health literacy dimensions may differentially influence tobacco product usage, and further research should specifically explore how multi-dimensional measures of health literacy can inform tailored, tobacco prevention strategies to reduce tobacco-related health disparities.

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POS3-191

THE IMPACT OF DEVICE SETTINGS AND VAPING PATTERNS ON THE SIZE DISTRIBUTION OF PARTICLES GENERATED FROM ELECTRONIC CIGARETTES

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BACKGROUND: The use of E-cigarettes has been rapidly increased. Vapors generated from E-cigarette (E-vapor) contain high concentrations of nano-sized particles, which once inhaled, can reach the deepest regions of the lung. Inhaling nano-sized particles has been associated with cardiopulmonary diseases. However, factors affecting E-vapor particle size distributions were not well understood. This study characterized the impact of E-cigarette device settings, vaping topography and E-liquid composition on E-vapor particle size distribution and lung deposition pattern. METHODS: Thirty E-cigarette users were recruited from Rutgers campuses and their vaping topographies were measured. The measured vaping topographies were imported into a smoking machine for E-vapor generation. E-vapors were also generated under various combinations of E-cigarette coil heating power (6.48 - 29.7 watt) and different E-juice (PG, VG or flavored). The resulting particle concentration and particle size distributions from 10 nm to 5 micro-meter were measured under 37 degree C and 95% relative humidity. A modified MPPD model was used to estimate lung deposition patterns of E-vapor particles. RESULTS: We observed a strong dependency of the measured particle size distribution on testing conditions, i.e. temperature, humidity, and dilution ratios. The count median diameter (CMD) was affected by coil heating power, and ranged from 320 nm (6.4 watt) to 450 nm (29.4 watt). Longer puff duration created larger particles. PG generated smaller particles than VG did, with an average of 50-100 nm differences in CMD. Total particle number concentration increased from 1.2×10^6 to 5.8×10^7 when coil heating power increased from 6.48 to 29.4 watt. VG generated 5 – 10 times more particles than PG. Flavoring agents didn't statistically significantly affect particle size distribution. VG based E-liquid and higher power settings resulted in greater E-vapor lung deposition. CONCLUSION: Our study demonstrated the impact of testing conditions, device power, vaping topography, and E-juice composition on E-vapor particle size distribution. Our study provides insights into E-cigarette product regulations.

FUNDING: New Jersey Health Foundation, Cancer Institute of New Jersey

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POS3-192

PARTICLES GENERATED FROM THE THIRD GENERATION OF AN ELECTRONICALLY HEATED CIGARETTE – THE IQOS SYSTEM

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BACKGROUND: Cigarette smoking is one of the leading risk factors in global burden of disease. Efforts have been made to reduce the harmfulness of cigarette smoking, including inventing some tobacco products, which release less harmful constituents. The IQOS (I quit ordinary smoking) system has been claimed as one of these products, which is the third generation of the electronically heated cigarette with precise heating control. However, no independent tests have been conducted to evaluate the emissions of IQOS. This study aims to characterize the particles emitted from the IQOS system. METHODS: The IQOS system used in our experiments was purchased from Japan through e-bay. Four commercially available flavored heat sticks, including mint, menthol, regular, and balanced regular, were also purchased. The IQOS system was connected with a smoking machine for smoke generation, using the smoking topography reported in the literature. Particles (10 nm to 5 micro-meter) generated from the IQOS system was measured, under 37 degree C and 95% relative humidity. A modified MPPD model was used to estimate lung deposition patterns of E-vapor particles. RESULTS: The measured particle size distribution was highly affected by testing conditions. The measured count median diameter (CMD) reduced 50% when the dilution ratio changed from 70 to 3000. The particle size was significantly increased ($p < 0.05$) by 11% - 20% from 30% RH to 95% RH due to the hygroscopic growth. The CMD ranged from 188 nm to 234 nm across four different flavored IQOS heat sticks (no significant difference). Particle number concentrations per puff ranged from 4.5×10^7 to 6.6×10^7 . Compared with the ISO puffing regime, 120 ml / 3.8 sec smoking topography generated significantly larger particles ($p < 0.05$), with an av-



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verage CMD difference of 10 nm. CONCLUSION: The measured particle size distributions were highly affected by testing conditions. The IQOS system generated up to 10 times less particles than a conventional cigarette per puff. The particle size distributions of the smoke generated from the IQOS were similar to conventional cigarettes, indicating a similar particle deposition pattern in human lungs.

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POSTER SESSION 4

POS4-1

LONGITUDINAL CHANGES AND PREDICTORS OF SECONDHAND SMOKE EXPOSURE AT HOME IN MOTHERS AND YOUNG CHILDREN IN HONG KONG

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SIGNIFICANCE: We investigated the pattern and factors associated with 3-year changes in home SHS exposure among mothers and young children in Hong Kong, the most densely populated city in China but with one of the lowest smoking prevalence in the world. **METHODS:** 771 non-smoking mothers and their children aged ≤ 18 months were recruited in 4 of the 33 Maternal and Child Health Centers (MCHCs) in 2012 and the mothers were followed after 3 years through telephone interviews. SHS exposure at home, health conditions and family smoking and related behaviours were recorded. Out of the 260 families with a smoking father and no other smokers at baseline, we included 161 families (61.9%) which were successfully followed. Logistic regression yielded adjusted odds ratios (OR) for a reduction in home SHS exposure in relation to demographics and smoking related factors. **RESULTS:** Home SHS exposure was non-significantly reduced from 40.1% to 37.3% or 218.3 to 163.1 minutes per week in children; and from 47.8% to 42.2% or 247.8 to 215.1 minutes per week in mothers (effect size was small to medium). Prevalence of exposure was unchanged, increased and decreased in 67.1%, 14.9% and 18.0% of children, and 67.1%, 13.7% and 19.2% of mothers, respectively. Living in subsidized home ownership housing (OR: 5.66, 95% CI 1.51-21.22) (vs public rental housing), and maternal SHS avoidance behaviours (OR per 1 more behavior: 1.61, 95% CI 1.17-2.23) predicted a reduction in children's SHS exposure at home. Similar associations were observed in mothers' home SHS exposure and the corresponding ORs were 3.80 (1.12-12.73) and 1.42 (1.06-1.89). **CONCLUSIONS:** Mothers and children in Hong Kong had slight to moderate but non-significant reduction in SHS exposure at home during 2012 to 2015. Future interventions should target public rental housing, and promote home SHS avoidance behaviours.

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POS4-2

THE ROLE OF ACCULTURATION AND BINGE DRINKING ON SMOKING STATUS AMONG MEXICAN AMERICANS ON AND OFF THE UNITED STATES BORDER

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INTRODUCTION: Border Mexicans are exposed to poverty, under-education, and heavy tobacco marketing, all of which are predictors of cigarette smoking. There have been no studies comparing border Mexicans to non-border Mexicans in cigarette smoking. **METHODS:** The current study used two epidemiologic surveys among border and non-border Mexican Americans. In the border sample, interviews were conducted among 1,307 self-identified Mexican Americans in the U.S.-Mexico border counties of California, Arizona, New Mexico, and Texas. The non-border sample consisted of 1,288 respondents self-identified as being of Mexican origin who were interviewed in Los Angeles and Houston. Additional interviews were conducted in New York, Philadelphia, and Miami. Covariates included age and education. Predictors of cigarette smoking included border status, acculturation and binge drinking. Analyses were stratified by gender. **RESULTS:** There was no difference in cigarette smoking between border and non-border Mexican Americans. Acculturation was not significantly related with cigarette smoking among men; however, women with high acculturation levels were more likely to be current smokers. Binge drinking was not associated with being a former smoker but positively associated with being a current smoker in both men and women. **CONCLUSIONS:** The current study was the first to examine whether there were differences in cigarette smoking between border and non-border Mexican Americans. Future public health smoking cessation efforts can equally focus on border and non-border

der Mexicans, since there was no difference in cigarette smoking between these two groups.

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POS4-3

HOW DO DISADVANTAGED WOMEN PERCEIVE SMOKELESS TOBACCO USE AND ITS CESSATION?

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Tobacco use is associated with social disadvantaged populations characterized by poverty and poor development opportunities. In Indian rural areas, 23.3% of women use smokeless tobacco (SLT), compared to 14.1% of urban women. Literacy status is negatively associated with SLT use: 27.5% of women with no formal schooling; 24.9% with less than primary education; 19.8% with primary education; and with 11% of women with secondary education and above use SLT. 22% of women in the lowest wealth quintile use tobacco. Perceptions of tobacco use and cessation are a relatively unexplored area among disadvantaged populations. However, if interventions have to be developed for this segment of the population, it is important to study their perceptions of tobacco use. This research was undertaken with an objective to document the perceptions of disadvantaged women in India on their own SLT use. The main concepts that were used to frame questions were: Why they use SLT, what it does for them, have they considered quitting its use and, finally, would they want to quit. Data was collected using focus group discussions and individual interviews on opinion, thoughts and attitudes towards SLT use, knowledge about the health impact due to its use, and intent to quit. The total sample was 59 women, age 22-37, with a maximum 7th grade education. These women had been consuming SLT for a period of 3 to 12 years. Almost all of them reported that they continue to enjoy the taste of SLT. Its use helps control hunger when they have no food. It helps them to control anger at being mistreated by others. According to them, it has the power to perk the user up, help her to concentrate, make her feel good and elated. They did not see any negative impact of SLT use on their health. However, through a compelling, in-person communication of risks using a YouTube video of Voices of the Victims (VOTV) and taking them through disease progression of users, I was able to persuade 17 of the 59 women to consider quitting and 3 to actually quit.

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POS4-4

PATTERN OF HEALTH APPS USE AND ASSOCIATED SOCIODEMOGRAPHIC FACTORS IN HONG KONG SMOKERS – FINDINGS OF FAMILY PROJECT

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BACKGROUND AND OBJECTIVES: Health related Apps is increasingly popular and may be useful for changing unhealthy behaviours. We investigated pattern and sociodemographic factors associated with health Apps use among smokers in Hong Kong, one of the most connected cities in the world. **METHODS:** As a part of the FAMILY Project (a Jockey Club Initiative for a harmonious society), a territory-wide probability-based telephone survey (Family and Health Information Trend survey) was conducted among 4038 randomly selected adults in 2016. Among respondents who had smartphones or tablets, types of health Apps function were recorded. Smoking status was categorised as current (n=273, 6.8%), ex- (n=382, 9.5%) and never smokers (n=3382, 83.8%). Logistic regression was used to yield adjusted odds ratios (OR) for health Apps use in relation to sex (male vs. female), age (3 categories: 18-29, 30-59, 60+), education (3 categories: primary, secondary, tertiary) and household income (3 categories: HK\$ ≤ 20000 , ≤ 40000 , >40000) (1US\$=7.8HK\$). **RESULTS:** Compared to ex-smokers (67.4%), more never (79.7%) and current smokers (77.3%) had smartphones or tablets



($P < 0.01$). Among smartphone or tablet owners, 21.3% never, 20.9% current and 23.2% ex-smokers had health related Apps ($P = 0.91$). Health Apps were commonly used for tracking physical activity (73.5%), recording health status (46.9%) and monitoring vital signs (32.7%) in current smokers. The pattern was similar in never and ex-smokers (all $P > 0.05$). Only 0.9% all respondents, 0.5% never smokers, 0.4% ex-smokers and none current smokers have used smoking cessation Apps ($P < 0.001$). In current smokers, male, younger age and higher household income were non-significantly associated with health Apps use, which was significantly associated with higher education attainment levels (adjusted $OR = 2.70$ for per category increase, 95% CI 1.35-5.37). These factors were non-significantly associated with health Apps use in ex-smokers except being younger (adjusted $OR = 2.26$ for category increase, 95% CI 1.21-4.23). **CONCLUSION:** Health Apps particularly smoking cessation Apps are underused in smokers especially those were old aged and had lower education level.

FUNDING: The Hong Kong Jockey Club Charities Trust

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POS4-5

EXAMINING THE TRANSITIONS BETWEEN CIGARETTE AND SMOKELESS TOBACCO PRODUCT USE IN THE UNITED STATES USING THE 2002-2003 AND 2010-2011 LONGITUDINAL FOLLOW-UP COHORTS

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BACKGROUND: Trends in smokeless tobacco (SLT) use have remained constant or even increased slightly in the US in recent years, while cigarette use has been decreasing. Assessing the transitions between cigarette and SLT use is critical to understand the long term impacts of tobacco use and consumption. We examined transitions between SLT and cigarette use in the US, and compared the quit rates of tobacco use from two longitudinal population cohorts. **METHODS:** Two longitudinal cohorts of the Tobacco Use Supplement of the Current Population Survey (TUS-CPS), 2002-03 ($n = 14,996$) and 2010-11 ($n = 18,226$) were used to examine the transitions between cigarette and SLT use over one-year periods. Each population was divided into four categories: exclusive cigarette use, exclusive SLT use, dual use, and neither. Percentages of each category were weighted and stratified by gender. Quit rates of cigarette smoking and SLT use were calculated in exclusive users and dual users. Among former smokers, we identified those who reported time since quitting for at least one year versus less than one year. **RESULTS:** For male exclusive users, the quit rate for smoking significantly increased in 2010-11 compared to 2002-03 cohort (24.2% vs. 11.6%, $p < 0.0001$), but the quit rate for SLT remained roughly constant (40.0% vs. 41.3%, $p = 0.32$). In both cohorts, the quit rates for smoking were lower in smokers than dual users (2002-03: 11.6% vs. 20.9%, $p = 0.37$; 2010-11: 29.5% vs. 24.4%; $p = 0.18$), and the quit rates for SLT use were significantly lower in SLT users than dual users (2002-03: 41.3% vs. 44.4%, $p = 0.75$; 2010-11: 40.0% vs. 62.2%; $p = 0.046$). Male recent former smokers in the 2010-11 cohort were three times as likely to turn to SLT as those in the 2002-03 cohort (3.5% vs. 1.0%, $p < 0.001$). **CONCLUSIONS:** Our study found that smoking quit rates doubled, while SLT's quit remained constant. In both cohorts, dual users were more likely to quit cigarettes than exclusive smokers and SLT users. However, recent smoking quitters were more likely to pick up smoking than SLT. Over the period considered, the cigarette industry came to dominate SLTs. Longer-term prospective data examining longitudinal transitions among tobacco users is needed to better understand transitions between tobacco products.

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POS4-6

SUSCEPTIBILITY TO ELECTRONIC CIGARETTE USE AND PERCEPTIONS OF HARM AND ADDICTION AMONG CIGARETTE SMOKERS AND NONSMOKERS

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SIGNIFICANCE: In recent years, electronic cigarette (EC) use has increased dramatically, particularly among US youth and young adults. EC characteristics (e.g., nicotine content, flavor) and marketing messages (e.g., reduced harm) are important factors that may influence propensity for use. This study compared EC susceptibility and addiction/harm perceptions for EC products differing in nicotine content, flavor, and harm message. **METHODS:** During Jan-Jul 2016, a cross-sectional online survey was conducted using Amazon Mechanical Turk among 681 current cigarette smokers (61% White; M age 33 yrs, 63% male) and 413 never smokers (59% White, M age 32 yrs, 55% male) who were randomly assigned to 1 of 8 conditions that differed by EC product: EC with no nicotine (-NN), EC with low nicotine (-LN), EC with high nicotine (-HN), EC with tobacco flavor (-TF), EC with fruit flavor (-FF), EC with menthol flavor (-MF), EC with reduced harm (-RH), and EC with reduced carcinogens (-RC). Outcomes included likelihood of using that EC soon, in the future, in the next year, and if offered by a friend, as well as addiction/harm perceptions. ANOVAs followed by Dunnett's t-tests (tested between groups relative to EC-NN; $p < 0.05$) were conducted. **RESULTS:** All outcomes significantly differed by condition among smokers while only likelihood of using an EC in the future, if offered by a friend, and perceptions of EC addiction/harm differed for nonsmokers. Susceptibility items had few significant between group differences. Smokers and nonsmokers perceived EC-NN as significantly less addictive compared to EC-LN, EC-HN, EC-TF, and EC-RC. Only smokers perceived EC-NN as significantly less addictive than MF. Nonsmokers perceived EC-NN as significantly less harmful than EC-HN, EC-TF, EC-MF, and EC-RH; smokers perceived EC-NN as significantly less harmful than EC-HN. **CONCLUSIONS:** Sole familiarity with nicotine and lack of knowledge regarding other EC ingredients likely contributed to our finding that EC-NN was perceived as less addictive and harmful than most EC types assessed. Future work should examine the effects of public health and industry messaging on EC perceptions and abuse potential.

FUNDING: Internal funding from Drs. Barnes and Cobb

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POS4-7

CURRENT E-CIGARETTES USE FOR ANY PURPOSE AND E-CIGARETTE USE AS AN AID TO QUIT IN THE REPRESENTATIVE ITALIAN POPULATION PASSI SURVEY, 2014-2015

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SIGNIFICANCE: This study showed prevalence of current e-cigarette use for any purpose in Italy, 2014-2015, and prevalence of e-cigarette use as an aid to quit in the most recent attempt made in the last year. **METHODS:** PASSI is the ongoing Italian Behavioral Risk Factor Surveillance System on representative samples of the Italian adult population aged 18-69 years (71,287 respondents in 2014-2015), coordinated by the Italian National Institute of Health and supported by the Health Ministry. Respondents to this large cross-sectional survey reported their e-cigarette use in the last 30 days. Percentages are weighted to take into account the sampling method. We used a multi-varied Poisson regression model to study the association between current e-cigarette use, socio-demographic characteristics (gender, age, education level, economic status, geographic area) and smoking status. We then analyzed 6,811 respondents who had made at least one quit attempt in the preceding 12 months, and who answered to a question on which method they used. Thirty-six respondents did not answer and were excluded. Quitting methods were grouped into three groups: no aid; e-cigarettes; traditional quitting methods (medications; quitting programmes delivered in National Health System [NHS] Smoking Cessation Services (SSSs); programmes not delivered in NHS-SSSs; other unspecified methods; does not remember). Response options were mutually exclusive. **RESULTS:** Prevalence of current e-cigarette users in 2014-2015 was 1.7% ($n = 1,187$). From the first 2014 quarter to the second 2015 quarter, there was a decreasing trend in current e-cigarette use in the general population (from 2.2% to 1.3%; $p < 0.01$) and among current smokers (from 6.5% to 3.3%); then current use remained stable and in the last 2015 quarter was 1.6%

in general population, 4.3% in current smokers. Among former smokers, current e-cigarette users were stable around 2.3% in the whole period. Men, adults aged 35-49, respondents with many economic difficulties, or living in Central Italy were more likely to be current e-cigarette users. Only 0.1% of non-smoking adults were current e-cigarette users, whereas the most part of them were current smokers (816 out of 1178). Respondents who reported a most recent quit attempt in the last 12 months, used no aid (N=5899; 86.3%), e-cigarettes (N=669; 10.2%), or traditional quitting methods (N=243; 3.4%). CONCLUSION: Prevalence of current e-cigarette use for any purpose was 1.7%, in Italy, 2014-2015, and 1 out of 10 quit smoking attempts in that period were made using e-cigarettes.

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POS4-8

THE PREVALENCE OF OBESITY AND CHARACTERISTICS OF OBESE ADULT SMOKERS AGED 20+ IN THE UNITED STATES: NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES) 2009-2014.

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SIGNIFICANCE: Obesity and smoking are the two leading causes of preventable morbidity and mortality in the United States. Although nicotine and cigarette smoking have been associated with lower body weight, obese cigarette smokers do exist. However, there are few reports of the prevalence of obesity among smokers using nationally representative samples. In addition, there is little known about the social and health related characteristics of these smokers. PURPOSE: The purpose of this study is to understand the prevalence of obesity among adult smokers and describe this population using a nationally representative sample. METHODS: 16,274 adults aged 20+ were selected for analysis from the 2009-2014 National Health and Nutrition Examination Survey (NHANES), including 12,930 non-smokers (never and former smokers) and 3,344 current smokers. Height and weight were measured. BMI weight class was defined as normal weight (BMI >18.5 and <25), overweight (BMI >25 and <30) and obese (BMI > 30). In addition obese class I (BMI 30-34.9), class II (BMI 35-39.9) and class III (BMI 40+) were calculated. Analyses were performed according to NHANES analytical guidelines to create nationally representative values. RESULTS: The prevalence of smoking was 19.8%. The prevalence of normal, overweight and obesity in never and former smokers was 27.9%, 34.4%, and 37.8% respectively. Among only current smokers, the prevalence of normal, overweight and obesity was 35.1%, 31.5%, and 33.3% and the prevalence of class I, II and III obesity was 19.5%, 7.8% and 6.1%. The prevalence of co-occurring obesity and smoking in the general population was 6.6%. Compared to normal and overweight smokers, obese smokers had lower incomes and less education. They were also more likely to report poor health, have diabetes, high cholesterol, asthma, high blood pressure and higher mean depression scores (all p-values <0.001). CONCLUSION: One in three US smokers are obese. Among smokers, those who are obese report significantly more physical and mental health problems, have lower incomes and are less educated than normal and overweight smokers.

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POS4-9

MIND THE GAP: UNDERSTANDING DISPARITIES IN SMOKING RATES

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INTRODUCTION: As rates of smoking have fallen in many jurisdictions, there have been concerns that declines in the overall smoking prevalence has masked the differing rates of progress among sub-populations and deflect attention away from disparities in tobacco use that could exacerbate health inequalities. Concerns about such disparities have prompted calls for government to focus attention on those who are vulnerable, or disadvantaged by economic, social or other factors, and to replace population approaches with a "vulnerable population approach". However, prevalence rates are a function of differences in rates of smoking onset and rates of successful smoking cessation. Understanding differences in rates of onset and cessation among population subgroups may help in the development of appropriate interventions. METHODS: The onset gap, or number of fewer smokers there would if subpopulation had the smoking onset rate (% ever smoked a whole cigarette) of the comparison group, and the cessation gap, the number of fewer smokers if the subpopulation had the quit ratio (% former vs ever smokers), holding other factors constant, was calculated using the Canadian Community Health Survey 2013/14, a population representative sample of 128,310 Canadians. The gap analysis was conducted for demographic, socio-economic, and mental health and substance use subpopulations. RESULTS: People who used cannabis or who met the criteria for alcohol abuse or dependence are the least likely to have remained a non-smoker or, having started, to quit with a prevalence gap of 1.6 million people. Single people and those who were formerly married, those who work in sales and service, and those who are lower income smoking onset are less likely to start smoking than their comparison groups, but once started are much less likely to have become former smokers. In contrast, 0.7 million more White started smoking than would be expected for the rate of visible minorities but, White Canadians were likely to have quit. CONCLUSIONS: There are substantial differences between subpopulations with respect to smoking onset and cessation. While the cross sectional analysis limits causal inference, the results suggest that single people, those working in the retail section, and lower income can particularly benefit from smoking cessation programs.

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POS4-10

THE FIRST LIBRARY OF SMS TEXT MESSAGES FOR APPROACHING MEXICAN SMOKERS

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Mobile phone technology for health promotion and disease prevention is a rapidly growing area of research. The development of mobile phone interventions (e.g., short-message service [SMS], multimedia message service [MMS], Internet, applications) is increasing with the widespread acceptance of cell phones. The development of mobile phone interventions for smoking cessation has shown to be efficient. Smoking cessation services are available in Mexico but they may not be accessible to all smokers and brief medical advice is still very low (around 19.3%). There are 14.3 million smokers and 107.1 million of mobile phones it is urgent to link the use of this technology to cessation interventions. OBJECTIVES: The aim of this study is to develop the first SMS-text messages library for smoking cessation considering the smoking patterns, level of nicotine addiction and perceptions of Mexican smokers. The intervention protocol has the following stages: 1) Motivation (2 weeks), 2) Stop Smoking Day and 3) Maintenance (8 weeks). The messages were planned for each one of those stages. The strategy to obtain and validated the messages comprised: two initial workshops one with current smokers, the other with former smokers (more than 6 months of abstinence), three expert panel sessions and four focus groups, two of current smokers and two of former smokers. The number of participants in each group was 10, each activity was performed weekly in sessions of 2 hours, conducted by qualitative researchers. The initial number of messages obtained was 375: 92 about motivation, 67 Educational "tips", 87 information, including the use of nicotine patch, 67 logistic of intervention, 64 relapse prevention. At the end of the discussion, the number



of messages increased to 495 plus 12 words to trigger automatic "help messages". This text messages library will be integrated into an intervention designed to evaluate the effectiveness of text messages on smoking cessation considering the smokers characteristics and the tobacco cessation health care services in Mexico. Results of different studies suggest that SMS text messaging may be a promising way to improve smoking cessation outcomes, especially in countries where cessation interventions are lacking.

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POS4-11

A METHOD TO ASSESS ELECTRONIC CIGARETTE SAFETY AND TOLERABILITY IN THE LAB AND AT HOME

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SIGNIFICANCE: Interest in electronic cigarette (ECIG) safety and tolerability is growing, though some adverse event reports are anecdotal or event-driven. The purpose of this study is to: 1) describe a systematic method to assess ECIG safety and tolerability and 2) present preliminary data on tolerability of two ECIG brands: MarkTen XL (MT) and e-Go. **METHODS:** Smokers (N=8) aged 18-65 participated in an ongoing study of ECIG abuse liability that includes 6 lab visits and a 1-month online follow-up. On visits 3 and 5, participants started a week-long crossover period with either a MT (~24 mg/ml nicotine liquid) or e-Go (3.3 v, with 1.5 Ohm dual coil cartomizer filled with 25 mg/ml nicotine liquid). While in the lab, participants used the product in a 5-min directed bout. A list of safety and tolerability items derived from FDA and poison control center reports was administered before and after the bout to isolate use-related symptoms from preexisting conditions (e.g. head cold). Items included: headache, chest pain, cough, nausea, dizziness, stuffy nose, confusion, feeling sick, sore throat, shortness of breath, stomach pain, blurry vision, and tiredness. Participants who experienced any of these within 30-min after the bout were asked whether they believed ECIG use caused or exacerbated symptoms. These measures were repeated after 3 days of *ad lib* use of each product and at 1-month follow-up. **RESULTS:** Participants were 6 men and 2 women, with a mean age of 44.1 (SD=18.2) and predominately non-Hispanic white (N=6). At home, participants reported mean (SD) 72 (137) MT puffs/day and 73 (145) e-Go puffs/day. Overall, both products were well tolerated. The majority (84.6%) of ECIG-related adverse events were reported after the 3-day at-home period, the most notable being cough after MT use (50%). Participants did not report additional adverse events beyond those on the form. **CONCLUSIONS:** Participant reports of ECIG adverse events were rare, suggesting that these devices/liquids are well-tolerated. The presented method may be appropriate for systematic measurement of the safety/tolerability of other cig-alike and advanced ECIG devices.

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POS4-12

PREDICTORS OF DROPOUT FROM A SMS TEXT-BASED SMOKING CESSATION INTERVENTION PROGRAM

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SIGNIFICANCE: Research has demonstrated the effectiveness of text-based smoking cessation programs, but high user dropout rates dampen their potential benefit. Identifying user characteristics associated with dropout can inform program changes to increase retention. **OBJECTIVE:** Determine if specific user characteristics are associated with dropout in a text-based cessation program. **METHODS:** From March 1 to June 21, 2016, items were added to the program registration page to assess: time to first cigarette and cigarette cravings, frequency of smoking reminders and of being around smokers, external and internal motivation to quit smoking, confidence in the quit attempt, and long-term intention to be smoke free. Associations between each characteristic with program dropout

were assessed (n=6827). Outcomes were days from quit date to dropout, dropout during the program (yes/no), and dropout at critical time windows (never, 48 hours before/after the quit attempt). **RESULTS:** Over a third of users (37.9%) smoked within 5 minutes of waking up, 50.3% were often around smokers, and 80.1% had high confidence in their quit ability. Adjusted survival analysis of days to dropout found that users who smoked within 5 minutes of waking (vs after 5) had a 19% higher risk of dropping out (HR=1.19, 95% CI:1.03, 1.37). Users who were infrequently (vs never) around smokers had a 33% higher risk of dropping out; however, this was only found during the first 13 days of the program (HR=1.33, 95% CI:1.03, 1.72). Users who were sometimes around smokers (vs never) had 1.67 higher odds of dropping out within 48 hours of their quit date (95% CI:1.01, 2.75), but this association did not reach statistical significance after 48 hours. When considering any dropout during the program, users who were infrequently around smokers (vs often) had 2.53 higher odds of dropping out of the program, but only among users who had high confidence in their quit attempt at sign-up (95% CI:1.35, 4.72). **CONCLUSION:** Nicotine dependence and frequency of being around smokers both influence retention at specific points in a smoking cessation program. Tailored messaging to address these factors during critical time points might improve retention.

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POS4-13

SPATIAL VARIATIONS IN INDOOR CIGARETTE AND E-CIGARETTE SMOKING RULES AND NORMS BY PERCEIVED SOCIAL STATUS

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SIGNIFICANCE: Smoke-free indoor air laws have been successful in limiting indoor exposures to secondhand cigarette smoke; however, exposure still exists in other indoor locations, most notably in the home. The purpose of the current study is to examine variations in place-based cigarette and e-cigarette smoking rules and norms and their association with smokers' perceived social status. **METHODS:** Participants (n=99) were U.S. adult smokers aged ≥ 18 years residing in the Washington, DC metro area recruited as part of the Moment Study, a mixed-methods observational study that examined the environmental and psychological factors that influence e-cigarette initiation, product choice, and cigarette displacement. Participants were followed for three weeks using a mobile geo-tracking application. During each weekly visit, participants' geo-tagged up to 5 frequented locations on their personal mobility map, which was based on their prior week's geo-tracking data. A Research Assistant-guided "place" survey for each geo-tagged location assessed indoor cigarette and e-cigarette smoking rules and norms. **RESULTS:** Participants with place surveys were majority non-Hispanic (96%), African American (69.7%), women (53.5%), and on average 41 years old (SD=12.5). Participants geo-tagged (n=549) unique places over the course of three weeks, with over half being either an indoor public space (31.9%), home (17.9%), or private residence (14.8%). The average number of geo-tagged places per participant was 5.5 (SD=2.7) and ranged from 1-14 places. The percentage of places reported by participants as having cigarette smoke-free indoor air rules was significantly different by participants' perceived community social status, Chi-square (3, n=99) = 10.22, p < 0.05. Overall, 67.8% of the places identified by participants had either conflicting (32.1%) or unknown (35.7%) indoor e-cigarette smoking rules and norms. **CONCLUSIONS:** Participants who reported higher perceived social status within their community frequented a higher percentage of places with known indoor cigarette smoke-free air rules. A majority did not know the indoor e-cigarette use rules or norms for the places they frequent.

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POS4-14

RELATIONSHIP OF ENFORCEMENT-RELATED LOCAL ORDINANCES TO PREVALENCE AND INCIDENCE OF TOBACCO PRODUCT USE IN SOUTHERN CALIFORNIA YOUTH

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IMPORTANCE: Anti-tobacco laws aimed at restricting youth cigarette access have successfully reduced smoking when local ordinances sufficiently tax tobacco retailers to fund enforcement through undercover decoy operations. The impact of these enforcement efforts on smoking in the transition to age of legal use and on e-cigarette, hookah, and cigar use among youth is not known. **METHODS:** In Spring 2014, 11th and 12th grade students (mean age 17.3; standard deviation (SD) 0.6) in 14 jurisdictions participating in the Southern California Children's Health Study (CHS) completed questionnaires on tobacco product use (N=2097); follow-up data were collected ~1.5 years later (mean age 18.8 (SD 0.6; N=1553) as participants reached 18 years of age. American Lung Association State Tobacco Control Report grades for reduced sale of tobacco to youth were assigned to each community (four grade "A", ten "D-F"). The prevalence odds ratio (OR) for an A grade in 2014 and of incidence of ever and of current use in the past month in 2015 were estimated for each tobacco product, after adjusting for gender, baseline age, race/ethnicity, and prior use of other tobacco products. **RESULTS:** A pattern of decreased use at baseline and of initiation at follow-up in A communities compared to D-F communities was observed for all products except hookah. Ever use of cigarettes at baseline (OR=0.61; 95% confidence intervals (CI): 0.41,0.90), initiation of cigarettes (OR 0.67; 95%CI: 0.45, 0.99) and e-cigarettes OR 0.74; 95%CI: 0.55,0.99), current cigarette use at baseline (OR 0.51; 95%CI: 0.28, 0.91) and of e-cigarettes at follow-up (OR 0.27; 95%CI: 0.08, 0.84) were significantly (p<0.05) less common in A communities. **CONCLUSIONS:** Communities with local ordinances with licensing fees sufficient to finance sting operations had reductions both in cigarette and e-cigarette use. The results suggest that benefits of regulation extended into young adult life.

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POS4-15

AMERICAN SPIRIT BRAND PREFERENCE AMONG SMOKERS WITH SERIOUS MENTAL ILLNESS

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SIGNIFICANCE: With acknowledgement of the significant harms of tobacco use, smoking prevalence in the US has declined from 42% to 17% over the past 50 years; however, public health gains have not been experienced equally for all groups. Tobacco-related disparities are seen among individuals of lower education and socioeconomic status (SES) and among those with mental illness, where smoking rates approach 45% to 60%. Perhaps in response to consumer concerns, tobacco brands such as Natural American SpiritTM (AS) have incorporated positive health-oriented language of "natural", "organic," and "additive-free." A recent study found that younger adults of higher SES were more likely to smoke AS cigarettes. With a focus on a vulnerable group - smokers with mental illness - we examined sociodemographic and tobacco-related factors associated with preference for AS cigarettes. **METHODS:** Adult smokers were recruited during acute psychiatric hospitalization in the San Francisco Bay Area between 2009–2013. The sample (N=956; M age = 38.7, SD=13.5) was 49% female and identified as 23% African American, 15% Latino, 44% White, and 18% Other. Participants listed their top 3 brands of cigarettes and completed measures of demographics, overall self-rated health, diet, cigarettes per day, readiness to quit, quit history, and the Fagerstrom Test of Cigarette Dependence (FTCD). **RESULTS:** AS cigarettes were identified as a top brand by 16% (n=153) of the sample. Logistic regression analyses indicated that the likelihood of preference for AS was significantly higher for participants of higher SES ($\beta = 1.08$) who were younger ($\beta = 1.30$), more highly educated ($\beta = 1.18$), reported better overall health ($\beta = 1.20$), and a low fat diet ($\beta = 1.57$), p 's < .05. African Americans were less likely to report a preference for AS cigarettes compared to Whites ($\beta = 0.19$). Preference for AS cigarettes was unrelated to gender, cigarettes per day, quit history, or FTCD. **CONCLUSIONS:** Younger, more

highly educated individuals, with higher SES, better self-rated health and healthier diets may select AS cigarettes because they perceive them to be healthier. Notably, measures of tobacco use and addiction did not differ for AS relative to other brands.

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POS4-16

WHAT DIFFERENTIATES CIGARETTE SMOKERS, E-CIGARETTE USERS AND POLYTOBACCO USERS AMONG ADOLESCENTS? RESULTS FROM A NATIONAL SAMPLE

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OBJECTIVE: Rising e-cigarette use among adolescents in recent years has raised the question whether e-cigarettes are adding to the pool of future smokers or whether they are appealing only to the adolescents who are already at higher risk of becoming smokers or tobacco users. Our aim was to examine the characteristics that distinguish cigarette smokers, e-cigarette users and polytobacco users among adolescents. **METHODS:** Data from the 2014 National Youth Tobacco Survey, of US middle and high school students, was analyzed. Current users (past 30 days, n=2355), were grouped as 'cigarette smokers' if they had only used cigarettes, 'e-cigarette users' if they had only used e-cigarettes, and 'polytobacco users' if they had used one or more tobacco products in addition to cigarettes or e-cigarettes. Associations of product use with demographic and smoking-related characteristics (e.g. age of initiation, quit intention etc.) were examined using multinomial logistic regression. **RESULTS:** Compared to cigarette and polytobacco users, e-cigarette users were more likely to be younger ($p<0.001$), more likely to be studying in lower grades ($p=0.033$), less likely to have initiated nicotine/tobacco use with a cigarette ($p=0.0009$), more likely to have initiated at a later age ($p<0.001$), have smoked fewer cigarettes ($p<0.001$), less likely to purchase products at a gas station ($p<0.001$), and less likely to believe e-cigarettes are harmful ($p=0.001$). Cigarette smokers were more likely to have an intention to quit than e-cigarette or polytobacco users ($p=0.010$). Polytobacco users were more likely than cigarette or e-cigarette users to believe smokeless tobacco ($p<0.001$) and second hand smoke ($p=0.012$) were harmless. **CONCLUSION:** Adolescent smokers, e-cigarette users and polytobacco users differ from each other in important demographic and product-use related characteristics. These findings imply a need for longitudinal investigation into the effects of these differences on future tobacco use in order to guide tobacco control policies and programs that could be implemented at an earlier stage in life.

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POS4-17

TOBACCO DEPENDENCE AMONG YOUTH WHO INITIATE TOBACCO USE WITH E-CIGARETTES

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INTRODUCTION: E-cig use among youth has raised public health concerns regarding its being a gateway to other tobacco products. Tobacco dependence may be an important factor in this transition. However, little is known about tobacco dependence among young e-cig users and its relationship with other tobacco products. This study aims to fill this gap. **METHODS:** Using data from the 2014 National Youth Tobacco Survey, this study examined the behaviors of 1,126 youth (ages 11-18) who initiated tobacco use with e-cigs. Tobacco dependence was measured using four criteria: having tobacco cravings and desire, feeling restless if tobacco is not consumed, and needing to consume tobacco soon after awakening. Weighted hierarchical logistic regressions were used to examine the relationship between current tobacco use and tobacco dependence stratified by gender. **RESULTS:** About 45% of our sample did not currently use tobacco, 27% only used



e-cigs, 20% used e-cigs and other tobacco products, and 8% had transitioned from e-cigs to other tobacco products. Tobacco dependence was the highest among those who used both e-cigs and other tobacco products (30.1%) followed by users of tobacco products other than e-cigs (18.2%) and exclusive e-cig users (7.1%; $p < .001$). Current tobacco status did not predict tobacco dependence in females, but among males, exclusive users of other tobacco (AOR=86.4, $p < .05$) and users of e-cigs and other tobacco products (AOR=4.2, $p < .05$) had on average higher tobacco dependence prevalence than non-users. The model comparison showed that the frequency of using tobacco other than e-cigs is a more important predictor of tobacco dependence than the frequency of using e-cigs. DISCUSSION: Almost 30% of youth who initiated tobacco use with e-cigs partially or entirely transitioned to other tobacco products later on in their lives and had the highest prevalence of tobacco dependence. Tobacco dependence prevention efforts should focus on e-cig use prevention and the transition to other tobacco products, and should be treated differently between males and female e-cig users.

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POS4-18

COMBAT, PTSD AND SMOKING CESSATION IN AN AUSTRALIAN VIETNAM VETERAN EPIDEMIOLOGICAL COHORT

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SIGNIFICANCE: Post Traumatic Stress Disorder (PTSD) is linked to failure to quit smoking. METHOD: This study investigated associations between combat exposure, PTSD, IQ and smoking cessation in a longitudinal cohort study of Australian Vietnam veterans assessed twice over 3 decades. Standardized in-person physical and psychiatric health interviews were conducted Australia wide of a random sample of Australian male Vietnam War Veterans interviewed 22 and 36 years after the war. The cohort comprised men who had never smoked, men who had quit by the first assessment, men who had quit by the second assessment, and continuing smokers. RESULTS: Men who had never smoked had lower combat exposure, higher IQ, less PTSD and other psychiatric disorders. Combat, PTSD and IQ were associated with smoking status with linear increase from non-smokers to continuing smokers. Continuing smokers had significantly higher rates of combat, PTSD, depression and lower mean IQ. Late quitters were intermediate between early quitters and continuing smokers. Logistic regression analysis showed that continuing smokers in were 3 times more likely than those who had never smoked to be diagnosed with PTSD (DSM-IV criteria) during their lifetime (OR, 3.2; 95% CI, 1.6–6.3) while the risk of being diagnosed with PTSD for veterans who started smoking during or deployment were 7.6 times more likely than those who had never smoked (OR 7.6; 95% CI 1.9–29.8). CONCLUSION: PTSD has a significant impact on smoking and cessation.

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POS4-19

ESTIMATING THE IMPACT OF GRAPHIC WARNING LABELS ON POPULATION-LEVEL SMOKING RATES IN AUSTRALIA

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SIGNIFICANCE: The use of graphic warning labels on cigarette packages has been a cornerstone of tobacco control policy in Australia for over a decade. Indeed, one of the objectives of the plain packaging legislation—introduced in Australia in late 2012—was to increase the prominence and impact of health warnings on packaging. While population-level smoking rates have declined markedly in Australia during this period, it is unclear how much of this decline can be attributed to graphic warning labels. This is in part because of other population-level intervention—mostly notably marked increases in the tobacco excise—that have been implemented during this period as well. Furthermore, laboratory and observation studies have questioned the effectiveness of current graphic warning labels. Here we attempt to assess the impact of graphic warning labels by comparing the decline in smoking rates among the blind and non-blind; if graphic warning labels are

effective, we would expect to see a greater decline in smoking among non-blind Australians. METHODS: Estimates of smoking prevalence for the blind and non-blind in the Australian population were obtained from the four Australian Bureau of Statistics National Health Surveys between 2004/05 and 2014/15. Blindness was defined as long-term complete or partial blindness of any cause, and smoking was defined as current smoking of any frequency. RESULTS: Prevalence of smoking in the non-blind decreased from 23.2% in 2004/05 to 16.0% in 2014/15, and in the blind from 19.4% in 2004/05 to 14.5% in 2014/15. This represents a rate of change in prevalence of -0.72%/year for the non-blind and -0.62%/year for the blind. In a generalised linear model of smoking prevalence, there was no significant interaction of blindness and time, meaning there is no evidence for a difference in smoking prevalence change between the blind and non-blind over the time period. CONCLUSIONS: These results question how much, if any, of the observed fall in smoking prevalence in Australia during this period can be attributed to graphic warning labels. Research into ways to improve the design and implementation of graphic warning labels is warranted.

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POS4-20

PERCEIVED INTER-PARENTAL RELATIONSHIP AND SMOKING BEHAVIOURS IN HONG KONG ADOLESCENTS

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SIGNIFICANCE: Family has important influences on adolescent smoking but no study has ever reported the association between quality of inter-parental relationship and adolescent smoking. We tested the association between adolescent smoking behaviours and perceived inter-parental relationship in Hong Kong. METHODS: During 2012-13, a representative school-based, cross-sectional sample of 45,857 secondary 1-6 (US grade 7-12) students in Hong Kong (boys 51.4%, mean age 14.6) rated inter-parental relationship as worse (fair/bad/very bad) versus good/very good (reference) and reported smoking behaviours. Data were weighted by sex, age and grade distributions of Hong Kong secondary students in 2012/13. Logistic and linear regression yielded adjusted odds ratios (AORs) of ever smoking, current smoking (smoked at least once in the past 30 days), morning smoking urge and intention to quit; and beta-coefficient (β) of daily cigarette consumption in relation to perceived inter-parental relationship, adjusting for sex, age, perceived family affluence, parental smoking, peer smoking and school clustering effects. RESULTS: In all students, 15.0% and 3.3% reported ever and current smoking, while 30.7% reported worse inter-parental relationship. Students reporting worse (vs good/very good) inter-parental relationship were more likely to be ever smokers (21.7% vs 10.7%; AOR 1.78, 95% CI 1.59 to 1.97), and current smokers (5.2% vs 2.0%; AOR 1.79, 95% CI 1.48 to 2.16). In current smokers, worse perceived inter-parental relationship was significantly associated with morning smoking urge (AOR 1.55, 95% CI 1.17 to 2.06) but neither with intention to quit (AOR 1.07, 95% CI 0.80 to 1.44) nor daily cigarette consumption (adjusted β -0.34, 95% CI -0.89 to 0.22). CONCLUSIONS: We found the first evidence that worse perceived inter-parental relationship in adolescents was associated with cigarette smoking. The findings suggest that family-based preventive measures strengthening inter-parental relationship and family wellbeing may be useful in preventing adolescent smoking.

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POS4-21

AN ECOLOGICAL MOMENTARY ASSESSMENT OF CIGARETTE AND CIGAR DUAL USE AMONG AFRICAN AMERICAN YOUNG ADULTS

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SIGNIFICANCE: Patterns of multiple tobacco product use are difficult to capture using traditional self-report methods. Cigars present special challenges due to the variety of types, brands, and flavors. Ecological Momentary Assessment (EMA) using mobile phones can measure product use, product characteristics, and factors associated with use in real-time. This pilot study assessed the patterns of cigarette and cigar smoking, and cognitive, social, and environmental factors associated with cigar vs. cigarette smoking among African American young adult (18-29) dual users. **METHODS:** For 14 days, 64 participants recorded their smoking, craving, emotions, and other factors via an automated text message-based EMA system on their phones: 4 random times a day and 4 specific times a day. The associations between baseline and EMA factors and the number of cigarettes and cigars smoked were modeled using mixed linear models for longitudinal analysis. **RESULTS:** On average, participants smoked 7 cigarettes daily compared to 3 cigars, with substantial variation. Nearly all participants smoked menthol cigarettes (92%) and flavored cigars (94%), and 86% smoked >1 flavor of cigar. Many participants (48%) were nondaily smokers of both products, and smoked more than one brand of cigar (83%) and cigarette (76%). Stress, craving, and perceived addictiveness were positively associated with cigarette and cigar smoking. Although women and older adults (25-29 years) smoked fewer cigarettes than men and younger adults (18-24), no difference was found with cigars. Stratified analysis showed that different factors were associated with smoking cigars as-is vs. cigars with marijuana (blunts). **CONCLUSIONS:** EMA is a useful tool to capture the variety of brands and flavors smoked within a group who are at high risk for dual use. Several factors are associated with smoking both products in this group, suggesting useful approaches to promote total cessation that may help address smoking disparities. Craving for cigars highlights their potential for abuse and the need for regulatory action against flavors and other product characteristics to reduce appeal to young people and discourage product switching.

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POS4-22

EFFECTIVENESS OF SMOKING CESSATION INTERVENTIONS AMONG PREGNANT WOMEN: A LITERATURE REVIEW

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SIGNIFICANCE: Although smoking during pregnancy can have severe health consequences for the (unborn) child, 8.6% of pregnant women in the Netherlands smoke daily during their whole pregnancy (in 2015). Among lower-educated women, this is even 22.1%. The aim of the present study is to provide insight into effective interventions for smoking cessation among pregnant women. **METHODS:** An international literature review was conducted via Pubmed to search for systematic reviews and meta-analysis (since 2005). If available, Cochrane reviews were leading. In addition, multiple primary studies were included to provide additional insights or examples, which were found via Pubmed (since 2014) and reference tracking. **RESULTS:** Psychosocial interventions are the most common and most suitable intervention to provide to smoking pregnant women and can reduce smoking during pregnancy and positively influence birth outcomes. Interventions that consist of multiple components seem to be most effective. Social support, biochemical feedback and financial incentives can have a positive effect on smoking cessation, if they are combined with personal counselling or coaching. Financial incentives are promising, but primary studies to this component are scarce. The research to the efficacy and safety of pharmacological devices (i.e. nicotine replacement therapy and medications) among pregnant women is too scarce to draw firm conclusions. Partners of pregnant women play an important role in

quitting smoking, but knowledge on how they can be involved and/or stimulated to quit smoking is insufficient so far. **CONCLUSIONS:** Multiple strategies are effective for smoking cessation among pregnant women. However, more research is needed, in particular to financial incentives and pharmaceutical devices. Involving (smoking) partners also needs more attention. Natal care professionals can support pregnant women in smoking cessation by providing effective interventions. Smoking cessation can have multiple positive effects for the (unborn) child and provides them a smoke free future.

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POS4-23

SMOKING AMONGST NZ PACIFIC YOUNG ADULTS – THE ROLE AND INFLUENCE OF FRIENDS, FAMILY, AND ENVIRONMENT

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BACKGROUND: Despite reductions in overall smoking prevalence within New Zealand (NZ), smoking rates amongst young adults, and Pacific peoples, remain high. Achieving the government's 'Smokefree2025' goal, requires an understanding of these groups' behaviours and needs. We therefore explored Pacific young adults' experiences of smoking initiation, transition from experimentation to more regular usage, and influences their peers, family, and environmental settings exerted. **METHODS:** Using a *Talanoa* methodology, appropriate for discussions with Pacific communities, we conducted six focus groups with NZ Pacific smokers (daily and intermittent) and susceptible non-smokers. All participants were born in NZ and aged between 17 and 25 years of age. We explored participants' smoking attitudes and behavior, including initial experimentation, transition to regular smoking, and environmental context. Directed content analysis was used to analyse the data. **RESULTS:** Many participants described peers, friends, and family members as the primary trigger of smoking initiation; with most articulating a desire to 'fit in with the crowd' as the key reason why they started smoking. Participants believed their environment not only promoted smoking uptake, but would prompt relapse among quitters. Although many wished to quit or reduce their smoking, they felt successful quitting would require them to remove themselves from their social contexts. **CONCLUSIONS:** These findings suggest that effective smoking prevention programmes for Pacific young adults need to modify the environmental settings that promote smoking, reduce the effects of peer pressure in adolescence, and strengthen the identity and character of young adults.

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POS4-24

MASS MEDIA AND QUITLINE COMBINED: MODELLING THE HEALTH GAIN (QALYS), EQUITY IMPACTS AND HEALTH COST SAVINGS

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SIGNIFICANCE: There is international use of mass media campaigns that include links to quitting services. But little is known about the impacts of this intervention package in terms of the health gain, equity impacts and cost-utility. Therefore, we studied this in a high-income country with a national quitline service: New Zealand (NZ). **METHODS:** We used an established multi-state life-table macro-simulation model (Blakely et al, *PLoS Medicine*, 2015). The setting was the adult population of New Zealand (NZ) in 2011, with a health system perspective taken. Effect sizes and intervention costs were based on past NZ Quitline data. Health system costs were from a detailed nationally linked health dataset, and a 3% discount rate was used. **RESULTS:** The combined media campaign and quitline intervention for one year was estimated to generate 4190 quality-adjusted life-years (QALYs), 95% uncertainty interval [UI]: 3410 to 5150. The intervention was also cost-saving for



all age-groups, sexes and ethnic groups (saving \$US 84.2 million [M]; 95%UI: 59.5 M to 115 M). It was also pro-equity in terms with QALY gains for Māori (indigenous population with higher smoking rates, and higher non-communicable disease rates) being 3.0 times higher than non-Māori (2.18 vs 0.73 per 1000 population respectively). The cost-saving aspect of the intervention was maintained for all scenario analyses: including using a higher discount rate (6%), and when the intervention effect size was halved as a sensitivity analysis. Running the intervention for 20 years would generate an estimated 54,000 QALYs which is 10.7% of all health gain achievable if all smokers had quit, and all uptake ceased, in 2011. CONCLUSIONS: This study provides modelling-level evidence that the combined mass media/quitline intervention appears to be an effective means to generate health gain, reduce ethnic inequalities in health and save health system costs in this high-income country setting. Nevertheless, if major reductions in smoking are to be achieved (eg, to achieve an endgame target of <5% smoking prevalence), other interventions such as increasing tobacco taxes and phasing down tobacco retail outlets would be required.

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POS4-25 SMOKERS MISUNDERSTAND THE COMPONENT CAUSES OF HARM FROM CIGARETTE SMOKING

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AIMS: To investigate smokers' understandings of component causes of the harms resulting from cigarette smoking, with a particular focus on younger smokers. METHODS: An on-line survey administered in Australia to 1055 participants in three groups: non-nicotine users aged 18 to 25, current smokers, e-cigarette users and recent quitters aged 18 to 25 and current smokers, e-cigarette users and recent quitters aged over 25. RESULTS: We asked participants to estimate contributions to total harm from four components of cigarette smoke: nicotine, naturally occurring substances in tobacco, combustion products of tobacco, and cigarette additives. 0.7% of participants made estimates within broadly defined accurate ranges for all four items and 13% were accurate for three items. We asked whether manufacturers add toxic chemicals to cigarettes to: a, make them more addictive, and b, make them taste better. 72% of the total sample identified the first claim as definitely or probably true and 70% of the total sample identified the second claim as definitely or probably true. 2% of the total sample identified both claims as definitely false. We asked whether it is true "pure tobacco is not very harmful to smoke." Over 30% of subjects in both of the nicotine user groups rated this proposition as true or probably true. In the non-user group 30% identified this as definitely false. In the young user and older user groups, the percentages were 17% and 16%. CONCLUSIONS: There is widespread misunderstanding of the component causes of harm from smoking. Harm from additives is amplified and harm from combustion of tobacco attenuated. Many smokers believe the tobacco industry directly adds toxic substances. A substantial minority believe "pure" tobacco is "less harmful." Public health messages should avoid inadvertently contributing to misunderstandings, particularly through representing "chemicals" as invariably harmful. More should be done to educate the public about how combustion produces harm.

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POS4-26 PREVALENCE, HABITS AND ATTITUDES OF CIGARETTE SMOKING ON A UNIVERSITY CAMPUS IN TURKEY

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SIGNIFICANCE: Tobacco remains the number one preventable cause of death in the world, with one billion tobacco-related deaths estimated for the 21st century. Among tobacco control and prevention efforts, smoke-free university campuses play an important role to help youth quit while still in college, or never start at this

formative age. Although Turkey has made great strides in tobacco control, smoke-free campuses remain a controversial subject in Turkey. Lasting from August 2014 to October 2015, this project's aim was to conduct a needs assessment to inform efforts to achieve smoke-free status at one Turkish university campus, and to identify barriers and opportunities for targeted smoking prevention and cessation interventions. METHODS: The study was done at Koç University (KU) in Istanbul, Turkey, in collaboration with New York University, New York, USA. Outcome measures included smoking prevalence and opinions about smoke-free policies, which were collected by campus-wide confidential online surveys and student focus groups. Participants gave written informed consent and IRB approval was obtained at KU. An open campus symposium, hosted by the university president, was held to discuss smoke-free policies with students and leadership and to identify sustainable interventions. RESULTS: On campus, 42% of students smoke regularly or occasionally, with 13% former and 45% never smokers. Thirty-seven percent of smokers were not aware of smoking cessation programs on campus, and another 40% reported that campus programs were not sufficient to help them quit. Thirteen percent preferred a 100% smoke-free campus and 36% preferred more campus restrictions. CONCLUSIONS: Lessons learned include needs for more education about smoking risks, more surveillance of student opinions and knowledge, and more smoking cessation resources on campus. Instead of all-or-nothing policies, intermediate measures could first focus on cessation counseling, smoke-free doorways, designated outdoor smoking areas, and maintaining current smoke-free indoor policies. Student advocacy and engagement activities, including a pilot social media intervention, followed this effort.

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POS4-27 REASONS TO QUIT SMOKING AND SITUATIONS OF RELAPSE AMONG COMMUNITY-RECRUITED SPANISH DAILY SMOKERS

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The majority of smokers make a high number of quit attempts before becoming completely abstinent, making relapse a common outcome within the behavior change process. Despite common of relapse, there is limited knowledge of situations of relapse in the general population of smokers; nearly all studies that identified predictors for smoking relapse were conducted with treatment seeking smokers in clinical samples. Given that Spain has a higher prevalence of smoking (24%, Spanish Ministry of Health, 2015), we sought to identify the reasons to quit smoking and situations of relapse among a community-recruited of Spanish daily smokers. A sample of 775 relapses was recruited among the general population using a snowball method. Participants completed a survey answering questions regarding sociodemographic and smoking-related characteristics. The reasons to quit smoking were assessed through one question with 10 response options. The smoking relapse situations were identified through specific questions assessing different aspects related with the last relapse episode. Situations of relapse were coded in 6 categories: Positive Affect, Negative Affect, Lack of Control, Habit, Craving or Nicotine Withdrawal Syndrome, and Social Pressure. Results showed that the principal reason to quit smoking was concern about health and fear of smoking related diseases (86.8%), followed by stopping tobacco dependence (40.4%), and saving money (39.9%). Regarding relapse situations, results indicated that most relapses were attributed to Positive Affect (36.6%) and Negative Affect (34.3%), followed by Lack of Control (10.1%), Habit (6.7%), Craving or Nicotine Withdrawal Syndrome (6.3%), and Social Pressure (5.9%). Findings indicate that health concern appear to be a motivating reason to quit smoking, and relapse may be a result of an affective process rather than a habit, a physiological or a social pressure process. Future tobacco prevention efforts are necessary in Spain. Thus, the results of this study may help develop more tailored public health smoking relapse prevention strategies or programs.

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POS4-28

PATTERNS AND DIFFERENCES IN THE CO-USE OF ALCOHOL AND MARIJUANA WITH THE SPECTRUM OF ALTERNATIVE TOBACCO PRODUCTS ACROSS YOUNG ADULTS AND ADULTS: RESULTS FROM WAVE 1 OF THE PATH STUDY

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Marijuana, alcohol, and tobacco use is more prevalent among young adults than any other age group, and frequently co-occur. Little is known about co-use patterns across the range of alternative tobacco products and whether patterns of co-use differ by age. This study examined the prevalence and correlates of current marijuana, alcohol, and tobacco product co-use patterns in young adults (18-24) and adults (25+). Data were from the Wave 1 adult dataset of the Population Assessment of Tobacco and Health (PATH) Study. Weighted analyses estimated the prevalence of all unique patterns of current marijuana, alcohol, and tobacco co-use (cigarettes, hookah, e-cigarettes, cigars/little cigars, and other products) in young adults ($n = 9,112$) and adults ($n = 23,208$). Multivariable logistic regression models examined demographic, substance use, tobacco use, and mental health correlates of each pattern. The top five patterns in young adults were: 1) no current use (33%); 2) alcohol-only use (20%); 3) cigarette/alcohol co-use (4%); 4) cigarette-only use (3%); and 5) alcohol/marijuana co-use (2%). The top five patterns in adults were: 1) no current use (38%); 2) alcohol-only use (33%); 3) cigarette-only use (6%); 4) cigarette/alcohol co-use (5%); and 5) cigar/alcohol co-use (1%). Young adults were more likely to show alcohol/ marijuana co-use compared to older adults (p 's < .05). Marijuana-only use did not emerge in the top five patterns among young adults, nor did e-cigarette use, either exclusively or in conjunction with alcohol or marijuana. Regardless of age, those with mental health problems were more likely to engage in co-use and poly-use behavior. Alcohol-only was the most popular use pattern in both age groups and was predominant in all of the top five patterns. Across both age groups, cigarettes were the only tobacco product used alone, without alcohol, marijuana, or other tobacco products. Prevention and intervention campaigns should focus on multiple substances of abuse rather than on exclusive use of substances, given the high prevalence and popularity of dual and poly-use patterns.

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POS4-29

INVESTIGATING THE EFFECT OF AGE IN SMOKING CESSATION AND FACTORS WHICH ASSIST YOUNG SMOKERS IN QUITTING

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SIGNIFICANCE: Whilst the quantitative effects of aspects of smoking cessation services (e.g. pharmacotherapy) and individual characteristics (age, sex) in influencing the probability of quitting are well understood within the clinical trial setting, these are less well described in the real world. In the current work, we focus on the relationship between age and quit success and how this may be influenced by individual and service-level covariates using observational data recorded by Quit-51 smoking cessation service in England. METHODS: Data were obtained from Quit-51 spanning the period March 2013 to January 2016. Quit success was measured in terms of Carbon Monoxide (CO) – validated quit at 4 weeks. The mean quit rate was calculated for each age between 13 and 90 years inclusive. Graphical evaluation suggested a non-linear relationship with a steep increase in the quit rate during the teenage period, but flattening out with increasing age. In order to assess this phenomenon statistically, a non-linear model was compared against a linear model with respect to this relationship. The variable age was subsequently recategorised into teenagers (13-19) and 20+ years between which groups much of the variance in quit rate occurred. This dichotomous variable was included as a main effect in a Generalised Linear Mixed Model (GLMM), response = 4-week CO-validated quit, in addition to the main effects and interactions with the following: gender, treatment (Varenicline/Nicotine Replacement Therapy), cigarette dependence (Fagerstrom index) and social deprivation index. RESULTS: Fitting

a non-linear model for age on quit rate represented a significant improvement against the simpler linear model ($F_{1,75} = 3.99$, $p=0.049$). In terms of the GLMM, all main effects were significant, but none of the interactions involving dichotomous age attained statistical significance. CONCLUSIONS: The chance of clients quitting improves with age, particularly in the teenage group. In GLMM analysis, none of the covariates considered here were shown to improve quit rates amongst teenagers, but given the importance of smoking cessation in this age group, further research would be invaluable.

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POS4-30

SYMPTOMS RESULTING FROM WATERPIPE TOBACCO USE AMONG YOUNG ADULTS

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BACKGROUND: Though often perceived as safer than cigarette smoking, waterpipe tobacco smoking (WTS) carries many of the same short- and long-term health risks as cigarette smoking. However, very little is known about the types of health symptoms users experience as a result of WTS. METHOD: In spring 2016, we conducted a nationally representative online survey of 2,219 young adults (ages 18-25) to assess prevalence of WTS and symptoms associated with use. Participants were asked to indicate whether they had ever experienced any of 10 health symptoms either during or immediately following WTS. Health symptoms were identified through a literature review and online user blogs. RESULTS: The sample was 58.9% female, 74.1% white, and 19.7% Hispanic, with a mean age of 21.6 years. Lifetime waterpipe use was reported by 23%, with 19.1% reporting use more than a month ago (former users) and 3.9% reporting past month use (current users). Sixty-two percent of lifetime users reported experiencing one or more symptoms. Over a third (35.8%) of current users and 30.1% of former users reported experiencing two or more symptoms. Common symptoms associated with WTS included, coughing (31.8%), dizziness (29.9%), headache (21.6%), sore throat (15.0%), nausea/vomiting (10.1%), and shortness of breath (9.4%). Few participants reported chest pain, confusion, passing out, or muscle weakness. Reports of symptoms were similar across user groups. CONCLUSIONS: Most users reported experiencing at least one negative health symptom as a direct result of WTS, with coughing and dizziness being most common. The symptoms experienced could have been due to nicotine exposure or early signs of carbon monoxide poisoning, since WTS emits high levels of carbon monoxide due to the charcoal used to heat the tobacco. Research on the immediate health consequences of WTS and communication strategies to warn users about possible symptoms are needed.

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POS4-31

APPLICATION AND DATA ABOUT THE EFFECT OF AN ONLINE SMOKING PREVENTION PROGRAM IN ROMANIA

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INTRODUCTION: Tobacco control experts must concentrate their efforts to prevent smoking and to promote cessation before adolescents become addicted to nicotine. Our aim was to extend the application of computer-based smoking prevention programs and to provide an online intervention among high-school students who



are familiar with information and communication technology. **METHOD:** ASPIRA is a Romanian/Hungarian version of an online smoking prevention program created in United States of America with five modules which contain tests, videos and interactive games. During the pilot study it was analyzed the functionality of the software. After that a computer-assisted baseline questionnaire was applied in both intervention and control groups collecting data about smoking habits and attitudes from 1,835 9th grade high-school students and after six month from 1369 students living in Tirgu Mures, Romania. **RESULTS:** The vast majority of students reported favorite impressions about ASPIRA online prevention program; language and cultural barriers did not reduce the effectiveness of the tested program. Our results show that 53.2% of questioned students had tried smoking cigarettes, 24.1% of the sample smoked cigarettes during the past month, 4.6% of participants smoked cigarettes daily in last 30 days. After the use of ASPIRA prevention program ever trying smoking was reduced mostly in intervention group compared with control group: OR=0.67, 95%CI 0.45-0.98. There were compared some habits and attitudes before and after intervention. Our results show that intervention has no effect on decisional balance, therefore the intervention effect was not mediated by the studied cognitive variables such as coping reinforcement and social benefit ($p>0.05$). **CONCLUSIONS:** Adolescents represent a very important category of smokers towards whom tobacco control experts must concentrate their efforts by strong educational policies to prevent smoking initiation and to promote early smoking cessation. ASPIRA computer-based anti-smoking software can be very useful especially in primary smoking prevention.

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POS4-32

SUSTAINABILITY OF OUTDOOR SCHOOL GROUND SMOKING BANS AT SECONDARY SCHOOLS: A MIXED METHOD STUDY

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BACKGROUND: Tobacco use is a major problem worldwide. Studies have shown that smoking bans help to improve general health. Although the number of countries implementing outdoor school ground smoking bans at secondary schools is growing, considerable less attention is paid on what happens after initial implementation (i.e., degree of sustainability), while paradoxically sustainability of interventions is essential to long-term effectivity. The aim of the study was to (1) assess the level of sustainability and (2) elucidate the perceived barriers and facilitators regarding sustainability of an outdoor school ground smoking ban. **METHODS:** In this study a sequential explanatory approach was used. In phase I quantitative data was collected (i.e., 438 online surveys) and in phase II qualitative data (i.e., 15 semi-structured interviews) was obtained at directors of secondary schools with an outdoor school ground smoking ban. ANOVA (phase I) and a thematic approach (phase II) were used for analyzing data. **RESULTS:** Result showed that sustainability of an outdoor school ground smoking ban was high. Furthermore, the perceived barriers and facilitators fell into three categories: 1) factors in the broader community environment (legislation, social environment, social norm), 2) school factors (school culture, education level, policy, school ground features) and 3) smoking ban/implementation factors (side effects, enforcement, communication, collaboration, guidelines). **CONCLUSION:** Overall, sustainability of an outdoor school ground smoking ban is high, indicating that schools have the capacity to maintain the smoking ban over time. The barriers and facilitators need to be considered when implementing and sustaining outdoor school ground smoking bans.

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POS4-33

ASSESSING THE KNOWLEDGE, ATTITUDES, AND BEHAVIORS OF HOOKAH SMOKING AMONG ETHIOPIAN AND ERITREAN AMERICANS

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INTRODUCTION: Prevalence of waterpipe or hookah smoking is increasing in several countries including the US. There is a paucity of research assessing use in Ethiopian and Eritrean Americans. The purpose of this study was to estimate the prevalence of hookah smoking in this subpopulation and to describe its associated knowledge, attitudes, and behaviors. **METHODS:** An online survey of 396 Ethiopian and Eritrean Americans was conducted between July 2015 and October 2015. Participants were recruited through social media and community organizations. The survey consisted of 49 questions on demographics, tobacco use, perceptions of harm and social acceptability. Chi-square tests were used to examine perceived harm and social acceptability of hookah smoking compared to cigarette smoking by hookah use status. **RESULTS:** Nearly 80% had tried hookah in their lifetime (ever users), and about 48% had smoked hookah in the past 30 days (current users). Ever use was highest among persons 24-29 years of age, but there were no significant differences by gender, education or employment. Ever users were less supportive of bans on hookah smoking in a bar or restaurant compared to never users, $\chi^2(3, N = 396) = 57.56, p<.001$. Additionally, ever users more often reported that hookah smoking was less harmful than cigarette smoking compared to never users. **CONCLUSIONS:** Hookah use is a major public health issue among Ethiopian and Eritrean Americans. Future research is needed to validate prevalence estimates and understand the predictors of hookah smoking, as well as factors that influence social acceptability and perceptions of harm. **IMPLICATIONS:** Hookah use is a growing concern in the US and current tobacco use prevention and control efforts do not sufficiently address this form of product use. This study demonstrates the need to understand hookah use in different US subpopulations and in order to develop effective prevention and control strategies to battle this burgeoning epidemic. Taking into account the FDA regulatory authority on tobacco products, public health researchers should also explore the policies that may fuel this epidemic such as the presence of flavors in the hookah tobacco, exemptions from clean indoor acts for hookah lounges and advertising for hookah products.

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POS4-34

CESSATION-RELATED WEIGHT CONCERN AMONG HOMELESS MALE AND FEMALE SMOKERS

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Concern about post-cessation weight gain is a barrier to quitting smoking; however, its effect on smoking cessation is unclear. Females have higher cessation-related weight concern than males and predictors of cessation-related weight concern are gender specific. Homeless males ($n=320$) and females ($n=110$) participating in a smoking cessation randomized controlled trial completed surveys on cessation-related weight concern, smoking status, and components from the Behavioral Model for Vulnerable Populations. Generalized estimating equations were used to examine baseline predictors of cessation-related weight concern at baseline, the end of treatment, and 26-weeks follow-up. Logistic regression models were used to examine the relationship between cessation-related weight concern and smoking status at the end of treatment and follow-up. Homeless females had higher cessation-related weight concern than homeless males. Among males, older age, Black race, higher BMI, depression, and having health insurance were associated with higher cessation-related weight concern. Among females, addiction to smoking, greater cigarette consumption, indicating that quitting is more important, older age of smoking initiation, and less support to quit from family were associated with higher cessation-related weight concern. Cessation-related weight concern wasn't associated with smoking cessation among males or females. Homeless individuals experienced comparable levels of cessation-related weight concern as other populations. Although several types of characteristics predicted cessation-related weight concern among males, only smoking characteristics predicted cessation-related weight concern among females. Given the small proportion of quitters in this study (8% of males and 5% of females), further research on the impact of



cessation-related weight concern on smoking cessation among the homeless is warranted.

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POS4-35

PUBLIC DELIBERATION ON GRAPHIC WARNING LABELS IN THE U.S.

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BACKGROUND: Despite health professionals' wide support of FDA's proposed graphic warning labels (GWL), the general public in the U.S. have expressed mixed feelings toward changes to cigarette packages. **OBJECTIVE:** This study sought to examine the content structure of the public discourse on GWL and identify rationales related to its public support or opposition. **METHODS:** We retrieved 29 news articles covering the developments of GWL from mainstream online news outlets. A total of 5102 readers' comments were collected from the comment boards following these news articles. A computerized content analysis was then conducted on these comments to determine their relevance, valence, and the arguments they made. **RESULTS:** Instead of discussing GWL, comments posted on the news websites were more likely to debate whether people should quit smoking. About 10% of the comments focused solely on the GWL, 40% of the comments were solely about smoking, 40% mentioned both issues, and the remainder mentioned neither. The majority of the relevant comments expressed opposition to GWL (66%), 11% showed support and 23% had mixed or neutral feelings. Although GWL had been ruled as constitutional in some courts and unconstitutional in others the opinion climate on the comment board was not affected by these rulings, and a consistent level of opposition was observed over time. A quarter of the comments used the slippery slope argument to question the legitimacy of GWL and asked whether it was acceptable to place warning labels on other potentially harmful products like alcohol or fast food. Commenters were also largely concerned that GWL may not be effective in reducing the smoking rate (15.2%), and may violate smokers' personal rights (9.5%). **CONCLUSIONS:** Online comments on news websites can provide insights into public opinion on GWL in the U.S. The tobacco control community should address the public's concern about GWL's legitimacy and effectiveness when attempting to gather support for GWL from the general public.

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POS4-36

A CROSS-SECTIONAL STUDY ON TOBACCO CONSUMPTION PATTERN AMONG AUTO RICKSHAW DRIVERS IN CHENNAI CITY, TAMIL NADU, INDIA

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Tobacco use is a major preventable cause of premature death and diseases, currently leading to five million deaths worldwide which are expected to raise over eight million deaths worldwide by 2030. India is the second largest consumer of tobacco in the world. Tobacco use is a leading cause of deaths and disabilities in India as well, killing about 1.2 lakh people in 2010. About 29% of adults use tobacco on a daily basis and an additional 5% use it occasionally. This study is contemplated with an aim to assess the prevalence of tobacco consumption and the associated factors involved in its consumption, as this group of the population is under constant pressure and account for the workforce of the country. So through this study we could be able to know the reasons of consumption, amount of consumption, awareness of ill effect of tobacco consumption, and out of pocket expenditure. **MATERIALS AND METHODS:** A Cross sectional descriptive study was conducted among Auto Rickshaw Drivers in Chennai City. Auto drivers who were working for more than two years and present on the day of examination and who were willing to participate in the study were included. Cluster random sampling technique was used. 400 samples were selected from 40 auto stands of

various parts of Chennai City. Data was collected using a Survey Proforma which comprised of a Questionnaire which can assess the frequency of consumption, age of initiation, the amount of consumption, mental stress, economic factors, any past history of disease and most importantly the awareness towards oral cancer. The data recorded was transferred and analysed using SPSS version 20. Age, tobacco consumption pattern, reasons of consumption, amount of consumption, harmful effects of tobacco are the variables Chi-square test was used to test the significance between groups. **RESULTS:** Prevalence among auto rickshaw drivers for consumption of tobacco products was very high (87%). Auto rickshaw drivers were mostly used tobacco in the form of Gutkha (72%) and bidi (40%) in comparison to other products. It also shows that they use cheap tobacco products. Most of the auto rickshaw drivers start using tobacco products in age less than 18 years (80%) and associated factors for tobacco use are due to friends and their influence (78%). **CONCLUSION:** Prevalence of tobacco use among auto rickshaw drivers was very high. Mostly they use tobacco products to reduce stress, to be awake or to remove nervousness but a large number of participants also use them without any reason.

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POS4-37

IMPLEMENTING AN AUTOMATED QUITLINE REFERRAL IN A LARGE ACADEMIC EMERGENCY DEPARTMENT

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BACKGROUND: Medically underserved smokers suffer disproportionately in terms of tobacco use, poor access to smoking-cessation treatment and a higher burden of tobacco-related comorbidities. This population is also more likely to utilize the Emergency Department (ED) due to poor healthcare access. For these reasons, EDs are an ideal setting for intervening with patients who may have the greatest need for tobacco-cessation services. **OBJECTIVE:** To describe the reach of a cold-call referral service designed to connect smokers seen in an ED to the South Carolina Quitline where they could receive tobacco-cessation counselling support and access to a free 2-week supply of nicotine replacement medications. **METHODS:** Electronic health records were used to identify smokers from patients admitted to the adult ED at the Medical University of South Carolina (MUSC) hospital between June and July, 2016 (61 days). Current smokers who were discharged home received an automated Interactive Voice Response call 3, 14, and 30 days after discharge that allowed them to be connected directly to the South Carolina Quitline. This study examined the number of patients reached by phone and the percentage that accepted the 'warm-transfer' to the Quitline. **RESULTS:** There were 6813 adult discharges from the MUSC ED, involving 5470 unique patients of whom 27% currently smoked cigarettes. Of the 1480 smokers identified, the vast majority were uninsured (47%) or on Medicaid (21%). With the automated calls to smokers we were able to reach 430 (29%) of whom 190 (44%) accepted a 'warm-transfer'/fax-referral to the South Carolina Quitline. Three month follow-up data are being collected to assess the impact of the service on smoking status of those enrolled in the callback program. **CONCLUSION:** The cold-call service was able to connect about 13% of smokers to the Quitline at minimal cost and with no extra work required from ED staff.

FUNDING: MUSC Health

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POS4-38

OLD WINE, NEW BOTTLES? PERSUASIVE APPEALS IN CIGARETTES AND NON-CIGARETTE TOBACCO PRODUCTS MAGAZINE ADVERTISING

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BACKGROUND: No studies examined persuasive appeals used in tobacco advertisements to promote tobacco use. **METHODS:** Content analysis of 945 unique tobacco magazine advertisements from 2010 to 2014 was conducted (cigarettes: n=375; conventional non-cigarette products (CNCP) (smokeless, cigar, pipe)



$n=344$; new products (NP) (snus, dissolvable, e-cigarettes) $n=244$). Intercooler reliability ranged from 0.74 to 1.00 using Krippendorff's alpha. RESULTS: Cigarette advertisements (62.5%) focused on consumers' psychological and physical needs whereas 86.9% and 59.4% of CNCP and NP advertisements focused on product attributes ($p<.001$). Purchase incentives appeared in 23.0%, 23.3%, and 14.3% of cigarette, CNCP, and NP advertisements ($p<.001$). Top incentives were sales (29.4%), contests/sweepstakes (21.3%), and coupons/rebates (20.8%). First-person and second-person pronouns appeared in 52.7% and 24.4% of cigarette; 27.6% and 45.1% of CNCP; and 21.7% and 51.6% of NP advertisements ($ps<.001$). Half NP advertisements highlighted benefits of tobacco use/purchase behavior versus 13.7% and 3.8% for cigarette and NCTP advertisements ($p<.001$). Claims about products and/or benefits were unfounded in 24.4%, 14.0%, and 7.8% versus supported in 2.5%, 12.8%, and 31.6% of cigarettes, CNCP, and NP advertisements ($p<.001$). NP advertisements (36.5%) emphasized alternatives-to-cigarettes message versus 0.6% of CNCP advertisements ($p<.001$). Of cigarette advertisements, 42.0% featured flavored products vs. 46.8% and 26.6% of CNCP and NP advertisements ($p<.001$) where menthol was the most common flavor (95.2%). CONCLUSION: Persuasive appeals differed by tobacco products. Cigarette advertisements were needs-focused with unfounded claims whereas CNCP and NP were product-focused with arguments promoting tobacco use. Anti-tobacco campaigns should expose appeals used in pro-tobacco advertisements.

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POS4-39

HEALTH EQUITY DIFFERENCES IN ADOLESCENT KNOWLEDGE ABOUT THE HEALTH EFFECTS OF SMOKING

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SIGNIFICANCE: There is a lack of evidence about adolescents' knowledge of the health effects of smoking particularly in countries with strong tobacco control policies. This study examines awareness of the health risks of smoking following the 2012 introduction of new pictorial health warning labels (HWL) in Canada. METHODS: Data are from the 2012/2013 Canadian Student Tobacco Alcohol and Drug Use Survey a representative school-based survey of 47,203 students in Grades 6-12 in 9 provinces. OLS regression models examined overall knowledge of 8 health effects of smoking included in the HWL. RESULTS: Knowledge of the health effects varied: lung cancer (93.9%), gum or mouth disease (77.6%), heart disease (67.9%), asthma (67.3%), premature or early death (63.4%), chronic bronchitis/emphysema (52.9%), bladder cancer (33.7%), vision loss/blindness (32.2%). For most health effects, never smokers were significantly less knowledgeable compared to experimental or current smokers. Among non-smokers there were disparities in knowledge by health equity groups: females ($p<0.001$), those in higher grades ($p<0.001$) and those with more spending money ($p<0.001$) were more knowledgeable whereas adolescents from all ethnic minority groups and susceptible never smokers ($p<0.001$) were less knowledgeable. A similar pattern was found for experimental smokers. Among current smokers there were fewer disparities in knowledge: those in higher grades ($p<0.001$) and with more spending money were more knowledgeable. Asian adolescent smokers ($p<0.001$), those who did not buy cigarettes ($p<0.05$) or who bought them in singles/loose/bags ($p<0.001$) compared to those who bought packs/cartons were less knowledgeable about the health effects of smoking. CONCLUSIONS: Adolescents are not adequately informed of the breadth of health effects of smoking. Knowledge is higher among smokers and there are fewer disparities in knowledge among smokers, suggesting that warning labels have the potential to improve knowledge of the health effects of smoking across groups. Additional efforts are needed to improve knowledge for non-smokers, particularly those susceptible to future smoking and from health inequity groups.

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POS4-40

DIFFERENCES IN SMOKING PREVALENCE AMONG CURRENT AND FORMER US SOLDIERS

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SIGNIFICANCE: Members of the military are generally less accepting of substance use. However, there is some evidence that suggests substance use norms shift upon separation from the military and individuals become more accepting of use. This work will examine if smoking status differs based on military status (current, previous or never). METHODS: Data are cross-sectional from the baseline assessment of Operation: SAFETY (Soldiers And Families Excelling Through the Years), an ongoing longitudinal study of US Army Reserve/National Guard Soldiers and their partners ($N=411$ couples). Participants were assessed across multiple health domains (physical and mental health, substance use, and relationship factors, as well as deployment events). Logistic Regression models, controlling for anger, anxiety, frequent heavy drinking and age, were used to examine current smoking rates based on military status (current, previous, never). Additionally, we also examined if a partner's military status was related to one's own smoking rates. RESULTS: Prevalence of smoking in males was 18% in current soldiers, 38% in former soldiers and 17% for civilian males who were married to a soldier. Female current smoker rates were 14% for current soldiers, 10% for former female soldiers and 15% for civilians married to a soldier. After controlling for anger, anxiety, frequent heavy drinking and age, males who had separated from the military were more likely to be smokers than current male soldiers (Odds Ratio: 2.97, 95% Confidence Interval: 1.1, 8.7; $p<.05$). There were no significant differences for females on the basis of military involvement. There was also some evidence ($p < .09$) suggesting higher rates of smoking for females who had partners who had separated from the military. CONCLUSIONS: Findings indicate higher likelihood of current smoking among males who left the military. Additionally, these former soldiers had partners who were more likely to smoke. Health care providers are in a powerful position to inquire about (self/partner) military status, smoking behaviors, and provide important education on smoking cessation.

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POS4-42

SAMOAN SMOKERS TALK ABOUT SMOKING AND QUITTING TOBACCO: CULTURAL PERSPECTIVES

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SIGNIFICANCE: Samoa, like other Pacific Island countries, faces a persistent challenge to reduce tobacco use among its citizens. As a signatory to the WHO FCTC, Samoa is obligated to introduce measures to reduce tobacco use and is currently trialling a text message smoking cessation programme (mCessation) to achieve this outcome. Tobacco remains relatively cheap and is widely available in Samoa, but little is known about how smoking is initiated or why and how people quit tobacco. This study offers an insight into tobacco use as a behaviour and as cultural practice perceived by smokers and non-smokers in Samoa. METHODS: Six focus groups with smokers and ex-smokers were conducted in Apia, Samoa. Groups were homogenous according to age, gender and smoking status. Focus groups were conducted in Samoan and later transcribed for the purpose of analysis. RESULTS: Tobacco use is initiated most commonly in late teens and early twenties and most frequently in (non-familial) social contexts. Maintenance of tobacco use reflects a widely held perception of the tangible benefits, including aiding feelings of strength and energy, relief from indigestion and as a means to accelerate the effects of alcohol. Tobacco use was deeply connected to social life in Samoa among friends and for some, with family. Drivers to quit originate out of concern regarding health effects and (secondly) costs. CONCLUSIONS: Tobacco use is well entrenched in Samoan society; efforts to reduce tobacco use need to be based on implicit understanding of fa'aSamoa and Samoan way of life in its context to reverse the trajectory of tobacco use and associated non-communicable disease.

FUNDING: Health Research Council of New Zealand

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POS4-43

TOBACCO RETAIL OUTLET DENSITY ASSOCIATED WITH INCREASES IN YOUTH CIGAR USE FREQUENCY

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SIGNIFICANCE: Disparities exist in the density of tobacco outlet across the U.S., and existing research suggests a link between outlet density and cigarette smoking among adolescents. Yet there is no research on associations between density and cigar products. Cigar advertising is increasingly prevalent in outlets and cigar use is high among high school aged youth and young adults. Prevalence is highest among African Americans in both age groups. This study's objective was to assess associations between outlet density and ever cigar use, past-30 day use, and frequency of use among youth and young adults overall and African Americans specifically. **METHODS:** Data from a 2015 national sample of tobacco retail outlets (n=286,599) were linked to survey data from a probability-based nationally representative sample of respondents aged 15-21 (n=13,844) collected in 2015. Density was calculated using kernel density estimation with a bandwidth of 6.5 miles, resulting in a continuous smooth density surface. The density variable was skewed and thus was dichotomized as greater than or equal to/below the median (median: 1.5 outlets per sq. mi). Multivariate logistic regressions assessed associations between density and outcomes among the entire sample and an African American subsample (N=1,339), adjusting for demographics and past 30-day marijuana use. **RESULTS:** Data indicate no association between outlet density and ever or past 30-day cigar use for respondents overall or among African Americans. For past 30-day users, those in high density areas in the full sample report smoking cigars 1.5 more days per month ($p < .01$) and in the subsample 3.5 more days per month ($p < .05$) than their counterparts in low density areas. **CONCLUSIONS:** While outlet density is not associated with ever or current use of cigars, higher density may serve as a trigger for current users that leads to increased frequency of use. This effect is stronger for African Americans than for youth and young adults overall. Outlet density may be an important contextual factor to consider when intervening with young cigar smokers. Results have implications for licensing and zoning restrictions, particularly for minority communities.

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POS4-44

CAN WE HEAR CRAVING? THE EFFECT OF CRAVING ON VOICE QUALITY

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BACKGROUND: Long term effects of smoking on voice quality are known, but short term effects of nicotine craving have not been investigated. Understanding how craving affects voice quality may reveal speech analysis as an unobtrusive physiological measure of drug craving. This formative study investigated whether craving has a perceptible effect on speech. We predicted naïve listeners could discriminate speech produced under craving and non-craving conditions. **METHOD, STIMULI CREATION:** Speech samples were collected from 4 medium-heavy smokers (Fagerstrom = 6, between 11 and 20 cigarettes per day). All were native speakers of Iberian Spanish. Participants read the sentences from Nazzi et al. (1998). The full set of sentences was recorded three times: 1) after smoking a cigarette, 2) after a one-hour craving period, and 3) after smoking a cigarette following the craving period. Momentary craving was assessed before each recording. The craving period included survey questions about smoking behaviors, reading catalogues of books discussing forthcoming publications in Humanities, and presentation of smoking images from Wray et al. (2011). **METHOD, PERCEPTION STUDY:** A subset of two sentences was selected for the perception study. Trials presented 2 versions of each sentence produced by the same speaker under smoking and craving conditions to 22 Spanish-speaking listeners. They judged which sample sounded more stressed. Subsequently, participants were again presented with pairs of sentences and judged which sample was more attractive. **RESULTS:** The samples produced under the craving condition were not judged as more stressed or more attractive than the samples produced under the smoking condition (50%; $\chi^2(1) = 0$, $p = 1$; 52%, $\chi^2(1) = 0.563$, $p = .453$). No effect of speaker was observed

($\chi^2(3) = 6.25$, $p = .1$; $\chi^2(3) = 5.078$, $p = .166$). Samples judged more attractive also tended to be judged less stressed, $r = -0.72$, $p = 0.04$. **CONCLUSION:** Contrary to our expectations, we did not observe an effect of craving on voice quality. Future research should use a stronger manipulation, more varied materials, and ask participants to discriminate on a wider set of dimensions.

FUNDING: Swiss National Science Foundation

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POS4-45

DOES E-CIGARETTE INFORMATION SEEKING PREDICT E-CIGARETTE PERCEPTION AND USE? A CROSS-SECTIONAL ANALYSIS AMONG U.S. ADULTS

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INTRODUCTION: Much research exists about passive exposure to messages that promote e-cigarettes (e-cigs). However, little is known about active e-cig information seeking and how it relates to perceptions of harm and use of e-cigs among individuals of various smoking backgrounds. **METHODS:** We used a nationally representative sample (n=3,038) of U.S. adults (≥ 18 years) from the 2015 HINTS-FDA survey. Stratifying by cigarette smoking status, we examined e-cig information sought, trust towards information sources, and used weighted bivariate and multivariate logistic regressions to examine the relationships between e-cig information seeking, e-cig harm perception, and ever e-cig use. **RESULTS:** About 17.0% of the respondents sought e-cig information. Current cigarette smokers (39.4%) were more likely than former (17.7%) and never smokers (9.2%) to seek information ($p < .001$), particularly about smoking cessation (28.4%), followed by health effects (22.9%) and cost (22.5%). The adults who sought e-cig information were more likely to lack perceived harm of e-cigs (OR=1.9, $p < .01$) and have ever used e-cigs (OR=12.9, $p < .001$). Doctors and non-governmental health organizations were the most trusted providers of e-cig information. In the adjusted regression model, information seeking predicted a lack of perceived harm, but only among current smokers versus never smokers (AOR=2.8, $p < .05$), and information seeking was positively associated with e-cig ever-use (AOR=12.0, $p < .001$) among respondents of all smoking status. **CONCLUSIONS:** For all the uncertainty about whether e-cigs are a viable smoking cessation tool, our study suggests that adult current smokers are, by far, the most interested in e-cig information, and are looking specifically for how e-cigs could help them to quit smoking, potentially resulting in their lack of perceived harm perception about e-cigs. We recommend that doctors and non-governmental health organizations deliver science-based knowledge regarding e-cig use to the general public and especially current smokers. Future studies should explore how current, never, and former smokers perceive e-cig information in order to develop targeted interventions.

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POS4-46

SAFE(R) OR DANGEROUS? ONLINE FORUMS DEBATING E-CIGARETTE USE DURING PREGNANCY

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SIGNIFICANCE: E-cigarette use is increasing against a backdrop of declining smoking rates. Their popularity is likely due to their potential to satisfy the habitual aspects of smoking in addition to supplying nicotine. E-cigarettes deliver fewer toxins than cigarettes. However, we know little about lay perceptions of the safety of using e-cigarettes in pregnancy. **METHODS:** We conducted a thematic discourse analysis of 13 online discussion forum threads that discussed e-cigarette use during pregnancy. We focussed on the ways that forum posters debated the 'safety' of e-cigarette use during pregnancy. **RESULTS:** We identified three distinct ways in which forum posters debated the safety of using e-cigarettes during pregnancy: (1) Quitting (nicotine) cold-turkey is unsafe; (2) vaping is the lesser of two evils; (3) vaping is not worth the risk. **CONCLUSION:** Discussions about the 'safety' of e-cigarettes drew on the premise that (1) immediate cessation of nicotine was potentially harmful and unsafe, (2) e-cigarettes were a harm reduction



tool, or (3) 'vaping' could be dangerous and should be avoided at all costs. While these arguments are not necessarily specific to pregnancy, this analysis points to the need for health professionals to educate and support women about smoking cessation and harm reduction options. Health professionals should be aware that some women may be currently using or considering using e-cigarettes to quit or reduce smoking. Health professionals should also be equipped to educate women with accurate up-to-date and balanced information about the risks and benefits of e-cigarette use during pregnancy and dispel myths, such as the belief that abrupt smoking cessation is dangerous.

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POS4-47

NICOTINE WITHDRAWAL, RELAPSE OF MENTAL ILLNESS, OR MEDICATION SIDE-EFFECT? IMPLEMENTING A MONITORING TOOL ON QUITLINE

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OBJECTIVES: Smoking cessation is more complicated for people with mental illness because: 1) symptoms of nicotine withdrawal can be difficult to distinguish from mental health symptoms, and; 2) smoking cessation can increase the blood levels and hence side-effects of some psychotropic medications. This paper describes the implementation of structured assessments of nicotine withdrawal and common medication side-effects in people with mental illness who are quitting smoking using a telephone smoking cessation service (Quitline Victoria, Australia). **METHODS:** Monitoring involves administering (once pre-cessation and at each call post-cessation) 1. Minnesota Nicotine Withdrawal Scale assessing eight symptoms: anger, anxiety, depression, cravings, difficulty concentrating, increased appetite, insomnia, and restlessness. 2. Adverse side-effects checklist of 5-10 symptoms: eg. dry mouth, increased thirst. Following a one-day update training in mental health, Quitline counsellors were asked to offer these assessments to callers disclosing mental illness. Group interviews with counsellors were conducted two months later to examine its utility. **RESULTS:** Barriers included awkwardness in integrating a new structured practice into counselling, difficulty in containing some callers, and initial anxieties about how to respond to changes in some symptoms. Benefits included the ability to provide objective feedback on changes in symptoms, as this identified early benefits of quitting, provided reassurance for callers and provided an opportunity for early intervention where symptoms worsened. So what? Structured monitoring of withdrawal symptoms and medication side-effects was able to be integrated into Quitline's service and was valued by counsellors and clients. Given its benefits we recommend its adoption by other services.

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POS4-48

STOP-SMOKING COUNSELLING IN DUTCH MIDWIFERY PRACTICES: A CONSTRAINT ANALYSIS

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SIGNIFICANCE: Although smoking during pregnancy can have severe health consequences for the (unborn) child, 8.6% of Dutch pregnant women smoke daily during their whole pregnancy (in 2015). Midwives in the Netherlands play a central role in providing quit-smoking counselling for pregnant women who smoke. This is done through an evidence-based minimal-intervention strategy ('V-MIS') imposed on midwives by the government. In practice however, the implementation of the V-MIS appears to be suboptimal. The purpose of the present study was to clarify the nature and extent of existing problems and needs in the provision of quit-smoking counselling in Dutch midwifery settings. **METHODS:** An online survey among midwives was conducted early 2016. The questionnaire included items on (possible barriers and needs regarding) the provision of quit-smoking

counselling for pregnant women. Descriptive statistics, chi-square tests and ANOVA's were used to analyse data from 150 midwives, representative for the Dutch setting in terms of age, function, and region. **RESULTS:** Eighty-one percent of the midwives start, and 10% fully apply quit-smoking counselling through the V-MIS. For 61% of the midwives, their clients' lack of motivation undermines the provision of quit-smoking counselling. Other hindering factors are the perceived lack of free brochures (54%), simple tools and gadgets (51%), and financial consequences for the midwife (37%) and/or the client (22%). Although 74% of the midwives regard it as their job to provide quit-smoking counselling to pregnant women, 77% perceive referral to a professional as a useful strategy (mostly to the GP; 74%). **CONCLUSIONS:** The smoking-cessation intervention strategy currently imposed in Dutch midwifery practices (V-MIS) is being used by midwives, however its implementation may considerably benefit from some modifications. Points of improvement are related to (intensification of) motivational interviewing techniques, availability of supporting materials, and the embedding of referral to the GP. Based on the study's findings, practical recommendations are done to facilitate the provision of quit-smoking counselling in (international) midwifery settings.

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POS4-49

EFFECT OF ELECTRONIC CIGARETTE USE ON TRANSITIONS IN CIGARETTE SMOKING AMONG COLLEGE STUDENTS: A MARKOV MODEL

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SIGNIFICANCE: E-cigarette (ECIG) use has rapidly increased since 2010 and is more prevalent among college-aged adults than older adults. Although ECIGs are marketed as a substitute for cigarettes, the role ECIGs in changes in cigarette smoking is not clear. Concurrent use of ECIGs during the college years may contribute to transitions in and out of various levels of cigarette smoking. The purpose of this study is to examine transitions of cigarette smoking (none vs. light vs. heavy) among college students, and determine if ECIG use predicts these transitions across a one-year period. **METHOD:** This study used data from three semi-annual waves of online data collected beginning in Nov 2014-Feb 2015. Participants were 5482 18-29 year old (M age=20.5; SD=2.36; 63.8% female; 36.4% non-Hispanic white) students at 24 Texas colleges. Cigarette smoking status was categorized as non-current smoking [0 cigarettes smoked per day (cpd) in past month] light smoking (1-5 cpd in past month) and heavier smoking (≥ 6 cpd in past month). Markov models were used to examine patterns and changes in the three categories of current smoking over one year and examine the effects of ECIG use on transitions in smoking. **RESULTS:** At baseline there were 78.8% non-current smokers, 18.2% light smokers, and 3.0% heavier smokers. Baseline non-current smokers and heavier smokers were more likely to retain their smoking status across time than to transition (probabilities=.94 & .57, respectively). About half (55.8%) of baseline light smokers maintained their light smoking status over the one year, whereas the others transitioned to non-current smoking (38.6%) or heavier smoking (5.5%). Current ECIG use predicted transitions from non-smoking to light smoking ($p < .05$), and from light smoking to heavier smoking ($p < .05$). **CONCLUSIONS:** Light smoking (1-5 cpd) is not stable during the college years, and concurrent ECIG use increases risk for transitioning to greater levels of smoking and from non-smoking to smoking. Findings underscore the importance of tobacco prevention programs that target various types of smokers, including light smokers and concurrent users of ECIGs, during the college years.

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**POS4-50****DESIGN AND IMPLEMENTATION OF THE FIRST TOBACCO QUIT LINE SERVICE IN MEXICO: "LINEA VIVIR SIN TABACO", THROUGH THE TELEPHONIC PUBLIC SERVICE (LOCATEL). A NEW APPROACH TO TOBACCO CESSATION**

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WHO Framework Convention on Tobacco Control (FCTC) mandates all its Parties to implement the key effective measures including quit lines. The WHO also suggest easily accessible and free quit lines. There is extensive evidence supporting the effectiveness of quit lines. Callers can expect to increase their chances of quitting by more than 40% as compared to not calling. The aim of the present study is to design and implement the first national quit line in Mexico, "Línea Vivir sin Tabaco" (Living without Tobacco). This is a collaborative project between the Telephonic Public Service (LOCATEL), the National Autonomous University of Mexico (UNAM) and the Institute for the Prevention and Treatment of Addictions in Mexico City (IAPA). The quit line was planned to provide easily accessible screening, counseling and behavioral cognitive intervention through weekly sessions lasting 45 minutes. The first call is made by the smoker seeking help to stop, a series of questionnaires are applied in order to evaluate motivation and level of physical dependence (Fagerstrom test). Smokers not motivated to stop are directed to the web site of LOCATEL where they can find information about the benefits of cessation, there will be a call back to evaluate if one week later they are ready to participate in the project. In the smokers motivated to quit a call back is made informing the schedule and who will be the psychologist on charge. Smokers showing high level of physical dependence on nicotine are directed to formal cessation services where they will be able to get a medication to help them to quit; smokers with low level of physical dependence will receive two therapy sessions and those with moderate dependence will receive four sessions. There are 41 psychotherapists in the project, they received a training course of 15 hours to be able to treat the smokers through the quit line service. In a parallel way, the website of LOCATEL was designed to have information about the consequences of smoking, benefits of quitting, electronic cigarette and other ways to smoke tobacco. The access to this website is free for the general population. LOCATEL services are available 24 hours during 365 days in the year. The line "Vivir sin Tabaco" began its services last June 9 and until now there are 112 smokers included in the program, we have received 209 phone calls seeking for information and on average there are three new smokers each day included in the program. It has had a broad acceptance by the public. Finally, after eleven years after the signature of the FCTC, Mexico is having a free tobacco quit line service.

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POS4-51**EVALUATION OF A VIDEOGAME PROTOTYPE FOR THE PREVENTION OF CIGARETTE SMOKING AMONG YOUNG ADOLESCENTS**

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SIGNIFICANCE: The purpose of this study was to conduct a test of the preliminary efficacy of a videogame prototype, *smokeSCREEN*, aimed at developing knowledge, motivation, and behavioral skills associated with primary prevention of cigarette smoking among young adolescents. We also explored participants' gameplay experience. **METHODS:** This study employed a one-group pretest-posttest design with 25 adolescent boys and girls aged 11 to 14 years (Mean age = 11.56, SD = .77) who had never tried smoking cigarettes. Participants played six one-hour gameplay sessions over a two-week period. Assessments of knowledge, self-efficacy, attitudes, perceived norms, and intentions related to cigarette smoking were collected at baseline, two weeks (post-play), and 12-weeks (follow up). One-way repeated-measures ANOVAs were conducted to examine changes in these dependent variables across the three assessment points. Ratings of gameplay experience were collected at two weeks and descriptive statistics were used to examine these data. **RESULTS:** The analyses revealed significant improvements in knowl-

edge related to the risks of cigarette smoking from pre- to post-gameplay ($p = .004$) that were characterized by large effects (multivariate partial eta squared = .39). Pairwise comparisons indicated significant increases in knowledge between baseline and post-play with no further improvement in scores between post-play and follow-up. Non-significant trends in the expected direction emerged for changes in self-efficacy and perceived norms which were characterized by medium-large effects (multivariate partial eta squared = .18 for self-efficacy and .15 for perceived norms). Overall, the players provided positive reports of their experience with the *smokeSCREEN* videogame prototype strongly endorsing the statements "I would play this game again" (Mean = 3.20/4.00, SD = .71), "I felt responsible for the choices I made in the game" (Mean = 3.12/4.00, SD = .78), and "I enjoyed playing the game" (Mean = 3.36, SD = .57). **CONCLUSIONS:** These findings provide preliminary evidence that a theory-based videogame may prove to be an effective and engaging means to deliver a cigarette prevention intervention.

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POS4-52**TOBACCO USE AND QUITTING OUTCOMES AMONG PERINATAL PATIENTS: AN "OPT-OUT" SMOKING-CESSATION SERVICE**

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BACKGROUND: Cigarette smoking during pregnancy and the postpartum is associated with costly morbidity and mortality for mother and infant. Despite efforts to provide targeted cessation interventions, many women continue to smoke during pregnancy or fail to maintain abstinence after delivery. **AIM:** This study aims to assess the prevalence of tobacco use and cessation outcomes among perinatal patients through a novel "opt-out" smoking-cessation service. **METHOD:** Adult (18 years or older) women admitted to the pregnancy, delivery, and postpartum units at a large academic hospital were screened for tobacco use. Smokers were identified at admission through their medical record, and some received a bedside consult on quitting by a tobacco treatment specialist. The consult gathered smoking patterns and included discussion of treatment options. Eligible smokers were followed up by phone through interactive voice response 3, 14, and 30 days after discharge to assess smoking status and offer cessation support. Follow-up eligibility included having a valid phone number and being discharged home. **RESULTS:** Between February 2014 and March 2016, 533 (9%) current and 898 (16%) former smokers were identified out of 5649 women with perinatal-related admission. Among current smokers, 188 were counselled and a total of 383 were eligible for follow-up calls. Patients smoked half a pack on average for an average duration of 11 years with over 75% reporting having their first cigarette within 5 minutes of waking up, and only 10% made a quit attempt in the past year. We were able to follow-up with 110 women (29%). Those who were counselled were twice (RR=2.22, CI=1.13-4.37) as likely to report being abstinent from smoking using intent-to-treat analysis. **CONCLUSION:** This service reached a highly nicotine-dependent sub-population. Our research demonstrates the feasibility of implementing an "opt-out" tobacco-cessation service as well as its receptivity among patients, highlighting areas of need for perinatal women. Recent quitters are at high risk for relapse, suggesting that "opt-out" programs should be extended to that group, which could have a significant positive impact on the health outcomes of these individuals and their neonate.

FUNDING: MUSC Health

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POS4-53

UNDERSTANDING CHARACTERISTICS RELATED TO SMOKING INITIATION DURING ADOLESCENCE AND YOUNG ADULTHOOD AMONG A US COHORT

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SIGNIFICANCE: Up to 38% of smokers aged 18-25 started smoking after age 18. Little is known about characteristics of these young adult initiators. We examine differences in psychosocial factors related to timing of smoking initiation. **METHODS:** Data are from the NEXT Generation Health study, a nationally representative cohort study of US 10th graders at baseline, collected annually from 2010-2015 (n=1602). Using data from 5 assessments, initiation was categorized by first reported past 30-day smoking: adolescent starters (reported smoking during 10-12th grades), young adult (YA) starters (reported no smoking during 10-12th grades but reported smoking after high school), and nonsmokers. Peer smoking and participants' smoking-related beliefs and attitudes were ascertained at 10th grade and 1st year after high school. Demographics included parent education, gender, race/ethnicity, sexual attraction, and baseline school urbanicity. Multivariate logistic regression models assessed factors associated with being a YA starter compared to an adolescent starter, and to a nonsmoker, accounting for clustering by school. **RESULTS:** Overall, 64.9% were nonsmokers, 26.5% were adolescent starters, and 8.7% were YA starters. Compared to nonsmokers, YA starters were more likely to be male (AOR=1.88), report attraction to the same/both sexes (AOR=1.92), and have friends who smoked at both 10th grade and 1st year after high school (AOR=1.83 and 5.17, respectively)(p<0.05). Compared to adolescent starters, YA starters were more likely live in urban areas at 10th grade (AOR=1.76), less likely to report peer smoking at 10th grade (AOR=0.27) and less likely to report ease of obtaining cigarettes as a factor related to their smoking status (AOR=0.35)(p<0.05). YA starters were less likely to report personal importance of being a smoker or not than nonsmokers (AOR=0.31), but were more likely to report this compared to adolescent starters (AOR=2.07)(p<0.05). **CONCLUSIONS:** Findings suggest that interventions for young adult smoking prevention should focus on young men, and stress the importance of decision making instead of yielding to peer influence. Policies that make cigarettes harder to obtain (e.g., higher price, zoning) may delay onset of smoking from adolescence to young adulthood.

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POS4-54

E-CIGARETTE USE AMONG PREGNANT CIGARETTE SMOKERS ENROLLED IN A CESSATION TRIAL

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Although the harms of smoking in pregnancy are well known, approximately 10% of women continue to smoke during pregnancy. Most want to quit, and some may switch to e-cigarettes as a perceived safer option. Little is known about the prevalence of e-cigarettes during pregnancy. Baby Steps is an ongoing, two-arm randomized controlled trial promoting smoking cessation (n=390). Women are recruited from public and private obstetrics clinics in Central NC and at Womack Army Medical Center in Ft. Bragg, NC. Dual use of cigarettes and e-cigarettes is not an exclusion criterion for this ongoing trial. Intervention messages recommends against e-cigarette use because unknown effects during pregnancy. The purpose of this research is to examine e-cigarette use among pregnant women enrolled in the Baby Steps trial. To date, we have recruited 284 women. Overall, women have a mean age of 27.6 (5.5), 38% are white, 53% married or living as married, 58%

<= HS education, and 34% are currently employed. Approximately 39% report experiencing financial burden. Women smoked an average of 9.5 (5.4) CPD for an average of 11.5(5.8) years. Nearly 29% reported making a quit attempt during this pregnancy, and 75% had a partner who smoked, and 74% lived in a household with smokers. Overall nicotine dependence was low to moderate (range 0-8; mean 3.9; SD 2.0). A total of 30 (11%) women reported e-cigarette use at any time during pregnancy, with most reporting intermittent use 73% (n=22). Overall, there were few differences between users and non-users in demographics or smoking behavior. Compared to non-users, e-cigarette users were more likely to be White (35% vs. 67%). E-cigarette users were less likely than non-users to have a partner who smoked (50% vs 78%) and more likely to live with a smoker (80% vs. 72%). Our results suggest that few pregnant women enrolled in a cessation trial report using e-cigarettes. Given the unknown safety of e-cigarettes during pregnancy, investigators should continue to research dual use of e-cigarettes and tobacco cigarettes in pregnancy.

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POS4-55

ADOLESCENT TOBACCO AND ALCOHOL ABSTAINERS: CHARACTERISTICS AND LIFESTYLE FACTORS IN A CROSS-SECTIONAL SAMPLE

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BACKGROUND: On average, Norwegian adolescents today smoke and drink less than previous cohorts. It has been suggested that this could result from closer emotional ties with parents and high demands for achievement from early on. Less substance use might have changed the composition of the group that choose to abstain from alcohol and tobacco, as well as how abstinence is perceived and practiced among youth. Based on cross-sectional survey data, lifestyle and social characteristics of 15-year-old non-users and users of tobacco and alcohol are compared to identify protective factors. **METHODS:** 3107 individuals from a school-based survey in made in 2011, of which 848 did not drink alcohol or use cigarettes or snus. Associations with leisure time activities, risk perceptions, parenting style, and social factors were analysed in logistics regressions. The occurrence of risk experiences and behaviour were analysed bivariously. **RESULTS:** The majority of non-tobacco users were also non-drinkers. Abstainers tended to have less unorganised and more hobby-related leisure, a higher tendency to regard snus use and smoking as risky, and to have more monitoring or emotionally supportive parents. They also reported lower occurrences of drinking and smoking among friends or siblings and less close relationships with their best friend. Abstinence was bivariously associated with lower occurrences of several problem experiences, e.g. problems with the police or having been robbed. **CONCLUSION:** The significance of less smoking and drinking in peers indicates an environmental effect for abstinence, and supports the idea that reduced adolescent substance use has made the choice to abstain less controversial. Emotional ties with parents may have played a part in the reductions seen in adolescent substance use in recent years. The demonstrated clustering of low-risk-behaviours might indicate that prevention of tobacco and alcohol use potentially may give gains also in other problem areas. Delayed or avoided initiation of tobacco and alcohol could thus potentially give large gains also beyond the immediate effect of lesser substance-related harm.

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POS4-56

E-CIGARETTES AWARENESS AND EVER USE AMONG ADULTS IN THE US

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INTRODUCTION: E-cigarettes became available for purchase in the United States in 2007¹. Since then, awareness and use of e-cigarettes have dramatically in-



creased, especially over the last few years. During 2010 to 2013, awareness of e-cigarettes among US adults rose from 40.9% to 79.7%. The percentage of adults who have used an e-cigarette at least once also increased from 3.3% to 8.5%.² The main goal of the present study is to explore the prevalence of e-cigarette awareness and ever use among US adults. A secondary goal is to explore whether awareness and ever use of e-cigarettes are associated with certain sociodemographic characteristics. METHODS: Data were obtained from the Health Information National Trends Survey-Food and Drug Administration (HINTS-FDA), a cross-sectional, nationally representative survey (N= 3,738) conducted in 2015. Descriptive analyses and chi-squared tests were performed to explore e-cigarette awareness and ever use, as well as its relationship with certain sociodemographic characteristics and smoking status. RESULTS: Overall, 81.5% of respondents reported awareness of e-cigarettes. Awareness was significantly higher among young adults aged 18 to 34 (91.9%), non-Hispanic Whites (88.2%), current smokers (86.2%) and those who graduated from college (88.7%). With regard to use, 16.9% of all respondents used e-cigarettes at least once. Significantly higher rates of use were found among current smokers (63.5%) compared to former smokers (14.6%) and non-smokers (3.5%). Among current smokers, ever use was significantly higher among young adults aged 18 to 34 (79%) and those who graduated from college (74.3%), whereas among former smokers and non-smokers ever use was associated with younger age (58% and 11.2% respectively within 18-34 year olds). DISCUSSION: This study provides evidence that awareness and especially ever use of e-cigarettes have increased over the last three years in the US. Moreover, increases in both awareness and ever use were particularly high in certain population subgroups. Given these fast changes in awareness and use and the unknown effect of e-cigarettes on health, frequent monitoring of these trends is needed.²

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POS4-57 SMOKELESS TOBACCO USE AMONG RURAL MALE HIGH SCHOOL BASEBALL ATHLETES IN CALIFORNIA

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Unlike cigarettes, US adolescents' use of smokeless tobacco (ST, moist snuff and chewing tobacco) is not declining. Males, rural-dwellers, and some sports participants are more likely to use ST. OBJECTIVES: (1) Describe ST and multi-tobacco product use patterns and associated characteristics among rural male adolescents; (2) Compare between-product differences in perceived harm by ST use frequency. METHODS: 594 high school baseball athletes at 36 rural schools in California (2014-2016) completed in-person electronic surveys at the baseline wave of an ongoing cohort study. Use of tobacco products (cigarettes, cigars, dissolvable tobacco, e-cigarettes, hookah, snus, ST) was categorized by reported days used per month (never, 0, 1-9, 10+, daily). Adjusted prevalence ratios (PR) relating past-month ST use to participant variables were obtained from generalized estimating equations (clustered by school). Perceived harm of each product (from not-at-all to extreme; scale: 0-100) was measured on separate visual analog items. RESULTS: Use of any tobacco (ever: 57%; past-month: 30%) mirrored national averages. Unlike nationally, ST was the most-used tobacco product (ever: 37%; past-month: 18%). ST was the tobacco product with the most daily use (25% of past-month users) and use ≥10 days monthly (48%). Of past-month ST users, 57% were past-month multi-product users, but few daily ST users were daily multi-product users. Adjusted for grade, race/ethnicity, and parental education, past-month ST use was positively associated with alcohol use (PR: 3.4), family member ST use (PR: 2.3), and greater perceived peer ST use (PR: 2.3). Mean perceived ST harm was lower in each increasing category of ST frequency (from 82 [never-users] to 35 [daily users]; $p < 0.001$). In each ST use category, perceived ST harm was less than perceived cigarette harm and exceeded perceived e-cigarette harm, but as ST use frequency increased, perceived harm differences between ST and cigarettes

widened (absolute difference: from 9 to 41) and between ST and e-cigarettes narrowed (from 19 to 0). CONCLUSIONS: In this population, ST use was common and strongly associated with adolescents' perceptions. The position of perceived ST harm relative to other traditional or alternative tobacco products appears to be a key behavior correlate.

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POS4-58 NICOTINE DEPENDENCE AND QUIT ATTEMPTS IN RELATION TO OTHER HEALTH RISK BEHAVIOURS AMONG ADULT SOUTH AFRICAN SMOKERS

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SIGNIFICANCE: Only limited nationally representative data is available on nicotine dependence and quitting behavior in the African region. Yet such information remains important in informing national strategy or guidelines for the treatment for tobacco dependence, as part of efforts to control non-communicable diseases. This study therefore investigated the socio-demographic and lifestyle behavioral factors associated with nicotine dependence and quitting behaviours among South African adult smokers. METHODS: Data obtained from those 16+ years (n=2,651) who participated in the 2011 South African Social attitude survey (SASAS) were analyzed to identify factors associated with nicotine dependence (measured using heaviness of smoking index - HSI), lifetime quit attempts and intention to quit smoking. SASAS also collected, among others, information on participants' assets ownership (used to compute asset index ranked to derive socioeconomic status [SES]), binge-drinking, physical activity and frequency of intake of fruits and vegetables. Data analysis took account of complex sampling used in SASAS and weighting was applied to account for survey response patterns. RESULTS: Smoking prevalence was 20.1% (n=573; 31.6% male & 9.5% female smokers), lowest among black Africans (16.3%) and highest among those who self-identified as 'coloured' (mixed ancestry) (37%). Only 13.5% (95%CI=10.2-17.7) of smokers were categorized as moderate to high dependence (HSI = 4-6) and 65.6% were considered to be very low dependence (HSI = 0-1). Of the smokers, 65.1% (95%CI=59.7 - 70.1) had made at least one or more quit attempts, but only 44.5% (95%CI=39.1-50.0) plan to quit. Quit attempt was more likely among those with health insurance (Odds Ratio [OR]= 2.37; 95%CI=1.08-5.21) and reporting frequent fruits & vegetables intake (OR=1.70; 1.01-2.86), less likely among those who frequently binge-drink (OR=0.34; 0.17-0.65), in the highest third SES (OR=0.34; 0.14-0.79) and have moderate to high nicotine dependence (OR=0.31; 0.17-0.57). The odds of being moderate to high nicotine dependent increased with every 10 years smoking history (OR=2.16; 1.41-3.30), but less likely among those who are frequently physically active (OR=0.33; 0.16-0.71). CONCLUSION: Majority of South African smokers may benefit from behavioural support while a moderate to high dependent minority may benefit from addition of pharmacotherapy with or without physical activity programme, especially if integrated with the promotion of healthy lifestyle or workplace wellness program.

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POS4-59 TRENDS IN SMOKING CHARACTERISTICS AMONG HOMELESS SMOKERS PARTICIPATING IN A SMOKING CESSATION RCT

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High self-efficacy to quit facilitates successful smoking cessation and smoking urges represent a barrier to quitting. Self-efficacy to quit and smoking urges are



dynamic with changes affecting quitting. This study examines changes in smoking characteristics (i.e., self-efficacy to refrain from smoking, confidence to quit, and smoking urges) over the course of a smoking cessation randomized controlled trial. Homeless smokers ($n=430$) completed surveys at baseline, and weeks 1, 2, 4, 6, 8, and 26 on demographics, smoking characteristics, and smoking status. A growth curve analysis was conducted by modeling change in smoking characteristics over time and examining the variability in change in smoking characteristics. We examined the relationship between change in smoking characteristics and smoking status at 26-weeks. Self-efficacy to refrain from smoking increased linearly over time with racial minorities experiencing greater increases. Confidence to quit increased until the midpoint of treatment but subsequently decreased. Blacks had higher confidence to quit than Whites. Smoking urges decreased until the midpoint of treatment but subsequently increased. Change in the smoking characteristics over time did not predict smoking status at 26-weeks. Individuals with higher self-efficacy to refrain from smoking at baseline were more likely to quit at 26-weeks. Higher levels of self-efficacy to refrain from smoking across all time points was observed among quitters at 26-weeks compared to smokers. Efforts should be made to increase self-efficacy to refrain from smoking among participants with low self-efficacy given its relationship with quitting. Determining strategies to sustain high confidence to quit and low smoking urges throughout treatment could be the key to promoting cessation among the homeless.

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POS4-60

SMOKING CESSATION CARE PROVISION IN AUSTRALIAN ALCOHOL AND OTHER DRUG TREATMENT SERVICES

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SIGNIFICANCE: Clinical practice guidelines recommend AOD services assess client's smoking status and offer smoking cessation care (SCC) to all smokers. The aim of this study was to examine staff report of recommended SCC practices: assessment and recording of smoking status; and the provision of 9 types of SCC (verbal advice to quit smoking; given written information about quitting smoking; offer of subsidized or free NRT; referral to telephone Quitline; referral to other stop smoking service; referral to a doctor; prescription of Champix or Zyban; participation in an on-site quit smoking group program; and follow-up to check on quit smoking progress). The study also assessed how the decision to provide SCC is made and the service and staff characteristics associated with the provision of SCC. **METHODS:** Between July-October 2014, treatment staff from 31 Australian AOD services participated in an online cross-sectional survey. In addition, a site contact at each service was interviewed to gather service related data. **RESULTS:** Overall, 362 staff with therapeutic client contact participated (response rate = 57%) and 62% estimated that client smoking status was recorded for the "majority or all" of their clients. About a third (33%) reported that they "always" provide verbal advice to their clients to quit smoking, 18% "always" offered free or subsidized NRT and 16% "always" followed-up to check on client quit progress. The majority (56%) reported that the decision to provide SCC was made on a client by client basis or only when the client requested assistance. Government-managed services, age and gender were significantly associated with the provision of SCC. **CONCLUSIONS:** AOD staff report that smoking status is recorded for the majority of their clients however, the frequency with which SCC practices are delivered is low and the decision to provide care is arbitrary.

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POS4-61

ASSESSING AND VALIDATING AN EDUCATIONAL RESOURCE PACKAGE FOR THE MANAGEMENT OF SMOKING CESSATION IN INDIGENOUS PREGNANT WOMEN

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SIGNIFICANCE: Australian Indigenous pregnant women have a high smoking prevalence (47%). Health providers (HP) report lack of adequate resources. Messages need to be tailored to ensure saliency, cultural-sensitivity and account for Indigenous population diversity. The ICAN QUIT in Pregnancy intervention aims to improve HP's management of smoking in Indigenous pregnant smokers. A resource package was developed collaboratively with two Aboriginal Community Controlled Health Services (ACCHS). We aimed to assess the scientific accuracy, cultural acceptability, perceived useability and readability of the resources. **METHODS:** A multi-centred community based participatory 4 step process (with 4 ACCHS from 3 states in Australia - NSW, SA, QLD), including: 1) Scientific review by a multi-disciplinary expert panel 2) 'Suitability of Materials' scoring by two Aboriginal Health Workers, Mean score and inter-rater agreement will be calculated. 3) Focus groups - two groups (HP's and community members) in each ACCHS, exploring views and opportunities for improvement of resources. 4) Readability scores - aiming for an average grade level of 5 for patient's resources and 10 for HP's resources. **RESULTS:** Major themes from the scientific panel and SAM evaluation included 'High attraction'; 'Simplifying resources'; 'Additional information (depression/e-cig/stress)'. Average readability score was grade 6 (patient resources, range 0.2-12.5), and 9.4 (HP's resources, range 4.7-31.4). Focus groups analysis will include pre-determined themes: Attraction, Comprehension, Self-Efficacy, Graphics, Cultural acceptability, and Persuasion. Resources will be adjusted accordingly. **CONCLUSIONS:** This process aims to ensure materials used for ICAN QUIT in Pregnancy are culturally sensitive and evidence-based. This novel formative evaluation protocol has never been done in Australia. If effective, it could be adapted for other Indigenous and culturally diverse interventions.

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POS4-62

HEALTH RISKS ASSOCIATED WITH THE USE OF SMOKELESS TOBACCO PRODUCTS: ANALYSES OF TWO NATIONALLY REPRESENTATIVE LINKED MORTALITY DATA SETS

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BACKGROUND: Available literature suggests US smokeless tobacco products (SLT) are less hazardous than cigarettes. We compare the health risks of SLT to cigarettes using mortality data linked to respondents from several years of two national public health surveys. We previously presented results of our analysis of the association between SLT use and the top ten causes of mortality based on a single public health survey mortality linkage; here, we extend these results by including 42 causes of mortality and analyzing an additional nationally representative mortality linkage. **METHODS:** We derived Cox proportional hazard ratios for mortality outcomes among SLT users and cigarette smokers based on data from the National Death Index (NDI) records of survey respondents to the National Health Interview Survey and the Tobacco Use Supplement to the Current Population Survey. These data sets each include over 3,000 current SLT users and over 150,000 total respondents with mortality follow-up through 2011. **RESULTS:** We did not detect excess mortality hazards among current SLT users compared to never SLT users in either data set for all causes, all cancers, lung cancer, digestive organ cancer (including colorectal, pancreatic and liver cancer), genitourinary system cancers, diseases of the circulatory system (including ischemic heart disease and cerebrovascular disease), or diseases of the respiratory system (including chronic lower respiratory diseases and influenza/pneumonia). We also include analyses of dual users and former cigarette smokers who currently use SLT and find no statistically significant differences in mortality hazards compared to exclusive cigarette smokers and completely abstinent former cigarette smokers respectively. **CONCLUSIONS:** These data support that SLT use is associated with far lower mortality hazards than cigarette smoking. This study, based on two large,

nationally representative US data sets with prospective mortality follow up, is one of the most comprehensive assessments of mortality hazards associated with SLT use. Overall, these analyses support current literature indicating SLT use is less hazardous compared to cigarette smoking.

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POS4-63

PATHWAYS AND PERCEPTIONS OF E-CIGARETTE USE AMONG YOUTH IN CALIFORNIA

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SIGNIFICANCE: Among the primary concerns regarding e-cigarettes is that they may serve as a gateway to smoking, and that their use may renormalize smoking among youth. This qualitative study, funded by the Tobacco-Related Disease Research Program, explored pathways of e-cigarette and tobacco use among youth and young adults (15 – 25 yrs) in the San Francisco Bay Area. **METHODS:** We conducted interviews with 50 young adults who reported ever use of e-cigarettes in order to explore e-cigarette initiation and dual use of tobacco and e-cigarettes. **FINDINGS:** Analysis of participants' narratives revealed overwhelming adoption of e-cigarettes as a tool for smoking reduction or cessation. Participants discussed stress as a barrier to successfully stop smoking, revealing a perception of e-cigarettes as a harm reduction strategy. This allowed some previous smokers to experience what they considered a palliative benefit of nicotine while minimizing perceived harms associated with smoking. Notably, however, many participants persisted in smoking at least occasionally and indicated they had not yet quit because vaping did not give them the same physical satisfaction as tobacco. Generally participants were concerned about the health implications of smoking and expressed a strong dislike of smoking and their own smoking habits, using terms such as "disgusting" to describe the habit. There was also a common desire to quit using e-cigarettes in the future or to use nicotine-free e-liquid only. **CONCLUSIONS:** These findings suggest that not all young adults follow an e-cigarette to cigarette trajectory, questioning concerns that e-cigarettes will renormalize smoking among youth and young adults. Implications for tobacco prevention and control will be discussed.

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POS4-64

DO SMOKERS WANT TO QUIT WITHOUT HELP? ATTITUDES TOWARDS ASSISTED AND UNASSISTED QUITTING IN AUSTRALIA

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SIGNIFICANCE: Smoking cessation pharmacotherapy is increasingly recommended as an effective way to quit smoking but many smokers are reluctant to seek cessation assistance. This study looked at use of, and attitudes towards, assisted quitting in Australian smokers. **METHODS:** An online survey with 1538 Australian adult smokers recruited from a market research panel in 2015 asked about: past use of cessation methods, intentions to use cessation aids, and attitudinal questions about assisted quitting. **RESULTS:** Half of all participants had used nicotine replacement therapy or a prescription medication on a past quit attempt and 67% of participants said that they would probably or definitely use a cessation pharmacotherapy in the future. Almost half (47.9%) agreed that quitting without medications ("cold turkey") was the best way to quit, although the majority acknowledged it was difficult to quit this way (79.5%). Most thought that willpower plays the biggest role in quitting success (86.1%), and that medications won't work without a strong desire to quit (75.2%). Younger adults, those with higher levels of nicotine dependence, and more educated participants were more likely to intend to use medications for their next cessation attempt. **CONCLUSIONS:** While the majority intended to use pharmacotherapy for smoking cessation, attitudinal ques-

tions revealed ambivalence and uncertainty around assisted quitting that may be a barrier to smokers seeking help from health professionals.

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POS4-65

CONSUMERS' COMPREHENSION AND PERCEPTIONS OF REDUCED RISK MESSAGING FOR A SMOKELESS TOBACCO PRODUCT

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A continuum of risk exists among tobacco products, whereby non-combusted products (e.g., smokeless tobacco) present less health risks than those that combust tobacco (e.g., cigarettes). Achieving tobacco harm reduction requires that relative risk information be effectively communicated to consumers, while also communicating appropriate cautions (e.g., nicotine is addictive). This study assessed comprehension and perceptions of relative risk messaging for a smokeless tobacco product (STP). A sample of 4,924 US adult tobacco users and non-users, drawn from an internet panel, viewed a mock advertisement stating that smokers who switch completely from cigarettes to the STP "can greatly reduce their risk of lung cancer, oral cancer, respiratory disease and heart disease." Respondents answered questions about the risks of the STP relative to smoking, absolute risks of the STP, and other information in the advertisement. Across the four diseases mentioned, <10% of respondents indicated the STP presented no risk at all; most (52-62% across diseases) indicated the STP presented less risk than smoking, but still some risk. Some respondents indicated the STP had the same risk as smoking; this varied by disease, even though the risk information did not indicate differences, by disease. 37% (95% CI: 35.3-38.7%) of respondents indicated the risk of oral cancer was the same for the STP as for smoking, compared to only 20% (18.5-21.5%) for lung cancer, suggesting that responses were shaped by intuitions and pre-existing beliefs as well as the messaging content. High proportions of respondents indicated the STP is addictive (82%; 80.6-83.4%), quitting tobacco use is the best choice (87%; 85.7-88.3%), and non-users of tobacco should not use the STP (83%; 81.6-84.4%) – statements included in the advertisement. Only 4% (3.9-4.7%) believed smokers would receive a health benefit if they continued to smoke while using the STP. The findings suggest that appropriate messages about the relative risks of tobacco products can be communicated to consumers, while also illustrating the pre-existing intuitions and misperceptions that public health must overcome.

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POS4-66

IS THE THEORY OF DIFFUSION OF INNOVATIONS A USEFUL THEORETICAL FRAMEWORK FOR EXPLAINING LONG-TERM CHANGES IN SMOKING?

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SIGNIFICANCE: The theory of diffusion of innovations is the most commonly used theoretical framework for explaining the temporal, spatial and social distribution of smoking in most developed countries across the 20th Century. However, although the theory seems to predict correctly the exponential rise of smoking in the first half of the 20th Century, it is less adept at explaining the gradual decline in the following decades. **METHODS/ARGUMENTS:** The theory postulates that consumer goods often spread between social groups in a predictable pattern beginning with innovators, then early adopters, early majority, late majority and laggards. Group membership correlates with a series of individual traits and socio-economic position. However, while the theory seems to explain adequately the rise in cigarette smoking in most developed countries, it cannot explain the decline in smoking, without making some additional specifications. First, over the last decades, smoking has not diffused. If the theory has any relevance, it must help explain what actually has diffused and how (habits, fashion, information or risk perceptions) and how these are linked with smoking (disenchantment or replacement). Sec-



and, the distribution of the decline has not been exponential. If the theory holds, it should be shown how different processes of replacement or disenchantment have affected smoking at different points in time. For example, dissemination of new information on the health consequences in the 1960s led to a disenchantment of smoking while the increased emphasis on a healthy lifestyle in the 2000s led to a replacement of positive feelings on smoking with "anti-smoking" sentiments. Both of these processes may have diffused through the social structure in an exponential manner. CONCLUSION: Without further theoretical specification, the theory of diffusion of innovations cannot adequately explain the decline in smoking in the latter half of the 20th Century. A more critical use of the theory would help explaining the sequential decline in smoking within and across societies, but also the rise and fall of other nicotine or tobacco products.

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POS4-67

EVALUATION OF ROMANIAN GENERAL PRACTITIONER'S PRACTICES TOWARDS SECONDHAND SMOKING AMONG PREGNANCY

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SIGNIFICANCE: Tobacco use and secondhand smoke (SHS) exposure during pregnancy is a global health problem, including in Romania. The aim of this study was to evaluate the perceived risk of SHS to Romanian pregnant women and their offsprings, from the General Practitioner's point of view. METHODS: A sample of 69 General Practitioners (GP) were recruited from Mures county in 2015, using a convenience sampling and a validated questionnaire. The questions included an estimate of the frequency of SHS exposure among their pregnant patients, locations of exposure, the GP's knowledge and attitudes towards SHS, and methods used for assisting women to reduce SHS and enforce household smoking bans during pregnancy. RESULTS: The GP sample included 85.5% women, 62.3% from urban areas, 72.5% with more than 20 years of experience, with an average of 200 patients weekly from which 5 were pregnant women. More than half of GP's said they have pregnant women exposed to SHS at home (30.3%), in the car (14%) or at work (13%); 29% reported that they ask about SHS at every patient visit, while 31.9% indicated that they ask sometimes; 42% have discussed the risks of SHS everytime they consult the pregnant women, but mostly with the smokers and patients who showed motivation for cessation. Only 36.2% of GP's recommended rules for banning smoking at home, in the car or at work. 88.5% cited lack of time as a major barrier to counseling; they reported having 3 minutes (for 1/3rd of them) to 10 minutes (14.5%, especially young specialist and residents) for it. They also reported that there are few cessation programs and 74.8% do not have enough information about the methods to help their patients reducing SHS exposure or quit smoking. 72.5% agreed that medication for cessation works only with counseling. CONCLUSION: Understanding the risk factors associated with exposure to SHS during pregnancy may help in developing community strategies to reduce such exposure, also motivation and training of healthcare providers regarding providing efficient cessation intervention.

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POS4-68

MARITAL STATUS AND PARENT INFLUENCE ON YOUTH TOBACCO USE IN VULNERABLE POPULATIONS

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SIGNIFICANCE: Prior research has documented the influence of family tobacco use behaviors on youth. Bricker et al. (2003) observed a higher rate of smoking among children whose parents smoke (31.8% vs. 18.6%). Single parents are more likely to smoke than parents living in two-parent households (29.0% vs. 14.8%) (National Health Interview Survey, 2013). These findings are relevant to the 26.8% of children who live with a single parent (U.S. Census, 2015). We explored the relationship between family structure and parental tobacco use on tobacco use by children. METHODS: We conducted 103 focus groups, wherein qualitative and quantitative data were collected from 664 participants in four race/ethnicity subgroups: 180 Hispanics/Latinos (Chicago, Bronx, Miami, San Diego); 212 African Americans and 78 Whites (Jackson, MS), and 200 Appalachian youth (rural Kentucky, North Carolina, New York). All audiences skewed lower SES. RESULTS: Divorced individuals have higher rates of past, present, and future tobacco usage when compared with single and married/partnered individuals. The relationship between smoking and marital status was observed for past usage (divorced vs. single/never married $p = .006$; divorced vs. married/partnered $p = .003$) and future intent (divorced vs. single/never married $p = .033$). Nearly half (45.45%) of female divorced single parents are smokers. Among Appalachian youth, living in two-parent households is marginally associated with lower current cigarette usage than single-parent households ($p = .052$). Similarly, current cigarette usage among youth is higher in single-parent households than in "other" household arrangements, including non-parental relatives, friends, or alone ($p < .001$). CONCLUSIONS: These findings highlight the need to develop communications and program strategies to reach at-risk families. Additional analyses will be presenting exploring other characteristics across these groups that may play a role in these differences.

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POS4-69

PREDICTORS OF SELF-REPORTED EXPOSURE TO SECONDHAND SMOKE AMONG RESIDENTS IN MULTI-UNIT, AFFORDABLE HOUSING

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BACKGROUND: In low income communities, which have high smoking rates combined with a high proportion of multi-unit dwellings, exposure to secondhand smoke (SHS) poses a chronic health burden. A proposed rule to ban indoor smoking by the U.S. Department of Housing & Urban Development (HUD) may provide protection from SHS exposure for up to 2 million public housing residents. To tailor future smoke-free housing implementation and communication strategies, this study assessed factors associated with residents' self-reported exposure to SHS, pre- and post-adoption of a smoke-free policy in a multi-unit, affordable housing setting. METHODS: Adult residents ($n=70$ smokers; $n=168$ non-smokers) of 12 affordable housing developments in 4 eastern US states were surveyed immediately prior to, and 6 months after the adoption of a smoking ban. Change in self-reported



exposure to SHS from baseline to follow-up was assessed using t-tests. Regression analyses assessed odds of self-reported exposure to SHS in the home at baseline. RESULTS: The proportion of residents who reported seeing or smelling SHS in the past month decreased 6 months after the ban, from 57% at baseline to 40% at follow-up ($p=.0002$). For nonsmokers, 66% reported SHS exposure in the past month, compared to 40% 6 months post ban ($p<.0001$). Among smokers, 34% reported exposure to SHS before the ban, compared with 38% at follow up ($p=.65$). Self-reported exposure to SHS was more likely to be reported by younger residents (linear age OR= 0.97; $p=.05$) and non-smokers (smoker OR= 0.28; $p<.001$), after controlling for gender, race/ethnicity, number of children in the home, education level, and employment status. CONCLUSIONS: These data support the benefit of smoking bans in multi-unit, low income settings, including the rule proposed by HUD. However, while there was a substantial decrease in self-reported exposure to SHS among non-smokers, this effect was not seen among smokers. These data suggest a need for more effective strategies to educate residents, especially smokers and younger residents, about SHS. Policy implementation strategies should also address other benefits of smoke-free housing policies, including the potential for promoting smoking cessation.

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POS4-70

VAPE SHOP LOCATION: NEIGHBORHOOD SOCIO-DEMOGRAPHIC CHARACTERISTICS AND PROXIMITY TO SCHOOLS

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OBJECTIVE: The rising prevalence of e-cigarette use in the US, especially among adolescents, has been accompanied by a surge in the number of vape shops. Unlike tobacco stores, little research has focused on the geographic locations of these vape shops in terms of factors like socio-demographic characteristics and their proximity to schools. Our study seeks to address this gap. METHODS: Names and addresses of vape shops, stores that primarily sell vaping products, in a Midwestern metro city area were obtained using online search. Seventy-four vape shops were confirmed to be operational via personal visits and telephone calls. ArcGIS, a geographic information system, was used to identify census tracts and to map vape shop proximity to middle, junior, and high schools within a 1 mile radius. The 2014 American Community Survey 5-year estimates were used to describe socio-demographic characteristics of census tracts containing the 74 vape shops. RESULTS: More than two-thirds (68%) of vape shops were located within a 1 mile radius of a school. Population of census tracts had a median age of 35.74 years, were predominantly Non-Hispanic White (69%), had higher proportion of 'some college degree or more' educational attainment (42%) than 'less than high school' (24.32%), more likely to be employed (50.62%) than unemployed or not in labor force (28.88%). There were also more households with annual income of \$25,000 to \$100,000 (65%) than those making less than \$25,000 in the vape shop neighborhoods. CONCLUSION: Vape shops seem to be located in census tracts with high SES, old and White population, and in close proximity to schools. It is important to investigate the reasons behind vape shop location preferences, both from a research and policy point-of-view in order to understand whether vape shops are targeting a different population than the tobacco industry or is it simply a business decision.

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POS4-71

BUILDING CAPACITY TO ADDRESS SMOKING AMONG BEHAVIORAL HEALTH CONSUMERS: RESULTS FROM A COMPREHENSIVE TOBACCO-FREE WORKPLACE PROGRAM IMPLEMENTED IN BEHAVIORAL HEALTH CLINICS ACROSS TEXAS, USA

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Tobacco use is the leading cause of death and disability in the United States and cigarette smoking is the most common form of tobacco use. Smoking has become increasingly concentrated among individuals with behavioral health needs (e.g., persistent mental illness) and has led to increased morbidity and mortality in this group relative to the general population. Comprehensive tobacco-free workplace programs are effective in reducing smoking and cigarette smoke exposure among behavioral health consumers. Taking Texas Tobacco-Free (TTTF) was an academic-community partnership formed to address smoking among consumers at behavioral health clinics across Texas via the dissemination and implementation of an evidence-based, multi-component tobacco-free workplace program that included policy implementation and provider training to regularly screen for and address nicotine dependence. From 2013 to 2016, over 200 behavioral health clinics in Texas adopted tobacco-free workplace policies (includes e-cigarettes; covers all buildings and grounds). Providers (N=1079 at time 1; N=993 at time 2) reported significant increases from pre- to post-implementation in training on assessing consumers for tobacco use (8.7% to 62%; OR=18.9, $p<.01$) and how to use medications in assisting quitting (6.9% to 56.1%; OR=17.5, $p<.01$). Over 85,000 consumers were asked about tobacco use status during the project; results indicated significant increases from pre- to post-implementation in providers asking about consumers' smoking status (48.1% to 61.0%; OR=1.75, $p<.01$); advising consumers to quit smoking (58.2% to 73.9%; OR=2.04, $p<.01$); assessing consumers' willingness to quit smoking (56.0% to 74.1%; OR=2.35, $p<.01$); assisting consumers to quit smoking (30.6% to 61.1%; OR=3.75, $p<.01$); and arranging follow up to assess consumers' progress (25.6% to 44.7%; OR=2.38, $p<.01$). TTTF significantly increased providers' administration of the 5 A's, an effective public health approach for addressing tobacco use. The dissemination and implementation of TTTF in other locales has the potential to significantly reduce smoking-related health disparities among individuals with behavioral health needs.

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POS4-72

THE CO-OCCURRENCE OF TOBACCO AND SUBSTANCE USE.

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AIM: The aim of this study is to explore pattern of tobacco use and other substance use among Norwegian males and females using Latent Class Analysis. STUDY DESIGN: Annually representative cross-sectional substance use survey of 1 780 females and 1 768 males 25-60 years. Pooled data file for the years 2013, 2014 and 2015. METHODS: Latent Class Analysis (LCA) was used to identify sub-groups of tobacco use (current cigarette smoking and snus use) and substance use (alcohol daily/weekly, ever use of cannabis, benzodiazepines and pain relievers (use last 12 months)). RESULTS: LCA produced three profiles for females; a low risk group (40%), a mixed risk group (36%) and a cannabis group (24%). In the cannabis group, the probability for endorsing cannabis was 60%, smoking 45% and alcohol 30%. In the mixed risk group, the probability of smoking, alcohol and pain relievers were 30% for each substance. For men, the LCA produced three profiles; low risk group (37%), an alcohol group (37%) and a cannabis mixed risk group (24%). The latter group had high probability of cannabis (85%), but also smoking, snus and alcohol (50%). The alcohol group had a 55% probability of endorsing the item alcohol, but low risk on the other substances. The low risk group had highest probability of endorsing the item snus (20%). DISCUSSION: Different substance risk profiles were identified for males and females. Among males, tobacco use (smoking and snus) were linked to only one of the two identi-



fied risk profiles (cannabis mixed risk group). For females, tobacco use was mainly smoking, and was found in both risk groups. The co-occurrence between smoking and prescription drugs among females needs further investigation.

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POS4-73

ELECTRONIC CIGARETTES AND HOOKAH SMOKING: HEALTH RISKS FOR NEW POPULATIONS OR ADJUNCT EXPOSURE FOR THOSE ALREADY SMOKING TOBACCO CIGARETTES?

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SIGNIFICANCE: The emergence of electronic cigarettes (e-cigs) and the growing popularity of hookah smoking in the U.S. has led to concerns about their dangers, and whether these nicotine delivery systems may be gateways to regular tobacco cigarette use, or leading to nicotine and/or tobacco use among those not already exposed. Recent national research suggests that e-cigs may not promote initiation of tobacco cigarette use. However, it is unknown whether this is true in populations with high rates of tobacco cigarette smoking, and whether this also applies to hookah smoking. **METHODS:** Patients presenting for a primary care visit at 1 of 3 family medicine practices in rural southern Appalachia were invited to complete a survey. **RESULTS:** 34% of participants reported current smoking, 24% reported former smoking. While 31% ever used e-cigs (compared with 12.6% nationally), only 3.9% reported current use (3.7% nationally). Among never-smokers, rates of ever using (7.1%) or current use of e-cigs (<1%, compared with <1% nationally) were low, and 98% of current tobacco cigarette users who also smoked e-cigs had been smoking tobacco cigarettes for more than 8 years. While 3.3% (20% <age 26) reported ever having smoked hookah (national rates 20%+ among young adults), the vast majority of those who did reported never having smoked tobacco cigarettes (hookah use 5.3% for never smokers, 1.9% for current/former smokers, $p < .05$). **CONCLUSIONS:** While experimentation with e-cigs is high in this rural population, regular e-cig use, and any hookah use, are on par with national averages. Additionally, e-cig use does not appear to lead to tobacco cigarette smoking in this population, or confer a health risk among those not already smoking tobacco cigarettes. However, most of those smoking hookah have never smoked tobacco cigarettes, suggesting that this health behavior poses risk among those not otherwise impacted by tobacco. Findings suggest that primary care interventions targeting e-cigs could target those already smoking tobacco cigarettes, however, hookah smoking may be occurring and need to be addressed as a significant health risk among those not already identified as smokers.

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POS4-74

SMOKING AND QUITTING CORRELATES – A 6 MONTHS FOLLOW UP OF CURRENT AND FORMER SMOKERS

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SIGNIFICANCE: The objectives were to examine demographic and smoking related factors associated with 1) successful and unsuccessful quit attempts and with 2) maintenance of non-smoking and smoking relapse after quitting among former smokers. Such knowledge is vital in developing effective smoking cessation strategies. **METHODS:** The sample consists of 798 subjects recruited via a smoking quit line and a tobacco web page between 2013 (T1) and 2015 in Norway who responded to a follow-up survey 6 months later (T2, response rate 58 %). We collected information about demographics (age, gender, education and marital status) and smoking related factors (smoking intensity, cigarette dependence, smoking attitudes, rules, risk perception, quitting behaviour and methods, and snus use) using electronic questionnaires. Four smoking groups were defined; those who quit smoking between T1 and T2 ("Quitters", $n=112$), those who continued to smoke from T1 to T2 ("Smokers", $n=103$), those who were ex-smokers at both T1 and T2 ("Abstainers", $n=477$) and those who were ex-smokers at T1 and smokers at T2 ("Relapsers", $n=37$). "Relapsers" were compared to "Abstainers" and "Smokers" to "Quitters" using Chi square tests and analyses of variance. **RESULTS:** "Relapsers"

differed from "Abstainers" by higher nicotinic e-cigarette risk perception (3.2 vs. 2.3, $p < .001$), fewer using e-cigarettes as quitting method (19% vs. 60%, $p < .001$) and more using snus at T1 (32% vs. 12%, $p < .01$) and at T2 (30% vs 9%, $p < .01$). "Smokers" differed from "Quitters" by more often living together with other smokers (35% vs. 27%, $p < .05$) and more "Smokers" using snus at T2 (27% vs. 13%, $p < .05$). In addition, "Quitters" had higher cigarette risk perception than "Smokers" (4.9 vs. 4.8, $p < .05$). **CONCLUSION:** Maintenance of non-smoking seemed to be associated with e-cigarettes perceived as a low risk product and used as a quitting method, while snus use was associated with relapse and unsuccessful quitting. In addition, living with smokers and having a lower risk perception of cigarettes was associated with continued smoking. These findings should be taken into consideration when developing smoking cessation strategies.

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POS4-75

PREVALENCE OF SMOKING REGULAR CIGARETTES AND USE ELECTRONIC CIGARETTES (E-CIGARETTES) AMONG ADOLESCENTS IN POLAND, 2013-2016

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SIGNIFICANCE: Electronic cigarettes ("e-cigarettes") are battery-powered devices that provide inhaled doses of nicotine by delivering a vaporized liquid nicotine solution to the user, usually including propylene glycol or glycerin. Despite the potential negative health effects of e-cigarettes, these devices are increasing in popularity worldwide, especially among youth. **AIM:** To assess the prevalence of smoking regular cigarettes and e-cigarette use among adolescents in Poland in 2013-2016. **METHODS:** We compared data from two nationally representative, cross-sectional, school-based studies conducted in Poland among students in 2013-2014 and 2015-2016. We tested differences in the prevalence of e-cigarette use and tobacco cigarette smoking between samples using multilevel mixed model regression. **RESULTS:** The prevalence of smoking tobacco cigarettes was slightly lower in 2015-2016 compared to 2013-2014 (38% vs. 36.5%). At the same time, use of e-cigarettes increased among students, with 29.9% reporting use in 2013-2014, and 33.7% reporting use in 2015-2016. **CONCLUSIONS:** These results indicate changes in tobacco use among young people in Poland, particularly the growing trend of using novel e-cigarette products. Such findings may be considered in informing future regulatory efforts concerning legal e-cigarette use.

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POS4-76

MEASURING YOUNG ADULTS' EXPOSURE TO TOBACCO NORM CONFLICT ON SOCIAL MEDIA

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INTRODUCTION: Exposure to pro- and anti-tobacco images and messages on social media may influence young adults' perceptions of conflicting norms of tobacco use, which could have downstream effects on tobacco-related attitudes, tobacco use susceptibility, and behaviors. To our knowledge, there is currently no existing measure of young adults' exposure to conflicting tobacco norms in their routine use of social media. The objective in this research study is to develop survey measures of exposure to tobacco norm conflict in social media. **METHODS:** We conducted a systematic literature review of norms conflict in several domains. Next, we pretested survey measures among young adults aged 18-25 years ($n=18$). We then conducted an online survey among 616 young adults aged 18-25 years (mean=22 years) and examined the associations of two versions of norms



conflict measures on social media (direct and indirect) with nomological criterion variables (exposure to contradictory information about smoking and social media usage). We further assessed respondent burden in completing these measures by coding participants' open-ended comments. RESULTS: Both direct and indirect measures of norms conflict demonstrated sufficient variability. Direct measures were associated with increased contradictory information exposure about smoking and other tobacco products and with social media usage. Indirect measures were weakly associated with contradictory information exposure about other tobacco products and were not correlated with social media usage. However, participants indicated some difficulty in answering the direct measures. CONCLUSIONS: We developed survey measures of exposure to tobacco norms conflict on social media. Young adults reported encountering tobacco norms conflict during their routine use of social media. Although direct measures of norms conflict performed better than indirect measures in terms of being associated with nomological criterion variables, the direct measures pose some response burden for participants. Further research is needed to refine measures of norms conflict exposure and determine the predictive validity of these measures on behaviors.

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POS4-77

SYSTEMS CHANGES FOR TOBACCO CESSATION IN CHIROPRACTIC CLINICS: A SURVEY OF POPULATION AND PROVIDER CHARACTERISTICS IN NORTH DAKOTA, USA

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SIGNIFICANCE: The U.S. Public Health Service and the CDC recommend changing health systems to increase the effectiveness of health care practitioners' interactions with patients who use tobacco. Chiropractors have not been systematically included in implementation of these recommendations. METHODS: Two surveys assessed chiropractors in North Dakota to inform a feasibility study of implementation of Ask, Advise, Refer (AAR) into their practices. The purpose of the first survey, *Population Survey*, was to understand their practices, structure, demographics, and to assess their interest in participating in a study related to health system changes. The second survey, *Provider Characteristics*, was to assess types and quantity of tobacco their patients use. All licensed chiropractors currently practicing in eastern North Dakota (N=175) were mailed the *Population Survey* with a postcard mailed 26 days later as a reminder. A second survey was mailed to those chiropractors who expressed an interest in participating in a study (n=16) with follow-up reminder telephone calls. This survey consisted of six multiple-choice questions. RESULTS: A total of 59 practicing chiropractors completed the *Population Survey*. The majority indicated they practice using a mixed philosophy (72.9%), do not personally use tobacco products (91.5%), and currently screen for tobacco use in their patients (66.1%). The reported number of patients seen in a typical month range from 10 patients to 1300 patients with a median of 200 patients. A total of 18 (30.5%) chiropractors indicated they were interested in participating in the study. Among the 16 chiropractors who completed the *Provider Characteristics* survey, 13 (81.3%) indicated that, among the patients they see for a new episode of care in a typical month, between 1 and 20 patients use tobacco, most commonly cigarettes or smokeless tobacco. Over half (56.3%) of the chiropractors indicated that they do not see any patients who use E-cigarettes or are unsure of E-cigarette use among their patients. CONCLUSIONS: Two-thirds of chiropractors already screen for tobacco use and many are interested in helping patients quit. Chiropractors should be formally trained on USPHS guidelines.

FUNDING: North Dakota Center for Tobacco Prevention and Control Policy

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POS4-78

ASSOCIATION BETWEEN CIGARETTE SMOKING AND PHYSICAL HEALTH DISPARITIES IN A SOUTHEASTERN UNITED STATES LGBT POPULATION

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SIGNIFICANCE: The LGBT population has higher rates of smoking compared to their cisgender, heterosexual counterparts in the United States (US). This health behavior is linked to health problems such as lung cancer, asthma, and cardiovascular diseases, adding to the significant health disparities experienced by this population. The purpose of this study was to investigate the relationship between LGBT cigarette use and related physical health concerns in a low-resource community in the Southeastern US. METHODS: Survey data was collected from February to June 2016 as part of a larger health needs assessment. Participants (N = 436) were asked about current and past medical conditions, health provider interactions, use of medical services, and current and past tobacco use and behaviors. RESULTS: Among respondents 62.7% were Caucasian, 63.3% identified as gay or lesbian, and the average age was 34.8 ± 13.49. Current smokers reported more days of poor physical health (r = 0.26, p < 0.01) and subjective overall poorer health (r = -0.24, p < 0.01) than nonsmokers. Heavy daily smokers were associated with being diagnosed and/or treated for heart disease (r = -0.36, p < 0.01) and hypertension (r = -0.34, p < 0.01). They also used emergency rooms (r = 0.29, p < 0.01) and urgent care (r = 0.25, p < 0.01) venues more often than those smoking less. More frequent cigarette smoking also correlated with a higher level of agreement of feeling blamed by their health providers for their health conditions and diagnoses (r = -0.15, p = 0.02). CONCLUSIONS: Findings demonstrate that LGBT individuals who smoke more tend to not only have poorer subjective experiences of physical health but also tend to report diagnoses and treatment of related health conditions more frequently than those who smoke less. Poorer health outcomes and frequent utilization of emergent care services may be further exacerbated in this population by negative experiences with health care providers. To reduce tobacco related disease burden and high-cost care, LGBT-specific smoking cessation resources for patients and providers could improve preventative and treatment services and thus overall LGBT physical health.

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POS4-79

AUSTRALIAN GP AND OBSTETRICIAN MANAGEMENT OF SMOKING IN PREGNANT WOMEN - WHERE DO WE NEED TO INTERVENE?

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SIGNIFICANCE: Several approaches to the management of smoking in pregnancy exist, including the 5As (Ask, Advise, Assess, Assist, Arrange); and AAR (Ask, Advise, Refer). There is lack of data on current practices of Australian physicians, which would help guide the development of interventions for improving smoking cessation care (SCC) in pregnancy. METHODS: A national cross sectional survey including questions about provision of SCC; Nicotine Replacement Therapy (NRT) prescription; and barriers using the Theoretical Domains Framework (TDF). Two sampling methods were included: 1) Paper survey sent to 5571 General Practitioners (GPs) and Obstetricians from the Royal Australian and New Zealand College of Obstetricians and Gynaecologists database. 2) Online survey sent to a random sample of 500 Members of the Royal Australian College of GP's National Faculty of Aboriginal and Torres Strait Islander Health (NFATSIH). Dimension reduction for the TDF was achieved with factor analysis. Clinically relevant variables were entered into a logistic regression. RESULTS: A total of 378 responded. Performing all the 5As often or always was reported by 19.9%; and 49.1% for AAR. NRT Prescription often or always was reported by 31%. TDF was reduced to two factors: Factor 1 (Internal) comprised confidence in counselling and prescribing NRT, optimism, time and resources, workplace routine; Factor 2 (external) comprised high priority, comfortable raising issue, benefit relationship. Logistic regression showed that physician group (NFATSIH GPs performing better than GPs with



Obstetric training OR 6.5 95%CI 2.6-16, and better than Obstetricians OR 6.7, 95%CI 2.6-17), reading any guideline (OR 2.1, 95%CI 1.1-4), and higher average Factor 1 scores (OR 3.6 95%CI 1.9-6.6) were associated with 'Performing all the 5As. CONCLUSIONS: Performance of SCC is low. Interventions should focus on improving provision of specific lacking components, such as NRT prescription, and incorporate strategies to change attitudes such as lack of optimism. The AAR approach may be easier to implement, and therefore it should be a priority to ensure easy, effective and acceptable referral mechanisms are in place.

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POS4-80

PREDICTORS OF SMOKING CESSATION SERVICE USE AND ITS EFFECT ON QUITTING AMONG SMOKERS IN 2015 "QUIT TO WIN" CONTEST IN HONG KONG

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SIGNIFICANCE: We investigated active referral of smokers to smoking cessation (SC) services, predictors of successful SC service use and the effects on quitting in participants of 2015 COSH "Quit to Win" Contest in Hong Kong. METHODS: In a cluster randomised controlled trial on brief advice and active referral on quitting (N=1226), 402 smokers (78.9% male, mean age 40.8±14.9 years) were randomly assigned to receive on site brief advice using AWARD (Ask, Warn about 1 out of 2 smokers will be killed by smoking, Advice, Refer and Do-it-again) model, a health warning leaflet, an SC services information card and an active referral for a quick SC appointment by transferring their contacts to their chosen service providers. Referral would be arranged again for smokers who could not receive call from service providers in the follow-ups. Logistic regression was used to analyse the factors and quitting associated with SC service use. RESULTS: 85.3% participants had chosen an SC service provider and 0.2% (n=1) refused referral. Among those who had chosen a service provider (n=343), 72.9% (n=250; 80.0% male, mean age 42.4 ±14.2 years) were successfully contacted by the service providers. Among them, 39.6% used the SC services. In the users (n=99), 22.2% received SC counselling only while 43.4% had varenicline, 41.4% had nicotine replacement therapy and 26.2% had acupuncture (some had more than one of the three). Busy schedule (61.6%) and time mismatch (49.7%) were the most common reasons for not using SC services. Participants aged 26-35 (odds ratio(OR)=0.02(95%CI 0.08-0.48)), perceiving smoking as important (per unit OR increase=1.21(1.01-1.44)) and receiving the first call from service providers within 1 month after baseline were strongly associated with service use (OR=13.12(2.91-59.1)). At 6-month, the overall self-reported and biochemically validated quit rate was 21.6% and 11.2% respectively. Use of SC services was associated with quitting (OR=2.30(1.25-4.24)) and biochemically validated quitting (OR=5.54(2.26-13.61)). CONCLUSION: Early proactive contact and referring smokers to SC service providers was associated with more SC service use, which significantly increased quit rate.

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POS4-81

ACTUAL USE STUDY OF THE CANDIDATE MODIFIED RISK TOBACCO PRODUCT (MRTP); TOBACCO HEATING SYSTEM (THS)

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The purpose of this study was to investigate how US adult daily smokers actually used the *HeatSticks* in near to real-world conditions. This study was a single group, prospective observational study, implying an assessment of subject-reported stick-by-stick consumption of *HeatSticks* and of conventional cigarettes (CC). Participants received *HeatSticks* free of charge and were able to consume *HeatSticks*, CC and other nicotine containing products *ad libitum*. The study consisted of a 1-week baseline period, a subsequent 6-week observational period, and a 1-week close-out period. To ensure a good representation in terms of age, sex, race and income, 1,336 US adult daily smokers were recruited and enrolled in 8 different cities spread across the US.

The results of this actual use study indicate that:

1. 33.8% of the participants "started using" *HeatSticks* (i.e. ≥ 100 *HeatSticks* used) during the observational period, meaning that they were using the product on a continuous basis.
2. 32.7% of them "switched" (i.e. ≥ 70% of tobacco products (*HeatSticks* and CC) used were *HeatSticks*) from CC to *HeatSticks* showing that a sizeable proportion of participants adopted a usage behavior involving either exclusive or predominant use of *HeatSticks*.
3. 34.6% of the participants who "started using" *HeatSticks* had a "combined use" of CC and *HeatSticks* (i.e. >30% and <70% of products used were *HeatSticks*). While the proportion of "combined use" decreased over time, the proportion of "CC use" (32.7%) (i.e. ≤30% of products used were *HeatSticks*) increased, indicating that a substantial proportion of participants with "combined use" returned to CC.
4. 15.5% of the participants, who "started using *HeatSticks* and switched" to *HeatSticks*, "switched back" to CC.
5. There was no increase in the use of tobacco products between the baseline and the observational period.
6. The levels of misuse of THS were overall low suggesting that participants used the product as intended or designed.

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POS4-82

DIFFERENTIAL EFFECTS OF PICTORIAL HEALTH WARNINGS FOR CIGARETTE PACKS IN INDONESIA: ASSESSING MODERATION BY SMOKER IDENTITY, SELF-EFFICACY, AND REACTANCE

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SIGNIFICANCE: Research is needed on which characteristics of pictorial health warning labels (HWLs) are most effective across key subgroups of smokers. METHODS: This experimental study employed both between-subject (textual type=didactic vs testimonial) and within-subject HWL manipulations (imagery type=no image; graphic image; suffering image; symbolic image), among Indonesian adult smokers (n=584), and 15- to 18-year-old adolescent smokers (n=280) and nonsmokers (n=313). Outcomes included ratings of HWLs for: fear arousal, credibility, and perceived effectiveness. Potential moderators included: smoker identity and self-efficacy to quit among smokers; and reactance to HWL stimuli. Main and interactive effects of HWL manipulations and participant characteristics on outcomes were estimated using linear mixed effects models. RESULTS: Smoker identity was associated only with perceived effectiveness ($\beta=-0.18$, $p=0.006$), with no statistically significant interactions found. Self-efficacy was positively associated with fear arousal ($\beta=0.13$, $p=0.018$), credibility ($\beta=0.18$, $p=0.002$) and



perceived effectiveness ($\beta=0.26, p<0.001$). Self-efficacy was significantly interacted with image type when assessing fear arousal ($\beta=-0.03, p=0.048$), such that differences in fear arousal across HWL image types were greater for smokers with lower self-efficacy than those with higher self-efficacy. Reactance was positively associated with fear arousal ($\beta=0.20, p<0.001$), credibility ($\beta=0.17, p<0.001$) and perceived effectiveness ($\beta=0.29, p<0.001$). Significant interactions between reactance and image type were found when assessing fear arousal ($\beta=-0.07, p<0.001$) and perceived effectiveness ($\beta=-0.02, p=0.021$), with greater differences between HWL image types among those with lower reactance than with higher reactance; however, ordering of HWL image styles with the strongest ratings was the same. CONCLUSION: To influence smokers with relatively stronger smoker identity and reactance, HWLs with suffering imagery and graphic depictions of disease appear the most effective. Messages that enhance self-efficacy to quit may further enhance the effectiveness of these pictorial HWL types.

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POS4-83

HOW PEOPLE THINK ABOUT THE CHEMICALS IN CIGARETTE SMOKE: A SYSTEMATIC REVIEW

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SIGNIFICANCE: Laws require the US and other countries to inform the public about harmful chemicals (constituents) in tobacco and tobacco smoke. To encourage behavioral scientists to address this challenge, we provide a brief overview of cigarette smoke toxicology and summarize research on cigarette smoke constituents and how the public thinks about them. METHODS: We systematically searched PubMed in July 2016 and also reviewed citations from included articles. RESULTS: Four central findings emerged across 35 articles that met inclusion criteria. First, people were familiar with very few constituents in cigarette smoke. Second, people knew little about cigarette additives, assumed harmful chemicals are added during manufacturing, and perceived cigarettes without additives to be less harmful. Third, people wanted more information about constituents. Finally, well-presented constituent information increased knowledge and awareness and may change behavior. CONCLUSIONS: Our review of the literature shows a field that time forgot, a place in urgent need of what behavioral scientists have to offer. Future research should investigate the impact that educating the public about constituents has on risk perceptions, starting smoking and quitting.

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POS4-84

E-CIGARETTE USE, FUTURE INTENTIONS, AND PERCEIVED HARM AMONG SOUTHERN LGBTQ

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SIGNIFICANCE: Popularity of e-cigarettes in the US is growing at an alarming rate each year and are aggressively marketed as a 'healthier alternative' to traditional cigarettes, are advertised as cessation aids, and touted for use anywhere. These trends are especially alarming for lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals since they smoke more and experience poorer health outcomes. Research has shown that e-cigarette use mirrors disparities in cigarette

smoking within this population. Misconceptions and lower harm perceptions along with convenience and novelty may encourage young adults to use e-cigarettes and become a gateway to smoking or discourage smokers to quit. This study describes e-cigarette harm perceptions and association with current and future use among LGBTQ tobacco users in the Southeastern US. METHODS: We measured e-cigarette prevalence, harm perceptions, intention to use, as well as socio-demographic and behavioral factors associated with smoking and other risky behaviors using data from health needs assessment of the adult LGBTQ individuals (N=436) living in the Southeastern US. RESULTS: Results show that 13% of LGBTQ use e-cigarettes compared to the 11% nationally reported in the 2014 National Adult Tobacco Survey and 52% are poly-users. E-cigarette use was greatest among respondents who were trans men (14%), cisgender males (13%), and identified as queer (33%). Primary uses of e-cigarettes are to quit smoking (42%), deal with stress (29%), and because they are less toxic (24%). Even though only 7% believe that e-cigarettes are not harmful, the majority (42%) of them are 18-24 adults. While 59% believe e-cigarettes are harmful, 34% are unsure of the harm. Harm perception was higher among lesbian (64%) and trans (58%) respondents. The odds of current e-cigarette use decreases among those who believe that e-cigarettes are harmful. The odds of future e-cigarette use decreases among those that believe e-cigarettes are moderately (OR=0.28, $p<0.02$) or very harmful (OR=0.03, $p<0.01$). After current users were briefly explained that e-cigarette vapor is shown to contain cancer causing substances, about 50% showed intention to stop using in the future while 26% were unsure. CONCLUSIONS: While majority believes e-cigarettes are harmful, over one third is unsure and over half is not likely to be persuaded from future use. Cessation advocates and providers should discuss erroneous perceptions and promote science-based e-cigarette education tailored to the LGBT population.

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POS4-85

CIGARETTE SMOKING BEHAVIOR AMONG EVER TRIERS OF E-CIGARETTES

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SIGNIFICANCE: E-cigarettes can provide cigarette consumers with a means to transition away from smoking. This presentation examines cigarette smoking behavior among individuals who have ever tried e-cigarettes (disposable, replaceable cartridge and/or refillable tank devices). METHOD: We conducted an online cross-sectional survey (fall, 2014) to gather information about adult e-cigarette ever triers' tobacco use patterns. Using non-probability sampling methods, we recruited respondents from online panels and central location testing facilities. We report results from the online panel sample. Demographic subgroup quotas and respondent weights were guided by U.S. Census information. The final online panel sample (N=3,472) consisted of adults segmented into four groups: ever triers of e-cigarettes who reported now using e-cigarettes (1) *every day* (n=530), (2) *some days/rarely* ("some days" n=986), or (2) *not at all* (n=976) in the past 30 days, and (4) those who reported using tobacco currently but never having tried an e-cigarette (n=980). RESULTS: The proportion of respondents who reported ever smoking a cigarette was high across study groups ($\geq 96\%$). A smaller proportion of respondents who use e-cigarettes every day reported current cigarette smoking compared to respondents who use e-cigarettes some days (46% vs. 71%), and a greater proportion had switched from cigarette smoking to e-cigarette use (24% vs. 3%). The proportion of every day e-cigarette respondents who had switched from cigarette smoking was greater than the proportion of respondents who now use e-cigarettes not at all and reported quitting cigarette smoking after first trying an e-cigarette (8%). The proportion of cigarette smokers planning to quit smoking in the next 30 days was highest among every day e-cigarette respondents (42%) compared to the other groups, including only 19% of smokers who never tried an e-cigarette. CONCLUSIONS: These results have implications for tobacco harm reduction, suggesting that regular use of e-cigarettes can facilitate transitioning away from cigarette smoking. These results also demonstrate the benefit of segmenting within current use status when studying e-cigarette consumers.

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POS4-86

PICTORIAL CIGARETTE PACK WARNINGS NOT CHOSEN THROUGH A SYSTEMATIC METHOD WOULD HAVE NO EFFECT ON ADOLESCENTS SMOKING SUSCEPTIBILITY, INITIATION AND TOBACCO USE

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SIGNIFICANCE: Pictorial Cigarette Pack Warnings (PCPW) aim to communicate information about smoking related harm. We explored if these PCPW have had any impression on adolescents, and whether noticing them was associated with smoking susceptibility, initiation and tobacco use. **METHODS:** School-based longitudinal study involving 33 secondary schools in Argentina. The sample included 2502 never smokers (average age at entry = 12.5 y), 1700 (67.9%) of whom completed follow-up surveys 17 months later. Students reported attention to PCPWs ("In the past month, how many times have you read or paid attention to the warnings on cigarette packs?") and PCPW impact on risk perceptions ("How much do the warnings on cigarettes packs make you think about the health consequences of smoking?", options were: never (1), rarely (2), sometimes (3), frequently (4), very frequently (5), then the scores were dichotomized into "frequently/very frequently" versus others). Logistic regression models estimated adjusted odds ratio (AOR) for the following transitions at follow up: non-susceptible to susceptible (among never smokers at both surveys), never smoker to ever smoker, and never smoker to current smoker (last 30 days). **RESULTS:** At baseline, 47% of respondents had noticed PCPWs often or very often and 66% reported PCPW often made them think about the health consequences of smoking. At follow-up, 34% of non-susceptible never smokers became susceptible, 24% reported having tried smoking, and 10% were current smokers. In adjusted models, awareness of PCPW was not significantly associated with transitions (i.e., susceptibility to smoking, AOR = 1.06, 95% CI 0.81 - 1.38; smoking initiation, AOR = 1.19, 95% CI 0.91 - 1.56; current smoker, AOR = 0.84, 95% CI 0.57 - 1.24). Similarly, PCPW-promoted risk perceptions were not independently associated with these outcomes (AOR = 0.90, 95% CI 0.66 - 1.2; AOR = 0.94, 95% CI 0.70 - 1.26; AOR = 0.77, 95% CI 0.51 - 1.16, respectively). **CONCLUSION:** The Argentinian PCPW was widely noticed and induced thoughts about health consequences in youth but these variables were not associated with smoking susceptibility or behavior.

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POS4-87

NATIONAL HOUSEHOLD SURVEYS OF SMOKING BEHAVIOUR AND QUITTING IN THE GERMAN POPULATION: STUDY PROTOCOL OF THE GERMAN STUDY ON TOBACCO USE (DEBRA)

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SIGNIFICANCE: The prevalence of tobacco smoking in Germany is high (nearly 30%). Timely and frequent tracking of national patterns of tobacco smoking and data on the "real-world" effectiveness of smoking cessation methods are needed to inform policies and develop campaigns aimed at reducing tobacco-related harm. In England, the Smoking Toolkit Study (STS) has been successfully tracking such key performance indicators since 2006, resulting in the implementation and adaptations of tobacco control policies, which have been associated with reductions in smoking prevalence. However, findings cannot be directly transferred into the German health policy context. The German Study on Tobacco Use (DEBRA) aims to provide such nationally representative data. **METHODS/DESIGN:** The

DEBRA study begun in June 2016 and consists of cross-sectional, computer-assisted, household interviews of youth and adults (over 14 years). Over a period of at least 3 years, every two months, a new sample of 2000 respondents will complete the survey (18 waves = 36000 respondents). Per wave, about 500 people are expected to smoke tobacco daily or occasionally. This group will answer detailed questions about their motivation to quit, triggers of quit attempts, exposure to health professionals' advice on quitting, use of behavioural and pharmacological cessation aids, including electronic cigarettes. Variables will be analysed considering potential confounders (e.g., strength of urges to smoke and sociodemographic characteristics). Last-year smokers will be asked to complete a telephone survey 6 months later. This prospective element allows, amongst others, to analyse the "real-world" effectiveness of smoking cessation methods. Descriptive data from the first 5 baseline waves (~n= 2500 smokers) will be available at the conference in March 2017. **CONCLUSIONS:** The DEBRA study will be able to track key variables relating to patterns and trends of smoking and quitting in Germany and will provide information for policy health strategies and future scientific studies. The methodology of the study is closely aligned to the STS, which will allow international comparisons of data.

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POS4-88

"YOU CAN'T GO ANYWHERE WITHOUT SEEING SOMEONE LIGHT UP A CIGARETTE": INFLUENCES ON APPALACHIAN YOUTH TOBACCO VIEWS AND USE

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SIGNIFICANCE: Tobacco takes a heavier toll on certain groups, with disparities shaped by several factors including geography and socioeconomic status (USDHHS, 2014). For example, youth smoking is more prevalent in rural communities (Lutfiyya et al., 2008), and features of the rural Appalachian lifestyle in the United States increase youth susceptibility to risky behavior, including tobacco use (Moreland et al., 2013). Given the higher tobacco use rates of rural, low socioeconomic U.S. youth, additional research is needed to better understand youth views of tobacco and the influences on tobacco use and to inform the development of more targeted and meaningful anti-tobacco campaigns. The aim of this study was to 1) examine the views of tobacco held by middle and high school students living in rural, low-income Appalachian communities and 2) evaluate the association between these perceptions and experimentation with tobacco. **METHODS:** During the 2014-2015 school year, focus group interviews and a corresponding cross-sectional survey were conducted with middle and high school students (N=199) in the Appalachian regions of Kentucky, North Carolina, and New York. Questions examined perceptions and use of tobacco. Descriptive statistics were calculated to characterize students who have and have not tried tobacco products. Examples shared during focus group interviews further explain the survey findings. **RESULTS:** Participants who tried tobacco were more likely to: (1) be older (p<0.0001), (2) have lower self-esteem (p=0.04), (3) have primary household members who use tobacco (p=0.0007), and (4) believe that women in their communities smoke about the same or more than men (p=0.002). Participants who perceived tobacco use in the community as a problem were less likely to have tried tobacco (p=0.0003). One student captured the views of many stating that tobacco "is everywhere. You can't go anywhere without seeing someone light up a cigarette." Some participants suggested that adults in their communities enable youth tobacco use and cited examples of parents and other adults giving youth cigarettes, chewing tobacco, or dip. **CONCLUSIONS:** Study results reveal individual, family, and community influences on youth tobacco views and use. The results also suggest several subtle means by which tobacco acceptance is reinforced. Given tobacco's ubiquitous presence in many of these communities, much additional anti-tobacco work is needed to increase the resilience of these rural youth.



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POS4-89

SMOKERS' UNDERSTANDINGS OF ADDICTION TO NICOTINE AND TOBACCO: A SYSTEMATIC REVIEW OF QUANTITATIVE AND QUALITATIVE RESEARCH

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SIGNIFICANCE: While health authorities have embraced the view that smoking is due to nicotine dependence, whether smokers see themselves as addicted to nicotine is less clear. The answer to this question contributes to two current debates: 1) why do many smokers prefer to quit unassisted despite availability of cessation aids; and 2) will most smokers be interested in switching to non-smoked nicotine products. **METHODS:** A systematic review of the literature on smokers' ratings of their addiction to smoking and nicotine, and the subjective meanings they associate with addiction. We applied critical interpretive synthesis to analyse both qualitative and quantitative literature. **RESULTS:** 22 quantitative papers and 24 qualitative papers met the selection criteria. Quantitative results showed that most smokers believe that smoking is addictive and that they are addicted to smoking. The qualitative results revealed that a feeling of "need" for cigarettes and a sense of a lack of control, were central to smokers' descriptions of addiction to smoking. However, the themes of smoking as a personal choice, and a habit, were central across studies. Few studies asked specifically about addiction to nicotine. When nicotine was discussed, it was most often seen as a partial explanation for addiction to smoking, and physical descriptions of addiction presented by smokers were rarely discussed in isolation from other factors such as family and peer influence. **CONCLUSIONS:** Smokers describe addiction as a complex interplay between physical processes and sensations, behavioural patterns and the social contexts in which these occur. Effective nicotine delivery alone may not sufficiently motivate the majority of smokers to switch to NRT or vaping. Rather, alternatives may need to satisfy the many attributes of cigarettes that smokers believe contribute to their addiction (e.g. the smoking routine and sociability) to be viewed as an acceptable substitute.

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POS4-90

CURRENT CIGARETTE SMOKING AND TOBACCO DEPENDENCE AMONG GED RECIPIENTS

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With a smoking prevalence estimated around 40%, General Educational Development (GED) recipients are a high-risk population. GED smokers may be more dependent than smokers with other education levels. We examined the effect of education on smoking and explored dependence measures as an explanation for the higher smoking prevalence in the GED population. We used data from the first wave (2013-14) of the Population Assessment of Tobacco and Health Study. In adults 25 years or older, we compared GED ($n=1,007$) to high school (HS) dropouts ($n=1,496$), HS graduates ($n=2,087$), some college (3,199), and Bachelor's degree or higher ($n=1,072$). We estimated weighted prevalences; odds ratios (AOR) adjusted for age, sex, race, ethnicity, employment; and 95% confidence intervals (CI) to examine the association between education and current smoking. Tobacco dependence was assessed by calculating mean scores (x) of Heaviness of Smoking Index (HSI) and Primary Dependence Motives scale (PDM-8). More than one-third (37.6%) of GED recipients were current smokers. This was significantly higher than the prevalence among HS dropouts (24.7%), HS graduates (21.0%), some college (20.2%), and Bachelor's degree or higher (7.1%). Compared to GED recipients, adjusted odds of smoking were significantly lower among HS dropouts (AOR: 0.79; CI: 0.68, 0.92), HS graduates (AOR: 0.48; CI: 0.41, 0.57), some col-

lege (AOR: 0.40; CI: 0.34, 0.46), and Bachelor's degree or higher (AOR: 0.12; CI: 0.10, 0.14). While HSI was significantly higher for GED ($x=2.8$) than some college ($x=2.4$) and Bachelor's degree or higher ($x=2.3$), HSI was no different when comparing GED to HS dropouts ($x=2.8$) or HS graduates ($x=2.6$). PDM-8 score was significantly higher for GED ($x=26.0$) than HS graduates ($x=24.2$), some college ($x=23.8$) and Bachelor's degree or higher ($x=20.2$), and not different when comparing GED to HS dropouts ($x=25.6$). Tobacco dependence may explain some of the disparity in smoking between GED recipients and individuals with at least some college education, but not between GED and HS dropouts or HS graduates. Further research is needed to understand and reduce the prevalence of smoking within this population.

FUNDING: No Funding.

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POS4-91

FLAVOURED ELECTRONIC CIGARETTE USE AND INTENTION TO SMOKE CIGARETTES IN NEVER SMOKING HONG KONG ADOLESCENTS

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SIGNIFICANCE: Electronic cigarettes (ECs) with nicotine have not been approved legally in Hong Kong, but low cost ECs with many flavours are on sale and easily accessible to young people. We studied flavoured EC use and its relation with smoking intention in never smoking adolescents. **METHODS:** Of 10923 Secondary 1-6 (US Grade 7-12) students surveyed in 2014/15 in Hong Kong, we analysed 9637 never smokers ($n=9637$; mean age 14.9, SD 1.8; 49.7% boys). Ever EC users indicated the flavours they had ever used (study factors) with 9 options, including "plain flavour", 7 specified flavours and "other flavours". Smoking intention (outcome) referred to choosing any responses other than "definitely not" to smoke cigarettes (i) in the next 12 months, (ii) when good friends smoked in front, or (iii) when a good friend offered a cigarette. Descriptive data were weighted by age, sex and grade. Logistic regression yielded adjusted odds ratios (AORs) of smoking intention for each flavour and the number of flavours used, with "other flavours" treated as a single flavour. Socio-demographic characteristics, family smoking and school clustering effect were adjusted for. **RESULTS:** In never smokers, 3.2% (95% CI 2.9%-3.6%) had ever used ECs. No user had used plain flavour, while mint (78.4%), coffee (36.7%), candy (6.1%), fruits (3.8%), spice (3.4%), alcohol (1.9%), tobacco (1.6%) and other flavours (25.5%) were reported. Significant associations were observed between smoking intention and using any flavours versus never EC use. Candy and tobacco flavours showed the strongest associations with AOR (95% CI) of 25.44 (7.97-81.13) and 21.42 (1.67-274.37) respectively. In EC users, 20.8% used 2 flavours and 14.9% used 3 or more. Using more flavours was more strongly associated with smoking intention, compared with never EC use. The AOR (95% CI) was 2.62 (1.92-3.59) for 1 flavour, 5.16 (2.94-9.08) for 2 and 9.25 (4.46-19.20) for 3 or more. **CONCLUSIONS:** Flavoured ECs were popular in never smoking EC users in Hong Kong adolescents. The strong association between using more flavours and smoking intention supports a ban on ECs, especially non-nicotine flavoured ECs, for smoking prevention in adolescents.

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POS4-92

LONGITUDINAL ASSOCIATIONS BETWEEN SMOKING STATUS AND SOCIAL SUPPORT, SOCIAL NETWORK, AND SOCIAL COHESION

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BACKGROUND: Previous studies have examined the effect of smoking cessation related social support on smoking cessation. However, how smoking status influence subsequent social relationship is largely unknown. We explored the prospective associations between smoking status and social support, social networks, and social cohesion in a cohort of adults. **METHODS:** Data came from the Coronary Artery Risk Development in Young Adults (CARDIA) study, which follows a cohort Black and White participants from four US cities aged 18-30 years in 1985-



86. We included individuals who participated at Y10 and Y15 in current analyses (aged 28-45 years, N= 3378). We created 8 categories to reflect stable (non-user, experimenter, former smoker, current smoker) and changed (new experimenter, initiator, relapser, quitter) smoking status from Y10 to Y15. We used PROC MIXED to assess prospective associations between smoking status and on familial social support, social networks (e.g., number of friends and relatives), and perceived neighborhood social cohesion outcomes at Y15. We adjusted for age, gender, city, parent education, Y10 education, Y10 employment, Y10 marital status, and Y10 household income. RESULTS: One-fifth (16%) of cohort changed their smoking status in five years. Current smokers, new experimenters, and relapsers reported receiving less social support than non-users ($p < 0.05$). In addition, former smokers reported more social support than current smokers ($p < 0.05$). Stable experimenters reported having fewer closer friends and relatives and non-users, but reported having more close friends and relatives than current smokers. Compared to non-users, current smokers reported fewer close friends and relatives ($p < 0.05$). CONCLUSION: Smoking is associated with less perceived social support, social networks, and social cohesion, all of which are essential for psychological well-being. Tobacco control efforts should highlight effects of smoking on social outcomes to deter smoking behavior.

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POS4-93

AN ASSESSMENT OF ORAL HEALTH STATUS, TOBACCO USE AND CANCER AWARENESS AMONG TEA PLANTATION WORKERS, NILGIRI HILLS, TAMILNADU INDIA

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BACKGROUND: Tea is an important agro-industry of India, which contributes immensely to the countries economy. Tea garden population constitutes approximately 1/12th of tea growing state's population. Poor socio-economic conditions, ignorance due to illiteracy, over-crowded and unhygienic living conditions in the residential colonies make tea garden population vulnerable to various communicable diseases and malnutrition. Hence this study was contemplated with an aim to assess the oral health status, tobacco use and cancer awareness among tea plantation workers, Nilgiri Hills, Tamil Nadu, India. METHODOLOGY: A cross-sectional descriptive study was conducted to assess the tobacco use and cancer awareness among tea plantation workers, Nilgiri Hills. Data was collected using a pretested Questionnaire, which included Demographic data, tobacco habits, its frequency and form. The data collected was analysed using SPSS version 15. RESULTS: Results showed that among 900 study population, showed 57% had no formal education, 34.5% had not visited dentist before. 64.5% had indigenous brushing habits. A very high prevalence of periodontal disease, tobacco chewing, deep rooted beliefs and customs regarding dentition and dental treatment was observed in this community. Prevalence of oral mucosal lesions in the study population was due to tobacco usage and lack of awareness regarding the deleterious effects of the products used. CONCLUSION: The dangers from smoking and chewing tobacco are well documented within the literature but the public's lack of knowledge of the risks is a concern. Health professionals are encouraged to ensure that the public is made aware of these risks, especially those within high-risk groups.

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POS4-94

INVESTIGATING A CRITICAL EPISODE REGARDING TOBACCO INDUSTRY E-CIGARETTE RESEARCH AND DEVELOPMENT

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As e-cigarettes continue to alter the nicotine and smoking marketplace, many public health practitioners are rightfully concerned about the role that the tobacco industry might play in this new space. Although the modern e-cigarette emerged from outside of the tobacco industry, an increasing amount of e-cigarette market share is produced by companies that also have existing tobacco cigarette busi-

nesses. This article seeks to understand how tobacco companies think about e-cigarettes by examining how they have approached similar devices in the past. In particular, it will concentrate on one critical episode: the development and subsequent abandonment of a propylene glycol e-cigarette by Philip Morris in the 1980s and 1990s. Using tobacco documents, I aim to explain what Philip Morris hoped to gain by engaging in this project, and why it was eventually abandoned. I will demonstrate that many of the critical factors considered by Philip Morris were not straightforward cost-benefit considerations that innovation scholars would typically associate with a firm's decision about moving forward on a novel product. This explanation may give insight into the strategic thinking of Philip Morris/Altria and other tobacco companies today with respect to novel nicotine products such as e-cigarettes.

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POS4-95

ELECTRONIC CIGARETTE USE ON A SMOKE-FREE CAMPUS: STUDENT PERCEPTIONS ON USE AND SMOKE-FREE POLICY COMPLIANCE

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OBJECTIVES: To determine student perceptions and beliefs about e-cigarette use on a smoke-free campus, the impact of e-cigarette use on smoke-free campus policy compliance and student use of e-cigarettes for smoking cessation. METHODS: To determine student perceptions and beliefs about the impact of e-cigarette use on smoke-free campus compliance, and online survey was sent out to a random sample of students from the University of Michigan Ann Arbor campus. There were 448 students that completed the online survey. Of the responses received, 50% were male and 50% were female. Undergraduate students represented 55% of the sample with graduate students representing the remainder. Eighty five percent of students reported a "never smoker" status with 11% reporting former use of either tobacco or e-cigarettes and 4% reporting current use of either tobacco or e-cigarettes. Students were asked a series of questions to assess their knowledge of smoke-free campus policy and their beliefs on whether e-cigarettes should be included in the smoke-free campus policy. Students were also asked the frequency of their observation of e-cigarette use on campus as well as their beliefs on the impact of exposure to secondhand vapor on their health and the health of the e-cigarette user. Finally, students were asked their tobacco use status and if they tried an e-cigarette as a method to quit tobacco. RESULTS: On average, the majority of students surveyed supported the inclusion of e-cigarettes in the campus smoke-free policy. The majority of students reported observing e-cigarette use with 18% reporting no observation of use. Fifty percent of students reported their belief that second-hand vapor was harmful to their health and 64% believed e-cigarette use was harmful to the health of the individual using the product. When asked their belief on whether e-cigarettes reduce tobacco consumption, 50% reported they believed it did. Eighty two percent of students who reported former tobacco use indicated they did not use the e-cigarette to help them quit. CONCLUSIONS: Most students who participated in the survey were in support of the inclusion of e-cigarettes in smoke-free campus policy. This project provides insight into student perceptions about e-cigarette policy as well as use and exposure. Additional studies can provide further assessment of student e-cigarette beliefs and use patterns.

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POS4-96

ENGAGEMENT WITH TOBACCO PRODUCT WEBSITES IS ASSOCIATED WITH CIGARETTE SMOKING AND SUSCEPTIBILITY AMONG U.S. ADOLESCENTS: PATH SURVEY

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SIGNIFICANCE: Although tobacco product websites are ostensibly aimed at adults, some adolescents can access these websites and view pro-tobacco content. Exposure to online tobacco marketing could influence their tobacco use and susceptibility. METHODS: We used the Population Assessment of Tobacco and

Health (PATH) data to examine associations of tobacco website engagement (access and liking) with cigarette smoking behavior and susceptibility (lack of a firm commitment not to smoke). **RESULTS:** Among 13,651 US adolescents ages 12-17, 2.4% had visited one or more tobacco product websites. The most prevalent website visited was Blu e-cigarettes, which has the least stringent age verification of all websites queried (Camel, Marlboro, Newport, Swisher, Blu). Those who had visited tobacco product websites were more likely to have tried cigarettes (39% vs. 13%, chi-square=187, $p<.0001$), relative to those who had not visited tobacco websites. Among never-smokers, those who had visited tobacco websites were more likely to be susceptible to cigarette smoking (58% vs. 32%, chi-square=57, $p<.0001$). All respondents also viewed pictures of tobacco websites and rated their liking of the websites; Blu received the highest liking score. Website liking scores were higher among ever-smokers (mean=2.2, range=1-4) than among never-smokers (mean=1.7, $t=21.3$, $p<.0001$). Among never-smokers, liking scores were higher among susceptible adolescents (mean=2.0) than among nonsusceptible adolescents (mean=1.6, $t=23.9$, $p<.0001$). **CONCLUSIONS:** Although few adolescents visit tobacco product websites, these websites might increase their likelihood of smoking and/or their susceptibility to smoking. More stringent age restriction on tobacco websites is needed to prevent youth from accessing online tobacco advertising. Longitudinal research is needed to determine whether websites influence smoking behavior or whether adolescents who are interested in tobacco tend to seek out websites for information or to purchase tobacco products.

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POS4-97

BEST FORMATS FOR WEB-BASED INFORMATION DELIVERY ON TOBACCO CONSTITUENTS: AN EXPERIMENTAL STUDY

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SIGNIFICANCE: American consumers have limited knowledge of tobacco constituents. Web-based information delivery can be highly customizable, incorporating interactive elements, which may improve comprehension. Yet, web-delivered content needs to strike a balance in providing sufficient, accurate information that doesn't overwhelm less familiar users. The objective of this study was to test the impact of experimental formats of web-based information to increase smokers' knowledge of tobacco constituents. **METHODS:** A convenience sample of adult smokers ($n=280$) were randomly assigned to view a website with information for 15 tobacco constituents. Intervention participants viewed a website tailored to the smoker's brand and sub-brand, and included interactive features; control participants received identical information unbranded and without interactive features. General linear regression was used to determine differences in post-test knowledge scores of 20 chemicals (15 tobacco constituents, and 5 non-tobacco constituents) were compared by condition, adjusted for pre-test knowledge scores. **RESULTS:** Compared to the tailored and interactive condition, smokers who viewed the control condition had significantly higher knowledge scores ($p<0.04$). This finding was counter to our hypothesis that tailored, interactive web-based content would significantly increase the knowledge of tobacco constituents, compared to generic, static web-based educational information. **CONCLUSIONS:** Simple web-based information on tobacco constituents was more effective in increasing knowledge than a more tailored interactive web-based information within a sample of adult smokers. These results suggest that such simple content can facilitate learning about unfamiliar tobacco constituents, to achieve the broad goal of minimizing consumer confusion.

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POS4-98

POPULATION MODELING OF MODIFIED RISK TOBACCO PRODUCTS WITH EFFECTS OF SMOKING REDUCTION

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Many cigarette smokers who try e-cigarettes or other potential Modified Risk Tobacco Products (MRTPs) persist as dual users while smoking fewer conventional cigarettes per day (CPD). Lower-CPD smokers have lower mortality risk based on large cohort studies. However, with little data on the effect of smoking reduction on mortality, predictive modeling is needed. As suggested by the Food and Drug Administration (FDA) MRTP Applications Draft Guidance, we developed a statistical model based on public data to explore the effects on population mortality of an MRTP resulting in reduced conventional cigarette smoking. Transitions are modeled to and from dual use, which affects CPD and cigarette quit rates, and to MRTP use only. Effects of different levels of CPD reduction are simulated using National Survey on Drug Use and Health (NSDUH) data. The decay of the Excess Risk (ER) of death relative to never-smokers when quitting or reducing CPD is modeled as age-dependent exponential changes. The same exponential change approach is applied to all transitions, including initiation of conventional cigarettes or MRTPs. Random individual product use histories, including CPD, are generated to project cumulative deaths through 2060 in a population with and without the MRTP. The ER of the MRTP relative to cigarettes is a key uncertainty that is varied in hypothetical scenarios. Results show high sensitivity of long-run mortality to CPD reduction levels and to ER for the MRTP relative to cigarettes, and moderate sensitivity to ER transition rates. Break-even analyses demonstrate how large an effect on population mortality, such as MRTP uptake by would-be never-users, would be needed to offset opposing effects from reduced conventional cigarette use. In conclusion, models projecting population effects of an MRTP should account for likely mortality effects of reduced smoking among dual users. In addition, studies should follow dual-user CPD histories and quit rates over long time periods to clarify long-term usage patterns and thereby improve health impact projections.

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POS4-99

PREFERENCE FOR MORE E-CIGARETTE FLAVORS IS ASSOCIATED WITH E-CIGARETTE USE FREQUENCY AMONG YOUTH BUT NOT ADULTS

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SIGNIFICANCE: Many e-cigarette users find the wide variety of available e-cigarette flavors appealing, and users often report liking more than one e-liquid flavor. The current study extends prior research by examining differences in adolescents' and adults' preferences for 10 individual e-liquid flavors (i.e., tobacco, menthol, mint, fruit, coffee, vanilla, dessert/candy, spices, alcohol, and other) and their total number of flavors preferred. We also examined whether adolescents' and adults' preferences for individual flavors or their total number of flavors preferred, respectively, were associated with more frequent e-cigarette use above and beyond covariates (i.e., sex, age, cigarette smoking status, e-liquid nicotine content [no/yes]). **METHODS:** The analytic samples comprised 396 past-month e-cigarette users from 3 Connecticut high schools who completed an anonymous, school-based survey in Spring 2014 (56.1% male; 16.18 [1.18] years; 42.2% smokers) and 590 adult, past-month e-cigarette users who completed an anonymous, MTurk survey in Fall of 2014 (53.7% male; 34.25 [9.89] years; 51.2% smokers). **RESULTS:** Compared to adults, more adolescents preferred fruit (52.8% vs. 40.0%), alcohol (10.4% vs. 6.3%), and other (2.5% vs. 0.3%) flavor e-liquids (all p -values $<.05$). Compared to adolescents, adults preferred tobacco (32.0% vs. 5.3%), menthol (27.6% vs. 9.6%), mint (27.6% vs. 10.1%), coffee (16.6% vs. 7.3%), and spice (12.2% vs. 4.0%) flavor e-liquids more often; preferred a greater total number of flavors ($M=1.95$ [1.19] vs. $M=1.29$ [1.45]); and used e-cigarettes more frequently ($M=15.56$ [12.48] days vs. $M=10.51$ [9.98] days), all p -values $<.001$. However, neither adults' preferences for individual flavors nor the total number of flavors preferred were associated with e-cigarette use frequency. In contrast, the total number of flavors preferred by adolescents was associated with more frequent e-cigarette use (partial $\eta^2=0.6$), as were preferences for fruit (partial $\eta^2=0.03$), dessert (partial $\eta^2=0.01$), and alcohol flavor (partial $\eta^2=0.03$) e-liquids. **CON-**



CLUSIONS: In sum, while youth reported less frequent e-cigarette use than adults, their preferences for individual flavors and the total number of flavors preferred were associated with e-cigarette use indicating that specific flavor preferences may play a greater role in adolescent e-cigarette use compared to adults.

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POS4-100

KNOWLEDGE AND BELIEFS ABOUT VAPING IN COLLEGE STUDENTS

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SIGNIFICANCE: Young adults are more likely to use e-cigarettes than any other age group. **METHODS:** Individual interviews (n=33) were conducted with college student e-cigarette users ages 18-24 focusing on e-cigarette beliefs and use. Interviews were recorded, transcribed, and analyzed using NVivo. **RESULTS:** Most students used multiple tobacco products, primarily cigarettes and hookah, since their late teens. The majority initiated vaping to reduce smoking, but were still using other tobacco products. Most students reported that family and friends supported their vaping either by expressing support for use or by purchasing products. Almost half said they would likely continue to vape after college. Participants often reported mixing their own e-liquid. Several worked in vape shops or made and sold e-liquid to other students. Seven admitted to adding substances to e-liquid such as THC oil, hash oil, caffeine, and alcohol. College students purchased high-end vaporizers and participated in activities associated with vaping culture such as cloud competitions. This differed from straight-to-work young adults who spent as little as possible on vaping products and did not participate in social activities related to vaping. Students held positive beliefs about the personal benefits of vaping while expressing skepticism about the "healthiness" of it. Most expressed little concern about potential health risks of vaping. Similar to straight-to-work young adults, credible sources for vaping health and safety information were vape shop staff, friends, websites, and some scientific publications. All students were aware of tobacco free campus policies, but most used e-cigarettes on campus. Those who did use on campus had rules about where was acceptable and where was off limits. For example, use in campus housing was considered acceptable while use in classes was seen as disrespectful. Students also used e-cigarettes in community locations that had banned vaping such as entertainment venues, restaurants, and retail locations. **CONCLUSIONS:** Clearer communication and better enforcement of campus tobacco free policies are needed. Implications for tobacco regulation include how to enforce e-liquid regulations when students can access ingredients to make and distribute e-liquid, and how to communicate information to educated young adult users with few concerns regarding the long term impacts of vaping.

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POS4-101

PATH DATA: HARM REDUCTION IS TEENS' TOP REASON FOR USING E-CIGARETTES

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E-cigarettes have aroused considerable controversy, especially regarding use among youth under 18. Understanding why youth use e-cigarettes is important. We present an analysis of stated reasons for use of e-cigarettes among youth surveyed in the PATH study. PATH is a nationally representative sample of 45,971; 13,651 were youth aged 12-17, of whom 3.1% (n=418) reported past-30-day e-cigarette use, and were asked their reasons for using e-cigarettes. A published finding (Ambrose et al., 2015) noted that the availability of e-cigarettes in flavors was the single most-cited reason for use (82%; 95% CI: 78-85%). However, a fuller consideration of multiple endorsements paints a more complete picture of youths' reasons for e-cigarette use. Among youth who cited flavors as a reason for use, almost all (92%; 89-95%) also cited reduced harm to self or others as reasons for use. Indeed, when harm reduction reasons were considered in an integrated fashion (reduced harm to self and to others, *combined*), harm reduction emerged as the most frequently-cited reason for e-cigarette use (88%; 85-91%), significantly greater than flavors. E-cigarettes' potential to help with quitting was also

an oft-cited reason (60%; 55-65%); almost all (98%; 96-99%) who cited this also cited harm reduction. In contrast to these health-related reasons, endorsement for media-related reasons (appeal of advertisements or use by people in media, combined) was modest (43%; 38-48%). Endorsing reasons related to being able to engage in e-cigarette use undetected (both because can use at times or in places can't smoke and because they don't smell) was endorsed by a minority (42%; 38-45%), but somewhat more often by those who had smoked in the past 30 days (53%; 46-60%). Overall, however, because of overlap due to endorsement of multiple reasons (averaging 6.7 [6.5-7.0] reasons) – especially harm reduction and flavors – few differences in e-cigarette use or cigarette smoking patterns could be distinguished by individual reasons for e-cigarette use. The PATH data make clear that youth have many reasons for using e-cigarettes, and that harm reduction reasons are the most prominent among them.

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POS4-102

GEOGRAPHICAL DISTRIBUTION OF LUNG CANCER MORTALITY WORLDWIDE

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BACKGROUND: Lung cancer is the most common cause of death from cancer, estimated to be responsible for nearly one in five, 1.59 million deaths (19.4%) of the total. There is large variation in mortality rates across the world in both males and females. This variation follows trend of smoking, as tobacco smoking is responsible for the majority of lung cancer cases. Geographical patterns of mortality are quite similar to those of incidence for both sexes. This communication presents the latest international geographical mortality data for lung cancer in the worldwide. **METHODS:** The mortality statistics presented here for cancers worldwide were taken from the International Agency for Research on Cancer IARC: * The Cancer Incidence in five Continents Vol X. * GLOBOCAN database, 2012. **RESULTS:** Lung cancer is the leading cause of cancer death in 87 countries in men and 26 countries in women. Among males, the highest mortality rates (per 100,000) worldwide are found in Central and Eastern Europe (47.6) and Eastern Asia (44.8) and the lowest rates are found in Northern Africa (14.0), South-Central Asia (10.7), Central America (9.0), and sub-Saharan Africa (4.4), with the lowest rate in Western Africa (1.5 per 100,000). Among females, the highest lung cancer mortality rates (per 100,000) were found in North Korea (30.7), Denmark (28.4), Hungary (26.6), and Canada (25.1). In Northern Africa (23.5), Northern Europe (19.1), Eastern Asia (16.2), Western Europe (14.8), Oceania (14.1), and Caribbean (12.2). Apart from Eastern Asia. Lung cancer mortality rates in women were the lowest in the regions where female smoking has been historically uncommon, including Western Asia (6.2 per 100,000), Central America (4.3 per 100,000), South-Central Asia (3.1 per 100,000), Northern Africa (2.8 per 100,000), and sub-Saharan Africa (2.2 per 100,000). The lowest estimated mortality rates were for Middle Africa (0.7 per 100,000). **CONCLUSION:** With current smoking patterns lung cancer will remain a major cause of death worldwide for several decades. Effective tobacco control policies must be implemented or enforced in order to further reduce smoking prevalence. Lung cancer mortality is likely to greatly increase in sub-Saharan Africa if appropriate tobacco control programs are not implemented. Although smoking is a highly preventable risk factor for lung cancer, exposure to other risk factors.

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POS4-103

TO SPIT OR NOT TO SPIT? THE UTILITY OF BIOCHEMICAL VERIFICATION IN A WEB-BASED SMOKING CESSATION TRIAL

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SIGNIFICANCE: Biochemical verification of smoking abstinence is considered the "gold standard" for cessation trials. Few studies have addressed the feasibility of



collecting biomarkers in Internet-based trials. This study examined the feasibility of collecting biomarker data in an Internet study, and the correspondence between self-report and biomarker data. **METHODS:** Participants were new registrants (n=600) on BecomeAnEX.org (EX), a web-based smoking cessation program, who joined a pilot study to assess the prevalence of substance use comorbidities. All were adult current smokers in the US. Participants completed baseline and follow-up surveys via the Internet with email reminders for follow-up non-responders. Those who reported 7-day abstinence at 3 months were sent a saliva sampling kit overnight with a pre-paid overnight return envelope. A \$25 incentive was offered for returning the kit. Returned samples were analyzed for the presence of saliva cotinine. **RESULTS:** At 3-months, 41.2% (247) of participants completed the survey; 37% (n=93) reported 7-day point prevalence abstinence and were mailed a saliva kit. 66 kits (71%) were returned; among those, 36% (n=24) had cotinine levels above the 15ng/mL threshold typically used to distinguish smokers from non-smokers. Compared to participants whose 7-day ppa was confirmed by cotinine testing, the 24 participants with cotinine levels above 15ng/mL reported lower levels of education and income, were less likely to be employed full-time, had higher interest in using e-cigarettes to quit, and lower website utilization. They were also more likely to report using e-cigarettes (11/24 vs 5/42, p=.002) and cutting back/switching brands (4/24 vs 1/42, p=.038) as quit methods at 3 months. **CONCLUSIONS:** Collection of biomarker data appeared feasible, though the overall study response rate was low. There was a relatively high rate of disconfirmation of self-reported abstinence. We could not determine whether cotinine levels were from use of other nicotine products or due to misreporting. Given these challenges and the low-demand characteristics of Internet studies, our findings support prior recommendations that biochemical verification in Internet trials is neither required nor desirable.

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POS4-104

ADOLESCENT PERCEPTIONS OF RELATIVE HARM OF E-CIGARETTES AND SMOKELESS TOBACCO COMPARED TO CIGARETTES: 2014 NYTS

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E-cigarettes and smokeless tobacco (SLT) are less harmful alternatives to cigarettes and have the potential to reduce smoking-related harms yet some hold concerns that any promotion of these as less harmful than cigarettes might increase their appeal especially to youth. The 2014 National Youth Tobacco Survey data were analyzed to understand students' perceptions of the relative harm of these products compared to cigarettes (rated as "less harmful," "equally harmful," "more harmful," or could not form an opinion (don't know enough/never heard of)). The majority of middle (MS) and high school (HS) students (51%) saw e-cigarettes less harmful than cigarettes; man fewer thought SLT (13%) was less harmful. Excluding those who could not form an opinion, 73% said e-cigarettes were less harmful and 20% said SLT was less harmful than cigarettes. Males (55%) were more likely than females (47%), HS students (57%) were more likely than MS students (43%), and ever cigarette (69%) and e-cigarette users (81%) were more likely than never users (46% and 44%, respectively) to believe that e-cigarettes were less harmful. Students susceptible to cigarette (62%) or e-cigarette use (71%) were more likely than the non-susceptible (38% and 34%, respectively) to say e-cigarettes were less harmful. For SLT, males (16%; females: 10%), HS students (15%; MS: 10%), ever cigarette (18%; never: 12%) and SLT users (43%; never: 10%) were more likely to believe that SLT was less harmful than cigarettes. Students curious about using cigarettes (16%) or SLT (31%) were more likely than the non-curious (10% and 9%, respectively) to believe that SLT was less harmful. Tobacco product harm views vary by students' experiences with the products. Youth, particularly ever cigarette or e-cigarette users, accept that e-cigarettes are less harmful than cigarettes, as do those susceptible to use. Very few believed that SLT is less harmful, even among ever SLT users. These complex patterns highlight the challenges of communicating relative harm of tobacco products.

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POS4-105

CIGARETTE BUTT POLLUTION ON TWO THAI BEACHES WITH IMPLICATIONS FOR POLICY APPROACHES IN LOW AND MIDDLE INCOME COUNTRIES

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BACKGROUND: Cigarette waste, primarily cigarette butts, is known to be dangerous since it is mostly non-biodegradable plastic and contains dangerous chemicals embedded in filter material. This is of major concern since butts are consumed by and can kill aquatic life, birds and even children. Such wastes also require costly beach clean-up. Thai law does not presently ban smoking on beaches. Beach pollution from cigarette waste in Thailand and other low and middle income countries (LMIC) is common, and its assessment is important for environmental protection and human health. **METHODS:** As a part of a larger study, we conducted an observational investigation to assess availability of cigarettes, population of smokers, warnings not to smoke, and number of cigarette butts on and adjacent to two popular public beaches in Thailand. We report these descriptive findings and other environmental measures reported elsewhere at the beaches observationally assessed in order to suggest possible policy approaches for public beaches in Thailand and other LMIC. **RESULTS:** Total, smoker and child populations in sections of the beach varied with up to 101 total population, 4 smokers and 15 children in a 400 m² area. This translates to 50 or more smokers along a 250 meter beach front area. In less than eight hours of cigarette butt collection, 2,810 cigarette butts were collected at one beach and 3,666 butts collected at the second beach with 58% collected in the beach lounge area, not on the open beach. Point source PM_{2.5} from smokers lounging on the beach showed peak levels of 716 and 1,335 µg/m³ with measures taken 1 to 2 meters downwind from active smokers. Cigarette retail sales were widely available close to the beaches, and only one beach had any "No smoking" signs posted. **CONCLUSION:** Pollution of beaches is evident by the number of cigarette butts found and the level of exposure to smoking in Thai beach areas. Various policies have been proposed for addressing cigarette butt waste, but many are not feasible in LMIC. We recommend a cost-effective approach of consumer education and responsibility which highlights the dangers to children and the natural environment for LMIC.

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POS4-106

LESSONS LEARNED FROM AN ONLINE SURVEY STUDY ABOUT HEALTH BEHAVIORS OF DUAL-SMOKER COUPLES: RECOMMENDATIONS TO IMPLEMENT SAFEGUARDS TO COLLECT VALID DATA FROM WEB-BASED SAMPLES

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BACKGROUND: The use of online surveys for research is increasing due to the growing number of Internet users in the United States, efficiency of collecting data, and cost-effectiveness. However, online surveys without safeguards may question the validity and reliability of data collected. We present lessons learned from a recent online study about couples' health behaviors. **METHODS:** We conducted an online cross-sectional study to assess health behaviors of dual-smoker couples. Participants were recruited via passive and targeted methods. Data were collected from 77 (pre-safeguard) and 197 (post-safeguard) participants. Safeguards included: a) changing the incentive from prepaid card to raffle; b) allowing only one IP address per response; c) masking eligibility; d) adding multiple questions to ensure consistency in responses; and e) emphasizing data surveillance. Descriptive statistics were computed using SAS 9.4 to compare enrollment rates and validity of data between the pre- and post-safeguard participants. **RESULTS:** Although 77 entries were collected within 24 hours (pre-safeguards), five responses were ineligible and excluded. Among the remaining 72 entries, 68.1 % were fraudulent as either multiple data entries (24.5%) and/or conflict in responses to similar survey items (83.7%). Once safeguards were administered (post-safeguards), data collection took longer to obtain 297 participants, which included 27 ineligible. Among the 270 eligible participants, 35.9% were fraudulent due to conflicting responses to similar survey items. **CONCLUSION:** Online data collection via surveys should



use safeguards to capture valid data. Many safeguards exist, which researchers should consider when designing online survey projects.

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POS4-107

THE ASSOCIATION OF ALCOHOL AND MARIJUANA USE ON THE AGE OF INITIATION OF FIRST TIME HOOKAH USERS: THE MARKETING AND PROMOTIONS ACROSS COLLEGES IN TEXAS (M-PACT) STUDY

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SIGNIFICANCE: Hookah use is increasing in popularity among young adults. Hookah has the same potential for negative health consequences as cigarettes. Marijuana use also challenges the health of young people. This study evaluated if current marijuana use predicts initiation of hookah use among young adults. **METHODS:** The Marketing and Promotions Across Colleges in Texas (M-PACT) study surveyed 18-29-year-old young adults attending colleges in Texas (n=5,482). Wave 1 data collection occurred between November 2014-February 2015 and 3 subsequent waves of data were collected in six month-intervals. The primary outcome was age of initiation of hookah use among 18-25-year-old students who were never-hookah users at wave 1 (n=2,394). Current marijuana uses at wave 1 was the exposure variable. Adjusted factors were socio-demographic variables, binge drinking, current number of tobacco products used at wave 1, susceptibility to hookah use, sensation seeking and impulsivity scores. Non-parametric survival estimates for interval censoring are reported. **RESULTS:** Participants for this study were 35% male, 33% white, 29% Hispanic, 22% Asian ancestry, 9% African ancestry, the median age was 19.8 years old and 92% were single or divorced at wave 1. The estimated cumulative probability that a college student will initiate hookah use by age 21 is 0.52. Among college students who reported current marijuana use, the risk to initiate hookah use at wave 1, was 48% higher than a college student who did not report marijuana use at wave 1 (Adjusted Hazard Ratio [AHR]=1.48, 95% CI: 1.23-1.77). Binge drinking and a one-unit increase in the current number of tobacco products used at wave 1, was also associated with the risk to initiate hookah use (AHR=1.23, 95% CI: 1.08-1.41 and AHR=1.62, 95% CI: 1.47-1.79, respectively). **CONCLUSIONS:** Results extend limited longitudinal research on hookah use by indicating that marijuana use increases the risk for initiating hookah use among young adults. The clustering of health compromising behaviors and the onset of hookah use in young adulthood underscore the need for health promotion and prevention interventions.

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POS4-108

PROMOTION OF "VAPE TRICKS" ON YOUTUBE

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SIGNIFICANCE: Conducting vape tricks using e-cigarettes is increasing in popularity among youth. Social media websites, like YouTube are being used to promote vape tricks. While youth find the ability to do "vape tricks" appealing, there is limited knowledge on how YouTube videos teach youth how to conduct these behaviors. Understanding this is critical to future prevention efforts. We examined youth-accessible YouTube videos on vape tricks, to characterize 1) types of vape

tricks, 2) appealing features, 3) device and e-liquid characteristics, and 4) user characteristics. **METHODS:** YouTube videos on vape trick tutorials were identified in April 2016. Inclusion criteria were videos that were uploaded in the past year with a duration of < 4 minutes from accounts that were accessible by underage youth. **RESULTS:** 69 videos met the criteria and representative videos were identified for further examination and used to develop a codebook. We identified five video types: 1) tutorials that provide instructions on how to conduct vape tricks, 2) compilation of various video clips of vape tricks often accompanied by music, 3) vape trick competitions, 4) performance of vape tricks, usually on stage with lighting and music, 5) "selfie" video recordings of vape tricks with no instructions. We also examined if the videos were private versus sponsor endorsed (e.g., vape shop, e-liquid company, YouTube star) and identified other appealing features in these videos (e.g., young models, music) and user features (e.g., sex, age, race). We further identified descriptive information about vape tricks (e.g., vape trick names, instructions on how to conduct them), and product/e-liquid features used (e.g., type, brand, modifications). **CONCLUSIONS:** Youth can access many YouTube tutorial videos that promote vape tricks. Analysis of these videos can be used to identify how vape tricks are promoted, who is promoting them and how e-cigarettes are used/modified to conduct vape tricks. This information could inform future youth-directed e-cigarette regulation and prevention strategies.

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POS4-109

TOBACCO PRICING STRATEGY FOLLOWING A VIGOROUS TAX POLICY INTERVENTION IN AUSTRALIA, THE WORLD'S DARKEST MARKET

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SIGNIFICANCE: With the most far reaching bans on promotion of any country, Australia has been described by international tobacco companies as the world's darkest market. Mass media and outdoor advertising disappeared more than 25 years ago; retail displays of tobacco products were banned in Australian states between 2010 and 2011; and legislation mandating plain packaging of all tobacco products in Australia was phased in at the end of 2012. Taxes on tobacco products in Australia have also increased steeply over several periods. **METHOD:** This presentation will describe tobacco product pricing strategy over the last 7 years in a country where promotion is now restricted to the naming of each product and the communication at point of sale of its size and price. **RESULTS:** Over the seven years from March 2010, excise/customs duty on tobacco products more than doubled, from 26.22 cents (AUD) per stick in February 2010 to 61.05 cents (AUD) per stick in February 2017, resulting in a 70 to 130% real increase in the recommended retail price of leading brands. The presentation will report on changes by company and by segment in the product range available and the pattern of price increases. **CONCLUSIONS:** Affordability of tobacco products for consumers has been protected over this period through increasing dispersion of prices achieved: 1. by expanding the range of products offered in existing brands in the budget range; 2. by launching new brands in the budget range during the period before package design was standardized; 3. by re-launching of non-performing brands at budget price levels; and 4. through innovative bundling of products (sticks per pack, very large packs and multi-pack buys).

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POS4-110

EDUCATIONAL INEQUALITIES IN CIGARETTE SMOKING PREVALENCE IN BRAZIL: ASSESSING TIME TRENDS BETWEEN 1989 AND 2013

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AIM: To assess whether the previously documented large-scale declines in smoking prevalence that occurred in concert with robust tobacco control efforts instituted in Brazil since the late-1980s have been socioeconomically equitable.



METHODS: Data on current cigarette smoking prevalence and education level (no education, less than primary, primary complete but secondary incomplete, secondary complete or higher) in adults ≥ 18 years came from four nationally representative cross-sectional surveys (1989, 2003, 2008, and 2013). Trends in absolute (slope index of inequality, SII) and relative (relative index of inequality, RII) educational inequality indices in smoking prevalence were estimated using Poisson regression models with robust variance for males and females separately. **RESULTS:** Between 1989 and 2013, there were significant absolute and relative declines in age-adjusted smoking prevalence in each education level in both males (none: 50% to 27%, less than primary: 45% to 24%, primary complete but secondary incomplete: 35% to 20%, secondary complete or higher: 29% to 13%) and females (32% to 13%, 25% to 16%, 26% to 13%, 20% to 7% respectively). But, inequality trends differed across the study period and between genders. In males, the SII declined significantly between 2008 and 2013 (-0.26 to -0.20, $p=0.009$) after remaining unchanged since 1989 (-0.23, $p=0.29$), and the RII stabilized between 2003 and 2013 (2.71 to 3.00, $p=0.58$), after a significant increase since 1989 (1.69, $p=0.004$). On the other hand, in females, both the SII and RII increased significantly ($p<0.001$) between 1989 and 2003 (SII: -0.06 to -0.17; RII: 1.49 to 2.92), but subsequently the SII stalled until 2013 (-0.14, $p=0.37$), whereas the RII continued to increase between 2008 and 2013 (2.95 to 3.78, $p=0.04$). **CONCLUSION:** Increasing inequalities in the earlier study period (1989-2003) indicate that progress during this time accrued more to higher educated groups than lower educated groups, especially in females. However, the stall and even declines in inequalities in the past decade indicate that efforts implemented recently (including equity-positive tax increases since the late 2000s) may have benefited lower educated groups, particularly in males. In order to ensure that future progress in reducing population smoking levels in Brazil is equitable, gender and socioeconomic status must be explicit considerations in tobacco control efforts.

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POS4-111

"TWO BELLY BUTTONS AND A HOLE IN MY NECK": UNDERSTANDING THE POTENTIAL FOR TOBACCO PREVENTION AND CESSATION FROM HEAD AND NECK CANCER SURVIVORS' NARRATIVES SHARED ONLINE

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Head and neck cancer (HNC) survivor narratives that articulate survivors' experiences with cancers of the oral cavity, larynx, throat, thyroid, nasal cavity, or salivary gland can promote positive tobacco prevention and cessation decision outcomes. The CDC's 2012 Tips from Former Smokers campaign utilizes a narrative framework to encourage people to quit smoking by showing the toll that smoking-related illnesses take on smokers and their loved ones through hard-hitting ads, and results indicate that this campaign resulted in a 12% relative increase in population-level quit attempts. Therefore, there is a tremendous potential in utilizing HNC survivor narratives to develop narrative interventions that affect diverse populations by increasing awareness about increased cancer risk due to tobacco use and motivate tobacco cessation behaviors. However, in order to harness these narratives, we must first understand what survivors typically share in these narratives. This descriptive study aimed to conduct a content analysis of HNC survivor narratives on the Web in order to characterize the survivors and their unique narratives, awareness of risk factors, coping with the disease, and psychosocial challenges. A convenience sample of 50 written and video HNC survivor stories was gathered from publicly accessible websites. Using deductive content analysis, it was found that most of the stories were written by HNC survivors who were white (98%) and male (66%). A large majority of survivor narratives (80%) did not mention any known HNC risk factors; risk factors in the remaining narratives included smoking (90%), alcohol (40%) and HPV (10%). Side effects such as fatigue, trouble swallowing, and facial disfigurement were described in a large number of narratives (94%); and an equally large number of narratives (78%) described psychosocial challenges including general concern for the future, labeling cancer as a negative experience, strained relationships, uncertainty about family's future, uncertainty about continuing career and other dilemmas. Finally, a little more than a quarter of survivor narratives included a preventive or screening message to raise awareness about harmful effects of tobacco use and advocate for tobacco cessation. These findings have clear implications around (a) highlighting how tobacco use can cause a harrowing outcome for users and their loved ones, and (b) investigat-

ing the impact of these survivor narratives in raising awareness about risk factors for HNC and encouraging tobacco cessation behaviors.

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POS4-112

ASSOCIATION OF TOBACCO AND E-CIGARETTE USE WITH OTHER ILLICIT DRUG USE AMONG ADULTS IN THE NIGHTCLUB AND DANCE FESTIVAL SCENE

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SIGNIFICANCE: Limited data exists regarding tobacco and nicotine containing product (TNCP) use and its association with other drugs of abuse in high risk settings. The purpose of this study was to examine the associations between TNCP use and other common illicit drug use among adults attending Electronic Dance Music (EDM) parties at nightclubs and festivals in New York City (NYC). **METHODS:** Adults (age 18-40) were recruited outside of EDM events in NYC between May and August 2016 and completed a computer-assisted personal interview on a tablet. The survey took approximately 10 minutes to complete and queried sociodemographic characteristics, nightlife attendance, and self-reported use of TNCPs (e-cigarettes, hookah, and "tobacco") and other drugs. Among recent (12-month) TNCP users, we compared illicit drug use according to number of TNCPs reportedly used with use of one TNCP representing mono-use, any two representing dual-use, and all three representing poly-use. **RESULTS:** More than half the overall sample (54%; N=524 of 965) reported past year use of a TNCP. Participants' mean age was (25.1+4.5) years, and 55.2% were male, and 27.7% reported attending an EDM event at least once a week. Almost half (46%) were mono users, 27% were dual TNCP users, and 27% were poly TNCP users. Sociodemographic characteristics were not associated with number of TNCPs used; however, number of TNCP products was significantly different regarding past-year use of marijuana, powder cocaine, ecstasy (MDMA, "Molly"), LSD, and psilocybin ("magic mushrooms"). Poly users were more likely to report use of marijuana (94.4% vs. 87.9% dual and 68.3% mono; $p<0.001$), cocaine (69.2% vs. 56.7% dual and 32.1% mono; $p<0.001$), ecstasy (65.0% vs. 61.0% dual and 49.6% mono; $p=0.007$), LSD (46.9% vs. 34.8% dual and 19.6% mono; $p<0.001$), and psilocybin (44.8% vs. 31.2% dual and 16.7% mono; $p<0.001$). **CONCLUSIONS:** Among this sample of EDM attendees in NYC, past-year use of TNCPs was strongly associated with the use of illicit drugs suggesting use of more TNCPs is associated with risky behavior in high risk settings. A limitation was that "tobacco" included all other TNCPs other than e-cigarettes and hookah. Adults' TNCP use patterns might be indicative of the extent of illicit drug use, especially among those frequenting high risk settings. Future research needs to probe in the reasons behind the patterns of TNCP use among those in high risk settings.

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POS4-113

WORK SITE TOBACCO CESSATION PROGRAMS - INCREASING WORKERS' CESSATION ATTEMPTS THROUGH WEB BASED CESSATION TOOLS

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SIGNIFICANCE: Employers throughout Utah have expressed interest in tobacco cessation services available in work settings. Improved employee health and reduced healthcare costs are top priorities for employers. Reducing tobacco use among employees is essential to achieving these goals. Human resource departments and insurance companies in the area have contacted local health departments seeking tobacco cessation resources for their employees. The Utah Tobacco Cessation Workgroup partnered with the company Centa in order to investigate



useful tobacco cessation resources available to employers. This was done to supplement tobacco cessation programs being created by health educators across the state. **METHODS:** A simple web search using the phrase "how to stop smoking" was performed producing millions of hits. Websites with exceptional quit resources including tobaccofree.org, cdc.gov, and smokefree.gov were among the top twenty sites displayed in the web search. However, the information found involved moderate study and referred people to state run quit programs tailored for individuals. Analysis of tobacco programs in six states in the intermountain west was carried out using search words "stop smoking," "tobacco cessation," and "how to quit smoking." All searches resulted in millions of hits. Without knowledge of state run programs, isolating state tobacco websites proved difficult. Therefore, the state name was added to the beginning of each search phrase resulting in state cessation programs appearing in the first twenty search results. The state pages link to cessation services but require a time investment to navigate as well as enroll in the program. **RESULTS:** The number of pages required to navigate is as follows; Utah 2 pages, enroll, Wyoming 1 page, enroll, Idaho 2 pages, enroll, New Mexico 1 page, enroll, Nevada 3 pages, enroll, Montana 3 pages, enroll. The enrollment process varies state by state and is tailored to individuals. **CONCLUSION:** While resources for employers do exist, the majority of state cessation materials are not easy to utilize in work settings. The workgroup determined that the creation of an online resource would be ideal for employers to utilize without requiring individuals to enroll in a state program. The website is designed in a modular format and includes a downloadable workbook available to employers to meet their goal of improving employee health. The website and associated workbook are also available for health educators as they conduct tobacco cessation presentations and design tobacco policies.

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POS4-114

WHAT ARE YOU SMOKING? RESULTS OF A UNIVERSITY CAMPUS SURVEY

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SIGNIFICANCE: While rates of tobacco use have been declining over the past 20 years, uses of other tobacco and nicotine products has risen dramatically in the past five years, such as hookah and electronic cigarettes. The rise of these electronic nicotine delivery systems (ENDS) is problematic because their use among young adult nonsmokers may lead to an increased probability of smoking cigarettes, and they contribute to the renormalization of smoking, as they often look and function similarly to traditional cigarettes. **METHODS:** Our research team collected over 800 surveys at a busy location on a large public university campus. We surveyed students (undergraduate and graduate), faculty, and staff about their attitudes and behaviors regarding tobacco and nicotine products and a 100% tobacco-free campus policy. We used a paper and pencil survey, including closed and open-ended questions and Likert scale measures of agreement statements. **RESULTS:** A total of 873 (381 male, 487 female, remaining "other" or missing) respondents completed and returned the surveys. The majority were undergraduates (89.8%, n=733), 8.7% (n=76) were graduates, and 1.4% (n=12) reported not pursuing a degree. Mean age was 21.7 (SD 5.47). Most respondents lived off campus (54.2%, n=474) with 33.6% (n=294) of respondents living on campus, and 11.4% (n=100) living in a family home. Those respondents who used electronic cigarettes were also more likely to use smokeless tobacco products (p=.000), but there was no relationship to tobacco cigarettes. Students in their 3rd and 4th year of undergraduate education were more likely to use electronic cigarettes (p=.011), and smokeless tobacco (p=.015) than either freshmen or graduate students. International students were more likely than domestic students to use both smokeless tobacco products (p=.002) and electronic cigarettes (p=.000). Of those surveyed, 9.8% (n=67) reported smoking at least 100 cigarettes in their lifetime, 36.4% (n=250) reported having used e cigarettes, and 54.3% (n=184) reported having used hookah. Of those surveyed, a majority of respondents reported not knowing any ingredients in hookah (58%, n=181), and 69.5% (n=219) reported not knowing any ingredients in ENDS. **CONCLUSIONS:** Despite these novel products being marketed as harmless, or quit smoking aids, students are using them for other purposes, and are uneducated about their ingredients or potential harms. Respondents at this university are using ENDS and hookah at higher rates than traditional tobacco, despite not knowing their ingredients.

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POS4-115

KNOWLEDGE, ATTITUDES, AND SMOKING BEHAVIOURS AMONG DENTAL AND MEDICAL STUDENTS IN CHENNAI, TAMIL NADU, INDIA

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BACKGROUND: Tobacco use continues to be the leading cause of preventable disease and it is responsible for more than 5 million deaths each year worldwide. The prevalence of smoking among adults accounts for approximately 25% deaths annually. Undoubtedly, smoking remains the main cause of mortality and morbidity in the developing nations. Healthcare professionals have an important role to play both as advisers influencing smoking cessation and as role models. However, many of them continue to smoke. Several studies have demonstrated the efficacy of smoking cessation programs and the importance of physician's advice to their patients. The aims of the present study are as follows: (i) to evaluate smoking prevalence, knowledge and attitudes, and tobacco cessation training (ii) to estimate the extent of teaching about tobacco and smoking cessation techniques. **MATERIALS AND METHODS:** A structured questionnaire consisting of 14 questions related to tobacco/smoking habits, cessation training and role of health professionals in tobacco control were asked to the study population and their response was recorded. Random sampling method was used and data was collected from a cross-sectional survey. The survey was conducted between January and February 2016. Statistical analysis was done using SPSS version 17. **RESULTS:** A total of 259 answered the questionnaire of which 29% declared to be smokers. About 53% of the males have smoked at least once in their life and the age of cigarette initiation was 16-17 years for 28% of the sample. 76% considered health professionals as behavioural models for patients, and 96% affirmed that health professionals have a role in giving advice or information about smoking cessation. Although 87% heard about smoking related issues during undergraduate courses, only 17% received specific smoking cessation training during specialization. 93% of the sample agreed that health professionals should receive specific training on smoking cessation according to while 6% were of the opposite opinion. **CONCLUSION:** All healthcare professionals play an important role in the process of smoking cessation both as advisers and behavioral models for the general population. The present study highlights the importance of focusing attention on smoking cessation training, given the high prevalence of smokers among physicians specializing in medicine and dentistry, their key role both as advisers and behavioural models, and the limited tobacco training offered in the curriculum.

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POS4-116

EVALUATING METHODS OF RECRUITING PEER MENTORS: A MOBILE-BASED SMOKING CESSATION STUDY

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Peer mentoring delivered by lay coaches is an essential component of popular health promotion programs like Alcoholics Anonymous and Weight Watchers. For smokers who want to quit, automated text messaging programs that provide motivation and information have also proven helpful. However, existing interventions for smoking cessation have not combined these approaches. In this ongoing pilot study, we test the feasibility and effectiveness of different methods of recruiting peer mentors to deliver smoking cessation support via text messaging. We aim to recruit 90 peer mentors to provide social support during an 8-week period to smokers who want to quit, and that combines automated and personalized messages from mentors. Mentors are paid modestly for their time (\$200, plus entry in a \$1,000 drawing). We are recruiting mentors through a variety of approaches: postings on social media platforms of three national tobacco control programs/organizations (Quit for Life, Smokefree.gov, and the American Cancer Society [ACS]), advertisements on the webpages of ACS, and an email solicitation to facilitators who participated in a nationwide group-based cessation program (ACS' Freshstart Program). To date, we have recruited 41 potential mentors, 95.1% of whom are



women. Forty-four percent found out about the study through the email solicitation, 23.5% through web advertisements, 11.1% through Facebook postings, and 14.7% through word of mouth. At least 63.4% of potential mentors have had prior experience as a cessation counselor or facilitator. Our early findings suggest that a variety of methods may be needed in targeting and recruiting peer mentors to provide cessation support. Our interventional study that follows will help to clarify the potential of peer mentoring as a low-cost, population-based smoking cessation strategy.

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POS4-117

TOBACCO ISSUES IN BREXIT-BACKER SOCIAL MEDIA

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SIGNIFICANCE: The Brexit vote in mid-2016 was preceded by an intensive social media campaign covering a variety of topics and media platforms as well as dynamising hundredthousands of users. This study aims to provide quantitative analyses of the social media content on tobacco-related topics in the context of Brexit vote to identify the peculiarities of online public opinion formulation. **METHODS:** A data mining algorithm was designed to collect information on the activity of selected major pro-Brexit Facebook pages and their impact on online interaction of users regarding the 12 months preceding to the vote. Search queries were designed to identify posts concerning topics related to tobacco or smoking. Further data (such as number of likes, frequency, timing and content of comments) were collected on selected posts to cover multiple aspects of user activity. **RESULTS:** A total number of 6 posts were identified on tobacco topics, namely: regulation of e-cigarettes, banning menthol cigarettes, introduction of plain packaging, lobbying of tobacco companies and legal actions of big tobacco. All posts appeared on the same Facebook page (Leave.EU). The regulation of e-cigarettes and banning menthol tobacco products appeared directly in the context of pro-Brexit reasoning, whereas other topics appeared indirectly, in the context of the TTIP. Although, the post discussing plain packaging received the most number of likes, the posts reflecting on menthol and electronic cigarettes induced more intensive user reactions (i.e. a higher number of users posted a comment, liked each others' comments), revealing a group of users sensitive to these topics. **CONCLUSION:** This study describes how the online community reflects to tobacco-related topics in the social media coverage of major political events such as the Brexit vote. Users seemed to produce more intense reactions when being exposed to the deprivation of certain products, compared to other issues. It can also be concluded that there is a risk of creeping corporate interest to influence public opinion through social media. These platforms may serve as a loophole for tobacco marketing, proposing future challenges to the regulators.

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POS4-118

ADOPTING SOCIAL MARKETING STRATEGY TO CHANGE BELIEF IN SMOKING BEHAVIOR AMONG YOUTH

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Tobacco use is a major preventable cause of premature death and diseases, which kills 6 million people worldwide annually. In 2015, approximately 22.8% (4,991,458) of Malaysian population aged 15 years and above were smokers, 43.0 % (4.85 million). Our National Strategic Plan for Tobacco Control (2015-2019) aims to instill a smoke-free lifestyle among youths, to empower the society in denormalizing smoking habit and to provide complete protection from cigarette smoke in public places. Tobacco industry is well known to target youth in marketing their product. The second national health survey in 1996 reported the public health sector has not acted in a timely manner to curb the marketing tactics of tobacco company. Failure to act aggressively from 1970 has made the action on 90' more difficult. Between 1986 and 1996 there was a 67% increase in teenage smokers. Learning from previous mistake, aggressive promotion to protect youth from the tobacco industry is crucial to prevent further increase in their smoking prevalence.

For this study, social marketing strategy will be applied as the intervention and further evaluation will be done to assess its effectiveness. Social marketing is defined as "the adaptation of commercial marketing technologies to programs designed to influence the voluntary behavior of target audience to improve their personal welfare and that of the society of which they are a part". A cool social branding will be developed to counteract tobacco industry marketing strategy to target youth population. Therefore, this study aims to change the Belief in Smoking Behavior Among Youth. The study will be conducted in 3 different stages. Stage 1: To identify the 'baseline' of the belief about smoking behavior among youth in university campus. Stage 2: Intervention stage where social marketing strategy will be applied. Stage 3: To evaluate the outcome of the intervention. A well designed structured and effective social marketing strategy is expected to change smoking behavior among youth in Malaysia. This study will add more information about the belief of smoking among youth in Malaysia, our segmented target.

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POS4-119

DO ATTITUDES TOWARD SMOKING CHANGE AFTER QUITTING? EVIDENCE FROM THE SIDRIAT STUDY

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SIGNIFICANCE: Quitting smoking is very difficult and often determined by more or less favourable attitudes towards smoking, as health concerns and expectations of an improved quality of life, as well as personal skills, such as the conviction of being able to manage a change. The aim of this study is to assess how certain motivational factors and personal skills change in former smokers by increasing time since their smoking cessation. **METHODS:** We used the follow-up data of 655 ex-smokers from the SIDRIAT study, a prospective multicenter cohort study that involve 1763 Tuscan youths and their 2870 parents already interviewed in 2002 in the SIDRIA2 study. We studied the association between time since smoking cessation and self-efficacy, i.e. the belief of being able to quit smoking, positive attitudes towards smoking, such as to consider it a pleasure and an important part of life, the health concerns and the expectation of an improvement in the quality of life by quitting smoking, using ordinal logistic multivariate models. **RESULTS:** Increasing the time since smoking cessation self-efficacy increases and positive attitudes towards smoking, the health concerns and the expectation of gains in quality of life decrease. **CONCLUSIONS:** This study confirms that attitudes and concerns related to smoking and personal skills determine a successful quit of smoking, and these factors are further strengthened increasing time since cessation. The smoking cessation programs should therefore focus on strengthening these aspects.

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POS4-120

SHORT TERM EFFECTS OF THE ANTISMOKING LAW FROM MARCH 2016 ON TRANSYLVANIAN TEENAGERS' ATTITUDE TOWARD SMOKING

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SIGNIFICANCE: A new law that bans smoking in all enclosed public spaces was implemented in Romania in March 2016. Main objective: We aimed to evaluate short-term effects of the Antismoke Law on teenagers' attitudes toward smoking. **METHODS:** Our cross-sectional study used a self-administered questionnaire completed by 8th grade students from three Transylvanian counties. The random stratified sample involved 695 students from 21 localities, 21 schools, and 55 classes. We report descriptive statistics regarding respondent perceptions of the new law. **RESULTS:** More than half (50.3%) of respondents reported that they



discussed the law with family members, and 46.2% were informed of the law in school. 15% of the teens are firmly convinced that the law will definitely trigger decrease of smoking prevalence, 38.1% believe it will be helpful to decrease smoking rate and the other responders were skeptical. There is a significant difference between smoking and non-smoking students also in the way they see the impact of the law, as facilitating hidden smoking (Chi square= 19,018; $p=.001$). Also non-regular smokers declared in a higher rate, that the new law influenced their smoking habits (Chi square=7,996; $p=0.046$). Since introducing the law, there has been a significant decrease in the average of the number of cigarettes smoked during a day from 5.72 to 3.51. The rate of the different tobacco products which they have consumed after implementation of the law: traditional cigarettes 22.6%; electronic cigarettes 33.4%; hookah smoking 21.7%; home-made cigarettes 9%. Majority of the responders have seen fewer smokers among parents and teachers. 8.6% of the adolescents do have friends who quit smoking. They also affirm that teachers respect designated smoking areas but 43% didn't see change among adolescents. **CONCLUSION:** However, there was no systematic debate - neither at home nor at school - after introducing anti-smoking law, majority of the responders do have a positive attitude toward the restrictive rules and, in their opinion, this law has perceived positive effects.

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POS4-121

CONSULTATIONS TO THE ARGENTINEAN NATIONAL TOBACCO CONTROL PROGRAM WEBPAGE

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BACKGROUND: Argentina is one of the few countries worldwide that has not ratified the Framework Convention for Tobacco Control. However, since 2004 the country has a National Tobacco Control Program (NTCP) which has implemented several tobacco control strategies according to the FCTC including a comprehensive national legislation since 2013. Since January 2007, the NTCP webpage provides a contact email for consultations. We aimed to assess how reasons for contacting the NTCP have evolved over the last decade. **METHODS:** We coded all consultations received through the contact email assessing year, month, gender, province/country and reason to consult. To facilitate analysis, reasons were coded into 7 categories: complaints about non compliance with smoke-free legislation, questions regarding smoking cessation, requests of promotional materials or capacity building, questions regarding the smoke-free institutions registry, offers to collaborate with the program, general questions and general comments. **RESULTS:** The NTCP received an average of 340 consultations per year (211 in 2011; 574 in 2007). Although most consultations came from the capital city of Buenos Aires, we received consultations from each one of the 24 states and also from other countries. We did not find a statistical difference in consultations by gender. The top reasons for consulting over the years were advice for smoking cessation and requests for materials and capacity building. However, after 2013, when the country passed a legislation that included 100% smoke free places and warning labels in all packs complaints about non compliance also increased. In the last couple of years, the number of consultations about e-cigarette use has increased dramatically. **CONCLUSIONS:** Analysis of consultations may be used as a reasonable tool to track the impact of tobacco control strategies implemented by the NTCP and emerging problems like e-cigarette use. The number of consultations per year varies according to the different communication campaigns implemented and is sustained by the inclusion of the webpage in all cigarette packs.

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POS4-122

ARE SCHOOL POLICIES ON E-CIGARETTES EFFECTIVE AT REDUCING E-CIGARETTE USE AMONG STUDENTS? A STUDY ON MIDDLE AND HIGH SCHOOLS IN TEXAS

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BACKGROUND: E-cigarette use has significantly increased among youth nationwide. No previous studies have examined the impact of e-cigarette school policies on student's e-cigarette use. **METHODS:** Data were from the Texas Adolescent Tobacco Advertising and Marketing Surveillance (TATAMS) study and an E-cigarette School Policy Interview conducted during the 2014-2015 school year. Weighted, logistic regression models adjusted for other types of tobacco use were used to examine associations between school e-cigarette policies and student self-reported e-cigarette use behaviors, among schools where administrators perceived e-cigarettes as an issue in their school or not. **RESULTS:** Written school policies were collected from 91% of 79 TATAMS middle and high schools, and 70% of these had provisions for student e-cigarette use. Fifty-four (68%) school administrators completed the E-cigarette School Policy Interview. In schools where administrators perceived e-cigarettes as an issue, the adjusted odds of ever e-cigarette use, susceptibility to use e-cigarettes, and perceived peer use of e-cigarettes was 0.20-0.54 times lower for students attending schools who had a policy on e-cigarettes compared to those without a policy ($p<0.05$). No significant relationships were observed in schools whose administrators said e-cigarettes were not an issue ($p>0.05$). Additionally, no significant associations were found between a strong policy, as indicated by the e-cigarette policy index, and e-cigarette use behaviors ($p>0.05$). **CONCLUSIONS:** E-cigarette school policies show an impact on youth e-cigarette use behaviors in schools where e-cigarettes are an issue. These findings support the need for additional research focusing on the impact of school-based e-cigarette policies.

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POS4-123

POPULARITY OF DIFFERENT TYPES OF HERBAL VAPORIZERS ON POLISH MARKET

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Different types of heat not burn products appear on Market since e-cigarettes become popular. One of such products are herbal vaporisers, which were built to heat not burn tobacco and other herbs. They can gain popularity with e-cigarettes but in contrast to electronic cigarettes there is no data about their popularity and toxicity for users. It is important to identify the most popular of them to be able to verify their toxicity because of different types of this products on Market. The aim of the study was to examine the availability on the Internet of herbal vaporizers in Poland. To examine this goal Google internet search engine, and auction website have been used. The research have been made twice in 2016. First in a period from February to April 2016 second in a period from July to August 2016. Research were done in two stages in the first one google searching engine have been used to identified brands and models of heat not burn products available in Poland. To do this polish word "waporyzer" (Eng. Vaporizer) have been used in Google. Then 60 first records have been used to identified all brands and models available in Poland, e-cigarettes brands and models have been excluded. Next all found brands and models were divided in to two groups. First – Portable vaporizers and second stationary ones. In the second stage Allegro – the most popular auction website and google search engine have been used to compare the popularity of each model. That allows us to rank the products due to their popularity. In the first stage 89 models (58 portable and 31 stationary) have been identified. The most popular were portable vaporizers. The most popular models were (number of auctions in Allegro; number of records in Google): Vaporizer AGO, company: Ago Vapor Co. (656, 44338); Vaporizer Titan 2 HEBE, different companies (274, 34817); Storm



Vaporizer Pen, no data about company (66, 10424). In accordance to stationary devices the most popular were (number of auctions in Allegro; number of records in Google): Volcano Plenty, company: Storz & Bikel (31, 10698); Volcano Digit Solid Valve company: Storz & Bikel (28, 4360), Volcano Digit Easy Valve company: Storz & Bikel (25, 4287). This study allows us to choose the most popular products on the Market, what in the future will allow us to provide toxicology analysis of this group of products. AS accepted personal fees from the eSmoking Institute in Poznan, Poland, and non-financial support from Chic Group LTD, a manufacturer of electronic cigarettes in Poland, outside of the submitted work.

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POS4-124

BARRIERS AND FACILITATORS TO SMOKING CESSATION IN PRIMARY HEALTH CARE, MEXICO

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INTRODUCTION: It is important to identify all smokers, their smoking status, and offer treatment, which may include counselling and pharmacotherapy. The most common method used by most people who have stopped smoking in Mexico is unassisted cessation. **OBJECTIVE:** To identify knowledge, practices, and perceived barriers and facilitators by health professionals to offer medical care to smokers in the primary care level in Mexico. **METHOD:** Cross sectional qualitative-quantitative research realized in two primary care clinics in Mexico City. A survey to evaluate knowledge and practices on treating smokers was applied to 70 health professionals, and six semi-structured personal interviews were realized by the study staff to examine perceived barriers and facilitators by the health professionals. **RESULTS:** The sample consisted of 57% physicians and 43% nurses; 77% women. A total of 17.5% physicians and 6.7% nurses responded correctly 4 out of the 5 questions about knowledge. Less successful questions were those related to the MPOWER policy (only 11.4% correct). A 25% of the physicians self-reported asking about smoking status, intention to quit, advice to quit, and assist the smokers during medical consultation; meanwhile 25% of nurses referred only asking about smoking status. During the personal interviews, the brief time of consultation, deficiency of infrastructure, nonexistence pharmacotherapy treatment to quit smoking, and lack of training were the main barriers identified by the health professionals, as well as perceived non-interested in quitting of the smokers. The main facilitators identified were gratitude by the patients and the existence of counselors. **CONCLUSIONS:** There is low level knowledge on treating smokers in Mexico and therefore slight in-patient practice. It is necessary to train the health professionals and provide them with the necessary infrastructure to treat smokers in Mexico.

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POS4-125

SMOKING, INFORMATION AND EDUCATION: EVIDENCE FROM THE 1962 REPORT BY THE ROYAL COLLEGE OF PHYSICIANS

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SIGNIFICANCE: On 7th March 1962 the Royal College of Physicians (RCP) published a report titled "Smoking and Health". It highlighted the multifaceted risks that smokers faced. The report published by the RCP was the first that widely distributed the information about the negative effects of smoking on health. While lung cancer was a primary focus the report also linked smoking to other illnesses such as bronchitis and cardiovascular disease. The difficulty in studying the effect of such a report is that data on smoking at the time is not widely available, with studies relying on smoking histories which are subject to various biases, such as recall (Shiffman et al. (1997)) and survivor bias (De Walque (2004)). This study provides evidence on the impact of the report. **METHODS:** In this paper I use a

historical data set that was collected around the time the report was published. Crucially, this dataset, the National Readership Survey (NRS), contains information on smoking behaviours and the age at which the respondent left school. Aizer and Stroud (2011) examine the same information shock for the United States. Two years after the RCP released their report the US Surgeon General released a report with the same name. The NRS is a more general and representative survey. The main purpose of the NRS was to examine changes in readership patterns and did not have a focus on health. **RESULTS:** I find that the probability of smoking cigarettes for those who left school after the age of 16 was 3 percentage points lower relative to those who level school at 15 or younger. The effect of the report was greater for those who left school later. The fall in the probability of smoking for those who left school aged 19 or greater was 7.3 percentage points almost three times as large as the impact on those who left school aged between 16 and 18. The effect appears to last for one year and then disappears. I am able to examine a mechanism that could explain the education and health gradient. It could be the case that rather than access to information it could be that the more highly educated are better at processing the information that is available. I examine this by looking at the gradient separately for those who did not have a TV and those who did. I find no difference in the probability of stopping smoking cigarettes for those who had a TV. **CONCLUSION:** The RCP report on smoking generated significant media coverage and highlighted the risks of smoking. Using a survey collected around the time of the report I find the smoking rates of the more educated fell.

FUNDING: No Funding

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POS4-126

EVOLUTION OF EDUCATIONAL INEQUALITIES IN DIVERSE SMOKING CONTEXTS – AN ANALYSIS OF SELECTED COUNTRIES IN THE SOUTH ASIA AND EAST ASIA-PACIFIC REGIONS

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BACKGROUND: The Cigarette Epidemic Model (CEM) describes the socioeconomic (SES) evolution of manufactured cigarette smoking specifically – smoking is concentrated in higher educated (positive inequality) in earlier stages and crosses over to lower educated (negative inequality) in later stages. Little is known about the generational evolution of SES inequalities in smoking in diverse smoking contexts, where non-Cigarette Smoked Products (NCSPs) are widely used alongside manufactured white cigarettes. **METHODS:** Data came from the Global Adult Tobacco Surveys (2009-2011) in 6 South Asia and East Asia-Pacific countries (BD-Bangladesh, IN-India, ID-Indonesia, MY-Malaysia, TH-Thailand, and VN-Vietnam) where NCSPs use >=5%. Educational inequalities by smoked type (overall smoking, exclusive manufactured white cigarettes, any NCSPs) were estimated via Relative Index of Inequality (RII), by generation (younger ages, 18-39 vs. older ages, 40-59) and gender, using modified Poisson regression models. **RESULTS:** Female smoking did not exceed 3% in any country, precluding type specific assessments. Negative educational inequalities were observed in overall female smoking, but were not significantly different across age groups in any country. In males, negative inequalities were observed for overall smoking in all countries, but changed significantly across age groups only in IN, MY, TH and VN. But inequalities varied by type. In males, for cigarette smoking, there were positive inequalities in older males but negative inequalities in younger males in IN (RII, 40-59 vs. 18-39: 0.47 vs. 1.21), BD (0.94 vs. 1.55), and TH (0.65 vs. 1.79). In ID, positive inequalities weakened but did not change significantly across age groups (0.08 vs. 0.19). On the other hand, in these same countries, negative inequalities in NCSPs use strengthened significantly from older to younger ages (40-59 vs. 18-39: IN: 8.9 vs. 19.36, BD: 16.06 vs. 50.75, TH: 8.44 vs. 25.87, ID: 1.70 vs. 2.09). In MY and VN, negative inequalities in both smoked types did not change across age groups. **CONCLUSION:** In males, negative inequalities in NCSPs use strengthened across age groups alongside the expected crossover from positive to negative inequalities in cigarette smoking, i.e. the evolution of SES inequalities in diverse smoking contexts is type specific. Since overall smoking masks type specific evolutions, nations with diverse existing or emerging tobacco markets must explicitly monitor and address type specific inequalities in order to reduce overall tobacco use equitably.

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**POS4-127****HEALTH DISPARITIES AMONG THE POOR AND THE RICH WHO WERE CURRENT SMOKERS AGED 35 YEARS AND OVER: EVIDENCE FROM THAILAND, 2013 AND 2015**

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BACKGROUND: The poor are more vulnerable than other socioeconomic group. The linkage between smoking and health inequality is empirical evidence which required the appropriate tobacco control policy. **OBJECTIVE:** to determine the prevalence rate of income inequality in health among Thai adults aged 35 years and above who were current smokers in 2013 and 2015. **METHOD:** The 2nd data of health and welfare survey conducting by National Statistical Office was applied. A survey was used a two stage stratified cluster sampling to produce nationally representative data. Participants aged 35 years and over were selected for this study. Those reported current status of tobacco use, had ever been sickness in the last month, and have been diagnosed with any chronic disease. Income-related health inequality was defined as personal income and divided equally into quintiles ranking from the poorest to the richest. Statistical analysis was performed by using descriptive and inferential statistics. **RESULTS:** In 2013 and 2015, there were no statistical difference in the prevalence of current smoking among Thai adults aged 35 years and above, 20.0% and 20.3%. Among current smokers, the wider gap of those who present any sickness in the last month was observed, at totally 32.3% (25.4% of the poorest vs 17.2% of the richest) and then increased to 38.5% (23.1% of the poorest vs 14.2% of the richest). The prevalence rate of the poorest who were current smokers and present any chronic disease was increased 23%, from 27.4% in 2013 to 33.7% in 2015. Meanwhile, the richest was increased 10%, from 14.3% to 15.7%. The income related inequality in chronic disease was wider between the poorest and the richest from 43.9% (27.4% vs 14.3%) to 53.4% (33.7% vs 15.7%). **CONCLUSION:** These findings suggest that linkage between health outcome and smoking among different of socioeconomic status has a vicious circle. So, the implication of tobacco control policy should be concern about the poverty.

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POS4-128**BI-DIRECTIONAL ASSOCIATIONS BETWEEN YOUNG ADULTS' EXPOSURE TO E-CIGARETTE MARKETING AND E-CIGARETTE USE**

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SIGNIFICANCE: Marketing for e-cigarettes (ENDS) has become increasingly prevalent. Limited research examines the prospective associations between exposure to ENDS marketing and use of ENDS among young adults. Even less research explores if marketing exposure precedes use or if ENDS users are more likely than non-users to report seeing ENDS marketing. The purpose of this study was to examine the bi-directional associations between exposure to ENDS marketing and ENDS use across a 1.5 year period. **METHOD:** Participants were 5,478 students (M age=20.49, SD age=2.36; 63.7% Non-white) from 24 Texas colleges. Students completed a baseline, online survey in fall 2014/spring 2015 and three subsequent surveys six months apart. Items assessed exposure to ENDS marketing through the point-of-sale (product displays and marketing), on television, on the radio, on the internet, and on billboards (0=not exposed, 1=exposed for each medium). An exposure index scored from 0 to 6 was then created. Current ENDS use (past 30 days) was scored dichotomously as "yes" or "no". A multi-level cross-lagged path model, using Mplus 7.3, was used to examine the bi-directional associations between exposure to ENDS marketing and current ENDS use across the four waves, controlling for socio-demographics. **Results:** The cross-lagged model fit the data well: although the chi-square was significant ($p > .05$), the CFI was .95 and the RMSEA was .02. Stability paths between each wave for both ENDS use (beta ranges=.75-.85) and marketing exposure (beta ranges=.55-.72) were significant. Over and above the stability paths and covariates, exposure to ENDS marketing at each previous wave predicted ENDS use at each subsequent wave ($p < .01$). Further, ENDS use at waves 2 and 3 predicted exposure to ENDS marketing at wave 3 and 4 ($p < .01$), respectively. **CONCLUSION:** Findings extend

existing research by showing that marketing exposure and ENDS use are bi-directionally associated. Although ENDS users are more likely than non-users to notice ENDS marketing, exposure to marketing predicts subsequent ENDS use. Findings have implications for limiting exposure of ENDS marketing.

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POS4-129**ASSESSING THE PREDICTING VALIDITY OF THE TOBACCO MARKETING RECEPTIVITY AMONG YOUTH**

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SIGNIFICANCE: In a previous cross-sectional study, we developed a marketing receptivity index (MRI), which had independent, positive associations with positive smoking expectancies, smoking susceptibility and current smoking behavior in a sample of early adolescents in Argentina. The current study aimed to assess the predictive validity of the MRI. **METHODS:** Data come from a longitudinal, school-based survey conducted in 33 secondary schools in Argentina. We included students who had never smoked at baseline and were successfully followed up approximately 17 months later ($n=1700$). Marketing receptivity was assessed with questions in three domains: frequency of going to stores that sell tobacco; recall of brand names for 3 cigarette packages with brand name removed; and ownership of branded merchandise. A four-level MRI was derived (low PoS marketing exposure only; high PoS exposure or recall of 1 brand; recall of 2 or more brands; and ownership of branded merchandise). Self-report of having tried to smoke at follow-up (i.e., initiation) was the primary outcome assessed. Logistic models regressed smoking initiation on the MRI, the MRI components (considered separately), and willingness to try one of the brands shown in the recall task, adjusting for sociodemographics, social influences and sensation seeking. **RESULTS:** The 4 level MRI had independent positive associations with smoking initiation ($AOR_{2 \text{ vs } 1}=1.42$, 95% CI=1.12-1.79; $AOR_{3 \text{ vs } 1}=2.04$, 95% CI=1.38-3.00; $AOR_{4 \text{ vs } 1}=2.16$, 95% CI=1.21-3.82). The index components, analyzed separately, were associated with outcomes except for ownership of branded merchandise. Willingness to try one of the brands shown in the recall task was also associated with initiation ($AOR=1.73$, 95% CI=1.31 - 2.28). **CONCLUSIONS:** The marketing receptivity index and its component were associated with cigarette trial, suggesting its predictive validity and utility for future studies. Ownership of branded merchandise may be more useful for studying smoking progression amongst those who have already tried smoking.

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POS4-130**AVAILABILITY AND MARKETING OF LOW-COST ELECTRONIC CIGARETTES IN LOW-INCOME ETHNIC COMMUNITIES**

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INTRODUCTION: According to the CDC, retail stores have been the most common source of e-cigarette advertising to middle and high school students. Given that retail stores that sell tobacco are disproportionately located in vulnerable, lower income communities, it is imperative to understand which communities are most impacted by the availability of e-cigarette products and marketing, especial-



ly disposable e-cigarettes which are more affordable than reusable e-cigarettes, and when used daily, can be more economical than combustible cigarettes. Retail stores may serve as vaping gateways in vulnerable communities, as use of e-cigarettes sold at retail stores may lead to use of advanced personal vaporizers sold at vape shops. **METHODS:** As a part of USC TCORS Project 2, retail stores in low-income Hispanic/Latino and African-American communities in Southern California are being recruited from a randomized list of retailers licensed to sell tobacco to examine the sale, use, attitudes and beliefs about e-cigarettes among retailers. **FINDINGS:** Current analyses, based on 172 interviews and 141 store observations, show that 17% of retailers have ever used e-cigarettes, with the highest rates in Hispanic/Latino communities (76%). Ever use of a vape pen/vaporizer was similar (15%), with the highest rates in Hispanic/Latino communities (80%). Overall 20% of stores sold e-cigarettes, with 71% sold in Hispanic/Latino communities. Flavored e-cigarettes were sold in 50% of African American communities and in 47% of Hispanic/Latino communities. The cheapest disposable e-cigarettes were found in Hispanic/Latino communities (\$3.99), while the cheapest disposable menthol flavored e-cigarettes were found in African-American communities (\$6.50). Stores in Hispanic/Latino communities (64%) had the highest rates of e-cigarette storefront advertising, compared to 36% of stores in African-American communities. **CONCLUSIONS:** These findings suggest that retailer use of e-cigarettes, availability of e-cigarettes, particularly low-cost disposables, and storefront advertising are more common within Hispanic/Latino communities compared to African-American communities. Communicating educational messages to retailers and the public about e-cigarette products should be community-specific in order to reduce tobacco-related health disparities in vulnerable communities.

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POS4-131

REDUCED ACCESS TO TOBACCO RETAILERS: MODELLING HEALTH, EQUITY AND COST IMPACTS AT A NATIONAL LEVEL

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There is increasing policy and research interest in reducing tobacco retail outlet locations and density, but little understanding of their potential health gain and health economic impacts and no direct empirical evidence of how outlet restrictions affect smoking prevalence. Therefore, we conceptualized outlet reduction as an increased 'cost' (e.g. travel time) and modelled four tobacco outlet reduction interventions at a country level (New Zealand and quantified the potential health and health cost impacts. The four interventions were to: i) reduce existing outlets by 95%; ii) permit sales at 50% of existing liquor stores only; iii) eliminate sales within 1km of schools; and iv) eliminate sales within 2km of schools. We used a multi-state life-table model of 16 tobacco-related diseases, which through 'cost changes' and tobacco price elasticities leads to smoking prevalence changes, and thence quality-adjusted life-years (QALYs) gained and net costs saved over the remainder of the 2011 population's lifetime. The most effective intervention limited sales to half of liquor stores (and nowhere else) resulted in a 0.8% reduction in tobacco prevalence in 2025 (down from a business-as-usual projection of 9.9%), and 29.4 QALYs gained per 1000 population (95%UI: 16.8 – 48.1), undiscounted. The per capita QALY gains were up to five times greater for Māori (indigenous population) compared to non-Māori. All interventions were cost-saving to the health system. These modelled tobacco outlet interventions reduced smoking prevalence, achieved health gains, and saved health system costs. If outlet reductions have additional spill-over effects (eg, denormalisation of smoking) then the effects would be larger. While these modelled impacts of tobacco outlet reduction were not as large as tobacco tax increases (using the same model), these and other strategies could be combined to both maximise health gain and to maximise cost-savings to the health system.

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POS4-132

IMPACT OF E-CIGARETTE ADVERTISEMENT WARNING LABELS AND CLAIMS ON E-CIGARETTE HARM PERCEPTIONS IN U.S. YOUNG ADULTS

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SIGNIFICANCE: Exposure to e-cigarette ads has been shown to increase intention to use e-cigarettes and e-cigarette trial in young adults. This may be due, in part, to claims made in product advertising that convey potential benefits of the product. Warning labels provide one way to communicate to young people on the potential harms associated with e-cigarette use. The goal of this study was to examine the impact of altered e-cigarette ad warning labels and claims on harm perceptions of e-cigarettes in a national sample of US young adults. **METHODS:** The current study randomized 4,096 young adults aged 18-34 to be exposed to one of 6 altered versions of a MarkTen e-cigarette ad using a 3 (warning label: none, short, long) x 2 (ad claim: yes, no) design or to a control condition (no ad). The long warning label was taken from existing MarkTen ads while the short warning was FDA's proposed "Nicotine is addictive" warning. The ad claim was "No ash. No tar. No smoke." Bivariate analyses examined the prevalence of e-cigarette harm perceptions overall and by study condition; multivariable log-binomial models included main and interaction effects of warning labels and claims, controlling for age, prior e-cigarette awareness, and cigarette smoking status. Additional analyses stratified by whether a respondent identified the product featured in the ad as an e-cigarette. **RESULTS:** Across all conditions, 40.4% of respondents perceived e-cigarettes to be "very" or "extremely" harmful. More than half (53.3%) perceived e-cigarettes to be as or more harmful than cigarettes and most identified the product in the ad as an e-cigarette (85.2%). There were no differences in harm perceptions of e-cigarettes across seven study conditions. Respondents in the "short warning label + claim" condition who were unsure of what product was featured in the MarkTen ad were the only group to report a significantly higher prevalence of e-cigarette harm relative to cigarettes. **CONCLUSIONS:** Future research is needed to identify how young adults attend to a variety of warning labels and claims in e-cigarette ads and ways in which warning labels can better serve an educational function on these products.

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POS4-133

YOUNG ADULT SMOKERS' AND NON-SMOKERS' AFFECTIVE RESPONSES TO NOVEL ON-PACK WARNINGS

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SIGNIFICANCE: On-pack tobacco health warnings typically present health risks designed to arouse fear. However, many young adults rationalise or reject these health-oriented warnings, which they view as depicting distal and irrelevant outcomes. We examined negative affect elicited in this demographic following exposure to warnings featuring more proximal and social effects. **METHODS:** We used a modified version of the Geneva Emotion Wheel (GEW) to measure emotional reactions and response intensity for 10 negative emotions stimulated by 36 different warning image and message combinations, plus a control. A sample of 474 smokers and 476 susceptible non-smokers evaluated three images drawn randomly from the set of 37 and indicated the emotions they associated with each image, and the intensity of emotional arousal experienced. We estimated general linear models to examine the effects of warning image, warning message, gender, ethnicity and smoking status (and interaction effects) on emotional potency. **RESULTS:** The images elicited very different negative emotions. Overall, daily smokers showed weaker emotional potency scores than occasional smokers, and male smokers had lower scores than female smokers. However, three images featuring a stillborn fetus, unwell baby, and animal testing, respectively, were all significantly more potent than the control among all smokers. Non-smokers had higher potency scores for images featuring animal testing, child labor and serious health outcomes; again, women typically had stronger responses than men. **CONCLUSIONS:** Images showing how smoking affected innocent third parties elicited stronger emotional reactions and thus may help deter smoking initiation and



prompt cessation among young adults. Current work is examining how emotional potency scores align with choice patterns and will test whether the Geneva Emotion Wheel could function as a screening tool to identify warnings with the greatest potential for reducing smoking prevalence.

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POS4-134

NEGATIVE EMOTIONS ELICITED BY CIGARETTE PACK WARNING LABELS AND SMOKING CESSATION: A LONGITUDINAL STUDY WITH SMOKERS IN AUSTRALIA, CANADA, MEXICO, AND THE US

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BACKGROUND: Health warning labels can elicit negative emotions among smokers, yet little is known about how these negative emotions influence behavior change. Guided by psychological theories about the role of emotions in risk perception and behavior change, we investigated whether smokers who reported stronger negative emotional responses when shown warnings also reported stronger responses to warnings in daily life and were more likely to try to quit. **METHODS:** 5,439 adult smokers from Australia, Canada, Mexico, and the US were surveyed every four months from Sept 2012 to Sept 2014. They were shown warnings already implemented on packs in their country and rated them for negative emotional responses (i.e., fear, disgust, worry), which were averaged (range=1 to 9). Country-stratified logistic and linear Generalized Estimating Equation models were estimated, regressing self-reported responses to warning labels in daily life (i.e., attention, cognitive responses to warnings, avoidance of warnings, forgoing cigarettes) and cessation attempts at follow-up on negative emotional responses, adjusting for socio-demographic and smoking-related characteristics. **RESULTS:** Smokers who reported stronger negative emotions were more likely to make cessation attempts at follow-up (Adjusted ORs ranged from 1.09 [95% CI: 1.04-1.14] to 1.17 [95% CI: 1.11-1.20] across countries; $p < 0.001$) than those who reported weaker negative emotions. Across countries, this relationship was partially mediated through the responses to warnings in daily life. Interactions between negative emotions and self-efficacy were not significant. **DISCUSSION:** Our findings suggest that negative emotions elicited by warnings encourage behavior change, promoting cognitive and behavioral responses that are associated with subsequent quitting behavior.

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POS4-135

PREDICTORS OF CIGARETTE SMOKING INITIATION IN EARLY, MIDDLE AND LATE ADOLESCENCE

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SIGNIFICANCE: Little is known about age-related differences in risk factors for cigarette smoking initiation. We identified predictors of initiation in early, middle and late adolescence from among sociodemographic factors (sex, age, maternal education); social modeling indicators (father/mother/siblings/friends smoke, home smoking rules, number of smokers at home, smoking in cars, school smoking rules); psychological characteristics (depressive symptoms, school connectedness); lifestyle behaviors (hours of TV daily, weight-related goals, use other tobacco products); and perceived need for cigarettes. **METHODS:** Data were drawn from a longitudinal study of 1801 children age 10-11 years at inception from 29 elementary schools in Montreal, Canada. Multivariable logistic regression

within a GEE framework was used to identify predictors among never-smokers across three 2-year windows: age 11 to 13 ($n = 1221$); age 13 to 15 ($n = 737$); and age 15 to 17 ($n = 690$). **RESULTS:** Three social modeling indicators, depressive symptoms, use other tobacco products and perceived need for cigarettes were operative across adolescence; nine additional predictors were significant in at least two age groups. Estimates for five social modeling indicators (father/mother/friends smoke; no smoking ban at home; number of smokers at home) decreased by >10% between early and late adolescence. Sex, TV viewing and weight-related goals were not associated with initiation. **CONCLUSIONS:** Tobacco control programs should focus on eliminating smoking in the social environment and on availability of other tobacco products. Because several risk factors were notably potent in early adolescence, intense preventive efforts may be needed for highly susceptible elementary school children.

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POS4-136

VAPE SHOP EMPLOYEES: ASSISTING CUSTOMERS, ENCOURAGING CESSATION, PROMOTING COMMUNITY, AND SUPPORTING REGULATIONS

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SIGNIFICANCE: E-cigarettes have increased in popularity, giving rise to a new type of sales outlet—the vape shop. Expanding on work examining vape shop employee e-cigarette and tobacco attitudes and behaviors, this study examined key messages that vape shop employees communicate to customers. **METHODS:** Using informal interviews, observations, and a cross-sectional survey, we examined vape shop employees' perceptions and e-cigarette use. Data were collected in 9 vape shops in Louisville, Kentucky. We used open coding to analyze the qualitative interviews, observation notes, and open-ended survey responses. Descriptive statistics were used to analyze survey data. **RESULTS:** The findings revealed that nearly all employees were former smokers (93.8%), who now relied solely on e-cigarettes. Over one-third of the employees (37.5%) began using e-cigarettes as a replacement for traditional cigarettes, and 93.8% reported better health since starting e-cigarettes. Although most employees believed that e-cigarettes should be regulated, 56.3% thought regulations should be different from those governing traditional cigarettes. Analysis of qualitative data revealed that employees see themselves as health advocates who: 1) provide instructions on vaping and promote a vape community, 2) encourage cessation of traditional cigarettes, and 3) support regulations. **CONCLUSIONS:** The findings reveal that vape shop employees regard e-cigarettes as viable smoking cessation tools and relish their role in assisting others in taking what employees view as positive health actions. Future research addressing communication between vape shop employees and customers, especially related to smoking cessation and health, is needed.

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POS4-137

A LATENT TRANSITION ANALYSIS OF MULTIPLE TOBACCO AND NICOTINE PRODUCT USE PATTERNS AMONG TEXAS COLLEGE STUDENTS

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SIGNIFICANCE: Diverse tobacco and nicotine products have altered the terrain of tobacco use behaviors. Limited research has examined longitudinal, contemporary patterns of use among young adults. This study identified product use groups and examined changes in young adults' use patterns over time. **METHODS:** Participants were 5,482 18-29 year old students (mean age=20.5 SD=2.36; 63% female) from 24 Texas colleges who completed 4 waves of an online survey. Latent class analysis was used to identify user groups from 10 wave 1 items (ever and current use of cigarettes, cigars, smokeless tobacco, e-cigarettes, and hookah). Latent transition analysis was used to examine probabilities of transitioning between groups over 4 waves. **RESULTS:** 10 classes were identified: non-users (38%), poly-experimenters (14%), former alternative tobacco (ATP) users (12%), irregular users (10%), poly-users (10%), ATP users (6%), dual users (4%), cigar users (2%), e-cigarette users (2%), and smokeless tobacco (SLT) users (1%). Cigarette users were dual- and poly-users. Cigarette and e-cigarette users had high prevalence of experimentation with all products. E-cigarette users had high prevalence of former cigarette use. Few students transitioned between classes over time; patterns of tobacco and nicotine product use remained stable. Dual users had the highest average probability of remaining stable over time (1.0), followed by e-cigarette users (.92), poly-users (.92), non-users (.92), former ATP users (.91), ATP users (.89), cigar users (.88), SLT users (.87), irregular users (.86), and poly-experimenters (.83). All groups became more stable over time except e-cigarette users and ATP users whose members were most likely to transition to dual or poly use groups. The greatest transition was from poly-experiencer to e-cigarette user with probabilities of .23, .17, and .12 for transitioning between waves 1 and 2, 2 and 3, and 3 and 4, respectively. **CONCLUSION:** There was substantial multiple product use, which may explain little movement between groups over time. Initiation of and fluctuations in alternative product use underscore the need for prevention programs targeting college students.

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POS4-138

USING INTEGRATIVE DATA ANALYSIS TO EXPLORE TOBACCO USE PATTERNS AMONG POPULATION SUBGROUPS

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States collect similar tobacco measures across multiple independent population-based surveys, which often have insufficient sample sizes to explore behaviors in small population subgroups. Integrative data analysis (IDA) is a novel methodology that allows researchers to pool samples from separate studies to increase statistical power and sample heterogeneity. We explored the use of IDA to improve precision when estimating the prevalence of smoking cigarettes and electronic cigarettes (EC) among American Indians (AIs) by gender and age. We harmonized demographic and tobacco use variables and pooled data from three statewide surveys in Oklahoma: Behavioral Risk Factor Surveillance Survey (BRFSS, n=6,347), Oklahoma Adult Tobacco Survey (ATS, n=3,026), and Tobacco Stops With Me Survey (TSWM, n=991). The sample sizes for AIs in Oklahoma were 552, 142, 97, and 791 for BRFSS, ATS, TSWM, and IDA datasets, respectively. We created combined stratification and weight variables for pooled analyses to estimate prevalences and 95% confidence intervals (CI). We used the coefficient of variation (CV) as an indicator of precision, with CV >0.3 indicating an insufficient sample size for reporting. Using IDA, the prevalence of smoking among AIs was 26.0% (CI: 20.1-31.8%; CV: 0.12) for males and 30.2% (24.8-35.7%; CV: 0.09) for females. Sample sizes in each original dataset were too small to provide estimates of smoking among AIs by age. Through IDA, the prevalence was highest among

AIs aged 25 to 34 (40.7%; CI: 29.4-51.9; CV: 0.14). In pooled analyses, ever use of EC was 33% for both male and female AIs. The CV was >0.3 in each individual study for current use of EC among AIs; however, through IDA we had sufficient precision to report a current EC prevalence of 9.8% (CI: 5.9-13.6; CV: 0.20) for AIs. IDA reduced standard errors by 11-16% compared to BRFSS, the largest original sample. By pooling three population-based surveys in Oklahoma using IDA, we obtained more precise estimates for tobacco use behaviors among AIs. The larger sample size decreased the CV sufficiently enough to report estimates that would not have been possible through each survey separately.

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POS4-139

TO WHAT EXTENT DO TEENAGE USERS OF SNUS ADAPT ALSO TO THE HABIT OF SMOKING? RESULTS FROM 11-YEARS' FOLLOW-UP IN THE NORD-TRØNDELAGE HEALTH STUDY

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SIGNIFICANCE: The use of moist snus has become highly prevalent among young people in Norway, at the same time as daily smoking declined sharply. However, dual use of tobacco is widespread, and it is not clear if snus facilitates smoking. We wanted to assess whether teenagers who were never-smokers, but snus users at baseline in 1995-97, had an elevated risk of smoking 11 years later (2006-08), after adjustment for known risk factors for smoking. **METHODS:** The Nord-Trøndelag Health Study (HUNT) invited pupils in junior high school (age 13-16) and high school (age 16-19) to participate in the Young-HUNT1 cohort during 1995-97. The participants could be followed until young adulthood (23-30), at which they were invited to a new examination (HUNT3 2006-08). The baseline Young-HUNT1 survey had a response rate of 88% (N=8981) for the questionnaire part of the survey, while 3358 or 37% of the baseline students also participated with a questionnaire 11 years later. Due to low prevalence of snus use among females in 1995-97, 1,346 males were included in the multinomial logistic regression analyses to assess the odds ratio (OR) of snus users, compared to non-tobacco-users at baseline, to be smokers or dual users of cigarettes and snus at follow-up. **RESULTS:** Male snus use in the age 13-19 years at baseline was associated with increased odds of smoking (OR=2.62, 95% CI 1.23-5.58), as well as with increased odds of dual use at follow-up (OR=5.57, 95% CI 2.88-10.78), after adjustment for previous smoking, school class, educational plans and alcohol use. Baseline snus only users who were dual users at follow-up seemed to prefer using snus daily and cigarettes occasionally. **CONCLUSIONS:** Young males who only used snus at baseline had an increased risk of being smokers or dual users at follow-up. Snus use may therefore act as a facilitator for smoking.

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POS4-140

BEHAVIORAL MODELS AS SENSITIZING CONCEPTS IN U.S. SERVICEMEMBERS' TOBACCO USE

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INTRODUCTION: Tobacco is the leading cause of preventable death and disease for the U.S. military. The Departments of Defense and Veterans Affairs spend more than \$6.5 billion annually on tobacco related medical care. Understanding the behavioral influences of military tobacco use are important for setting policies that protect personnel from tobacco's health hazards. We developed a behavioral model from literature on tobacco use in adolescents, adults, the workplace, and the military. Using these sensitizing concepts, we qualitatively examined tobacco use in a population stationed on Okinawa, Japan. The data were then analyzed to refine the original model. **METHODS:** Thirty one-on-one semi-structured interviews were conducted with Marines and Sailors, including healthcare workers.



Sessions were recorded, transcribed and analyzed in MAXQDA, a qualitative data management and analysis software. **RESULTS:** The Integrated Behavioral Model (IBM) served as the base for the initial model. The IBM is more applicable to this situation than the Theories of Reasoned Action or Planned Behavior since the IBM incorporates habit, knowledge, and skills to perform the behavior. Environmental considerations, particularly the social environment, is important due to the U.S. military's long connection to nicotine. The financial cost of tobacco is similarly a major concern for servicemembers with low incomes. To account for tobacco's addictive nature, trans-theoretical elements were added to the IBM. Interviews were analyzed inductively using the principles of grounded theory and themes were mapped to the model. Themes not initially accounted for were added in order to refine the model. **CONCLUSIONS:** Tobacco use in this culture conforms to the constructs of the IBM with trans-theoretical elements. Across those interviewed, instrumental and experiential attitudes towards tobacco use are negative. Injunctive norms are also consistent across the population: tobacco is a coping mechanism for boredom and stress. Environmental influences on tobacco use varied the most, depending on the participant's age, work supervisor, and home support structure. In the refined model, role models have an amplified influence on the behavior and are a distinct subset of peers and the media. Policy influences were also refined to look at tobacco rights, restrictions, and enforcement. **IMPLICATIONS:** These models can be used as a theoretical framework from which to research military tobacco use. The refined model also serves a starting point for future studies of this population. The views expressed in this abstract are those of the author and do not reflect the official policy of the Department of Army/Navy/Air Force, Department of Defense, or U.S. Government.

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POS4-141

VAPING IN SMOKE-FREE PUBLIC PLACES, HOMES, AND CARS: DIFFERENCES BETWEEN UK AND AUSTRALIAN VAPERS

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BACKGROUND: E-cigarette (EC) use globally has increased rapidly in recent years. However, little is known about where vapers choose to vape, both in private and public areas, and how different regulatory environments for EC might affect the extent of vaping in various venues. Nicotine-containing ECs are banned in countries like Australia (more restrictive environment) but are allowed in countries like the UK (less restrictive environment). **AIM:** Examine reported use of ECs in various private and public venues among vapers (i.e., users of electronic cigarettes) and factors associated with use in these places in Australia and the UK, two countries with quite different regulatory environment for ECs. **METHODS:** Data analysed were from 2849 smokers and recent ex-smokers who participated in the 2014 survey of the Australian and the UK arms of the International Tobacco Control (ITC) Four-Country survey. **RESULTS:** Compared to Australian vapers, UK vapers were more likely to report vaping in smoke-free public places (OR=2.49, $p<.01$) and at home (OR=2.48, $p<.001$), but not in their car, controlling for demographic factors and vaping and smoking status. Daily vapers were more likely to vape in all three venues than non-daily vapers. Those who reported enjoying vaping were more likely, whereas those from high income group were less likely, to vape in smoke-free public places. Being comfortable vaping around family increased the odds of vaping in smoke-free public places and at home only whereas being comfortable vaping around friends increased the odds of vaping inside cars only. Perceiving vaping to be less harmful than smoking was positively associated with vaping in homes and cars but was unexpectedly negatively associated with vaping in smoke-free public places. **CONCLUSIONS:** Vaping in smoke-free public places and at home were more common in the UK than in Australia, suggesting that the extent of use of ECs in various private and public places is likely affected by the regulatory environments for ECs as well as attitudes, beliefs and behaviour of vapers.

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POS4-142

CHEMICAL ANALYSIS AND HEALTH ASSESSMENT OF AN ALTERNATIVE TOBACCO PRODUCT (DOKHA)

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Dokha is known to be one of the spreading alternative tobacco products (ATPs). It is composed of leaves, herbs, nicotine as well as other added spices and is smoked using a pipe known as Midwakh. There is no scientific research published on the chemical composition of dokha and only very little was done to investigate its impact on human health. In this study, three different types of dokha were used: cold, mild, and hot. The trace metals content in the raw dokha samples were analyzed using Inductively-Coupled Plasma-Optical Emission Spectroscopy (ICP-OES) and Energy-dispersive X-ray Spectroscopy-Scanning Electron Microscope (SEM/EDS). Quantitative analysis of the trace metal components in the three types of dokha samples revealed the presence of toxic metals in concentrations similar or even greater to those reported for cigarettes. In addition, other metals like iron and manganese were detected in noticeable amounts. Dokha smoke was generated using IREADYCo device that simulate human smoking puffing. The smoke samples were collected on Tenax and activated carbon adsorbent tubes followed by chemical analysis using Thermal Desorption-Gas Chromatography-Mass Spectrometry (TD-GC-MS). Overall, based on the available clinical data, the presence of several potentially harmful and even toxic compounds in dokha smoke were identified. These included 22 irritants, 3 known carcinogens, and 3 compounds with miscellaneous effects. Also, 6 central nervous system (CNS) depressants were identified. Many of the identified compounds in the dokha smoke lacked clinical data on their potential health impacts which reveals the urgent need to conduct more research on this merging alternative tobacco product.

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