SYM19a
EMERGING TOBACCO PRODUCTS: TOXICITY, APPEAL, AND USE
Dorothy K. Hatsukami, Ph.D., University of Minnesota
Little systematic research has been conducted on the toxicity of emerging products and how these products are being used. This presentation will cover three types of products: 1) snus; 2) dissolvable tobacco and 3) electronic cigarettes. Existing product constituent studies generally show lower tobacco specific nitrosamine levels and other toxicants in these products compared to conventional tobacco products, which results or most likely results in lower toxicant exposure levels. However, levels of exposure tend to be higher than medicinal nicotine products, especially when examining the snus products.
These emerging products vary in nicotine levels, although lower than observed in conventional products. Challenges associated with electronic cigarettes are the marked variability in nicotine levels due to the wide differences in dose in the product and how the product is used. Emerging products come in varying flavors, which can contribute to the appeal of the product, especially among young adults. Our studies show a strong preference for the mint-flavored snus and dissolvable products among smokers and survey studies show a notable number of uses of e-cigarettes choosing the flavored variety. Several main principles and observations may provide insight into how products are used: (1) uptake of a product is dependent on the level of satisfaction derived from the product and based on individual preferences; (2) craving relief from oral tobacco products is dose-dependent, while e-cigarettes provide craving relief even at very low doses; (3) the ability to completely switch to a product is nicotine dose-dependent; (4) abuse liability and continued use of the product are determined by nicotine dose and rate of nicotine absorption; (5) a significant number of smokers engage in dual product use and this prevalence is likely to increase over time with the availability of these alternatives for smoking. The impact of dual use could potentially be negative but is unknown. More systematic and comprehensive studies need to be conducted for these products in all areas of tobacco product evaluation.
Funding: R01 CA135884, R01CA141531, and HHSN26120100438P.
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SYM19b
DEVELOPMENTS IN TOBACCO CONTROL AND REGULATION POLICY: A UK PERSPECTIVE
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The 1998 government white paper, Smoking Kills, marked the end of decades of official neglect of tobacco in the UK and initiated a continuing move towards comprehensive tobacco control policies, including for the first time reimbursement of pharmacological aids to cessation and the provision of NHS treatment services for dependent smokers. By 2011, against the background of the strong association of smoking with inequalities in health and recognition of that many smokers cannot or will not quit, the new tobacco control plan for England, Healthy Lives, Healthy People, explicitly expanded help for smokers to include harm reduction as an arm of policy, with a commitment to “encourage the manufacturers of safer sources of nicotine to develop new types of nicotine products that are more affordable and that have increased acceptability for use in the long term”. NICE is currently considering guidelines for the implementation of harm reduction approaches within NHS smoking services, and is due to report in early 2013. Decisions on whether to include electronic cigarettes within the MHRA’s regulatory framework are also pending. Important intermediate steps in the evolution of policy were the 2005 move by the MHRA to adopt a public health approach to regulating nicotine delivering products (and the change to viewing the effects of ongoing smoking as the appropriate comparator in considering new products), and the 2007 report by the Royal College of Physicians Harm reduction in Nicotine Addiction: Helping people who can’t quit. A feature of the evolution of policy in the UK has been the close co-ordination and collaboration between government officials, the medicines regulator, the advocacy group ASH, and academic researchers, which has facilitated the opening of a space for innovative nicotine products with the potential to replace cigarettes.
No funding.
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SYM19c
OVERVIEW OF THE EVOLVING NICOTINE AND TOBACCO MARKETPLACE AND MORPHING TOBACCO INDUSTRY
Mitch Zeller, Pinney Associates, Bethesda, MD
A series of profound changes to the marketplace for nicotine and tobacco products has been taking place over the past decade. These changes have been accompanied by a morphing of the tobacco industry as

many companies are now selling nicotine in multiple forms, both as tobacco and pharmaceutical products. This presentation will describe the evolution of the nicotine and tobacco marketplace to now include cigarettes, smokeless tobacco products, dissolvable tobacco products, electronic cigarettes, and nicotine replacement therapy products all being sold either by tobacco companies or their wholly-owned pharmaceutical subsidiaries. The marketplace for tobacco products in the United States is now under the regulatory control of the Food and Drug Administration. FDA has a historic opportunity to forge a comprehensive nicotine regulatory policy that cuts across the agency's Tobacco and Drugs Centers. Experts agree that there is a distinct "continuum of risk" when it comes to products that deliver nicotine. FDA is uniquely poised to shift current tobacco users away from the deadliest form of nicotine delivery (conventional cigarettes) to the cleanest and safest (currently medicinal nicotine products). This presentation will highlight the impact of the evolving marketplace and morphing tobacco industry on FDA's ability to design an agency-wide nicotine regulatory policy.

M. Zeller is employed by Pinney Associates, a health policy consulting firm. Pinney Associates provides consulting services to GlaxoSmithKline Consumer Healthcare on issues related to the treatment of tobacco dependence.

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SYM24a

YOUTH RISK PERCEPTIONS OF TRADITIONAL AND NON-TRADITIONAL TOBACCO PRODUCTS: FINDINGS FROM THE 2012 NATIONAL YOUTH TOBACCO SURVEY

Bridget K. Ambrose, Ph.D., M.P.H.*, Blair N. Coleman, M.P.H., and Benjamin J. Apelberg, Ph.D., M.H.S., Center for Tobacco Products, U.S. Food and Drug Administration

Although some progress has been made in reducing cigarette smoking prevalence among youth, young people in the United States remain highly susceptible to initiating tobacco use. Understanding youth perceptions of the health risks associated with tobacco product use will provide insight into potential determinants of initiation and continued use of traditional products as well as non-traditional products such as hookah, electronic cigarettes, and dissolvable tobacco products. We will examine data from the 2012 National Youth Tobacco Survey (NYTS), which for the first time, included questions pertaining to youth risk perceptions of a variety of tobacco products. NYTS is a nationally representative, school-based survey of approximately 20,000 middle and high school students. Survey items collected information on perceived risks of non-traditional tobacco products compared to cigarette smoking ("Do you believe that electronic cigarettes are less harmful, equally as harmful, or more harmful than regular cigarettes?") and perceived harm from cigarettes and smokeless tobacco products, including dissolvables, based on frequency and amount of use. We will report the latest findings of multivariate analyses assessing the correlation between middle and high school students' risk perceptions of tobacco products and demographic characteristics as well as reported experimentation, current and regular use of different types of tobacco products. These findings will help inform future research and regulatory policy development at the Food and Drug Administration (FDA) in order to prevent tobacco use among young people, one of the core priorities of FDA's Center for Tobacco Products.

Funding: Center for Tobacco Products, Food and Drug Administration.

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PA9-1

ASSESSMENT OF ELECTRONIC CIGARETTES AS A SOURCE OF EXPOSURE TO ACROLEIN

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Significance: Acrolein (also known as propylene aldehyde or 2-propenal) is a highly reactive chemical that causes irritation to the nasal cavity, and damage to the lining of the lungs and is thought to contribute to cardiovascular disease in cigarette smokers. Electronic cigarettes (e-cigarettes) are battery-powered devices that deliver vaporized nicotine, usually in propylene glycol or glycerin. Since acrolein may be formed as a result of heating glycerin, we examined the hypothesis that inhalation of e-cigarette vapor leads to exposure

to acrolein. Aim of the study: The aim of this study was to assess exposure to acrolein from e-cigarette smoking. Materials and methods: Vapors were generated from 12 brands of e-cigarettes in controlled laboratory conditions using modified smoking machine. Acrolein was extracted from aerosol to solid phase with 2,4-dinitrophenylhydrazine (DNPH) and analyzed with high-performance liquid chromatography with spectrophotometric DAD detector. To compare levels of acrolein in e-cigarette aerosol and mainstream smoke of conventional cigarette we assumed that 15 puffs from an e-cigarette (typical use pattern) would correspond to smoking one conventional cigarette. S-(3-hydroxypropyl)mercapturic acid (3-HPMA), a metabolite of arolein, was measured in urine of 20 e-cigarette users and 20 tobacco cigarette smokers with liquid chromatography/tandem mass spectrometry method. Results: The levels of acrolein in e-cigarette vapor ranged from 0.07 to 4.19 µg per 15 puffs, which about 4 times lower than levels in cigarette smoke. The average urine 3-HPMA concentration in e-cigarette users was 308 (IQR 134-516) ng/mg creatinine and was significantly lower than in tobacco cigarette smokers (822 (IQR 464-1,423) ng/ mg creatinine; $p<0.05$). Conclusions: Our findings suggest that e-cigarette vapor is a source of acrolein, however the level of exposure is less than that from a conventional cigarettte. Substituting tobacco cigarettes with electronic cigarettes may substantially reduce exposure to acrolein. Further research is needed to evaluate long term effects of inhalation exposure to acrolein from e-cigarettes.

This study was conducted while the first author was at Medical University of Silesia, Poland and was supported by the Ministry of Science and Higher Education of Poland under grant number N N404 025638. Analytical Chemistry at the University of California, San Francisco was supported by grants P30 DA012393 and S10 RR026437 from the National Institutes of Health, and from the Flight Attendant Medical Research Institute Bland Lane Center of Excellence on Secondhand Smoke at UCSF.

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PA9-2

ASSESSMENT OF PASSIVE EXPOSURE TO AEROSOL FROM ELECTRONIC CIGARETTES

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Background: Electronic cigarettes (e-cigarettes) are battery-powered devices that deliver vaporized nicotine, usually in propylene glycol or glycerin. When a user inhales through the device, air flow is detected by a sensor, which activates a heating element that vaporizes a nicotine solution contained in a cartridge. Although no vapor is generated during puff breaks, some vapor is exhaled by e-cigarette user. It is unknown whether e-cigarettes release potential toxic compounds into the indoor environment. Aim: The aim of this study was to evaluate the passive exposure to aerosol from e-cigarettes. Materials and methods: We compared passive exposure produced from 'vaping' e-cigarette, smoking conventional cigarettes, and no-smoking. Five dual-product users were recruited for the study and asked to use both electronic and tobacco cigarettes subsequently in a ventilated experimental room. After baseline measurements were taken, each of the subjects was asked to use e-cigarette twice during the one-hour period following smoking of two conventional cigarettes for the next hour. Concentrations of air constituents including respirable aerosol (PM2.5), carbon monoxide (CO), nicotine, and volatile organic compounds (VOCs) were measured. Results: Passive exposure to nicotine from electronic cigarettes was about 10-times lower than from tobacco cigarettes (3.3±2.5 vs 31.6±6.9 microgram/cu m., $p=0.0081$). Concentrations of PM2.5, CO and VOCs were substantially reduced when volunteers were using e-cigarettes as compared to smoking conventional cigarettes ($p<0.05$). Second-hand exposure to CO and VOCs from e-cigarette was in the same range as nonsmoking. Conclusions: E-cigarettes are a secondhand source of exposure to nicotine, but to much lower extend than tobacco cigarettes. Further research is needed to evaluate long term effects of passive exposure to vapor from e-cigarette, including using the products to reduce harmful tobacco smoke exposure to others and to get around smoke-free policies.

This study was conducted while the presenting author was at the Medical University of Silesia, Poland and was supported by the Ministry of Science and Higher Education of Poland under grant number N N404 016939.

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PA10-3
THE USE AND PERCEPTION OF ELECTRONIC CIGARETTES AND SNUS AMONG THE U.S. POPULATION

Shu-Hong Zhu, Ph.D.*, Anthony Gamst, Ph.D., Madeleine Lee, B.A., Sharon Cummins, Ph.D., Lu Yin, M.S., and Leslie Zoref, Ph.D.

E-cigarettes have generated controversy in the tobacco control field similar to that of Swedish snus, which came to the U.S. market six years earlier. Some argue that e-cigarettes have great potential to help smokers quit regular cigarettes while others contend they should be banned for lack of safety and efficacy data. We conducted a population survey in the U.S. with a national probability sample (N=10,041) from February 24 to March 8, 2012, and compared the use of e-cigarettes with that of snus. Survey respondents were asked if they had heard about e-cigarettes, where they had heard about them, whether they had used e-cigarettes or snus, how often they used them, and why they used them. Responses were weighted to represent the entire U.S. population, and data were compared with another population survey conducted in 2010. The main findings are: A high proportion, 75.4%, reported having heard about e-cigarettes. Television ranked as the number one source of information, followed by “heard in person” and “Internet.” About 8.1% had tried e-cigarettes, and 1.4% were current users. These rates were twice those of snus (4.3% and 0.8%, respectively). Among current smokers, 32.2% had tried e-cigarettes, and 6.3% were current users. Compared to the survey data in 2010, the proportion of smokers who have experimented with e-cigarettes has increased by 182%, and the current use of e-cigarettes by 54%. Women were significantly more likely to have tried e-cigarettes than men, even though they were less likely to have heard about them. Those who had tried e-cigarettes were more likely than those who tried snus to report their products being safer than regular cigarettes (49.9% vs. 10.8%). Almost half (49.5%) of current smokers were susceptible to using e-cigarettes in the future. Conclusions: That e-cigarettes have surpassed snus in adoption rate, despite there being no promotion of e-cigarettes before this national survey by major tobacco companies, suggests that the former have tapped into smokers’ intuitive preference for potentially harm-reducing products, probably due to the product design. E-cigarette use is likely to increase in the next few years.

Supported by a grant from National Cancer Institute U01 CA154280.

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PA10-4
USE OF ELECTRONIC NICOTINE DELIVERY SYSTEMS BY TEENAGERS IN A LONGITUDINAL STUDY

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Electronic Nicotine Delivery Systems (ENDS) have been gaining in popularity recently.Prevalence studies in adults have found that most ENDS users are current or former smokers. The objectives of this study were to estimate the prevalence of ENDS usage in adolescents over time, and examine the correlates of use.Surveys assessing tobacco use were conducted multiple times in two suburban Western New York high schools between 2010 and 2011. In School A, grades 9-12 were surveyed three times: February 2010, October 2010, and June 2011. In School B, students were surveyed in October 2010 and June 2011. The survey included questions on ever use of ENDS and past 30 day use. Correlates examined included grade, gender, race, survey year, cigarette use in the 30 days prior to the survey, and susceptibility to smoking. Descriptive statistics on prevalence of ever and past 30-day use and logistic regression to assess correlates of past 30-day use were conducted. Three findings are observed from the results: (1) the prevalence of ENDS use increased in each school over time [Ever use was 2.9% in Spring 2010, 4.2% in Fall of 2010, and 5.7% in Spring 2011. Past 30 day use was 1.1% in Spring 2010, 1.0% in Fall of 2010, and 2.0% in Spring 2011]; (2) ENDS use is mostly concentrated in current smokers or those susceptible to smoking; and (3) no demographic differences in ENDS use were observed. These data indicate that in this sample, the use of ENDS more than doubled over 14 months, and there were no demographic differences in use. ENDS use is almost exclusively concentrated in current smokers and non-smoking youth who are more susceptible to become cigarette smokers in the future. Youth not otherwise susceptible to smoking appear to have little interest in ENDS. Important unanswered questions are whether dual use of ENDS with cigarettes increases or diminishes future likelihood of smoking cessation, and whether use of ENDS in those susceptible to smoking increases or decreases future likelihood of becoming smokers among adolescents. Prospective data are needed to understand these critical potential consequences of youth ENDS use when trying to estimate the net population health impact of ENDS.

Supported by R01DA026450.

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PA16-2
NEW AND EMERGING TOBACCO PRODUCTS: GAINING INSIGHTS FROM NIELSEN STORE SCANNER DATA

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Tobacco control environment has changed rapidly in the past few years. The federal taxes on tobacco products were increased in 2009. The Family Smoking Prevention and Tobacco Control Act of 2009 gave FDA authority to regulate tobacco product production, distribution and marketing. In addition, many state and local governments have adopted or strengthened smoking free policies and other tobacco control policies. Tobacco industry has responded by focusing on, among other things, product design and development. This study examines the sales trend of new and emerging tobacco products using the quarterly market level Nielsen store scanner data between 2010 and 2011. The Nielsen store scanner data contain detailed information on retail prices, sales, and price-related promotions for all tobacco products. Data were directly gathered from participating retailers' tapes in 52 U.S. markets defined by Nielsen. The markets consist of groups of counties centered on a major city (similar to metropolitan statistical areas). Participating retailers include mass stores, drug stores, grocery stores, and convenience stores. Our analyses show a dramatic increase in electronic cigarettes sales between 2010 and 2011. Sales volume of e-cig kit increased 9 times from about half a million pieces in 2010 to more than 4.5 million pieces in 2011. E-cig refill cartridge increased more than 14 times during the same time period (from about half a million pieces to more than 7 million pieces). Sales volume of dissolvable lozenges/tablets has increased 20% from less than 50 million pieces to more than 60 million pieces. The sales volume of dissolvable strips and sticks were low compared to that of lozenges/tablets, less than half a million pieces annually and their sales volume has been declining since the first quarter of 2010. Dissolvable orbs sales have also declined between 2010 and 2011, from approximately 13,000 ounces to less than 4,000 ounces. Snus sales have declined steadily since early 2010. Our results revealed a rapidly changing landscape of new and emerging tobacco products and have important implications on government regulations targeting these products.

Support for this project was provided by a National Cancer Institute-funded grant (Grant #1U01CA154248), titled "Monitoring and Assessing the Impact of Tax and Price Policies on U.S. Tobacco Use." The opinions expressed here are those of the authors, and do not necessarily reflect those of the sponsors. None of the funding agencies played any role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for the conference.

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PA17-4
ELECTRONIC CIGARETTE MARKETING: A GLOBAL TOBACCO CONTROL CHALLENGE

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Background: Electronic cigarettes (e-cigarettes) are battery-powered nicotine delivery products advertised widely on the internet, and increasingly, in retail stores. The products are not evaluated by any regulatory authority before going to market and their availability and promotional marketing are currently unregulated in the U.S., though other countries have partially or completely restricted their sale and use (e.g., Brazil). Methods: This presentation will include examples of marketing from several countries, information about the regulatory status of e-cigarettes and selected results from a content analysis of the marketing on 55 e-cigarette retail websites. Results: The results of our content analysis indicated that most prevalent advertising appeals focused on health benefits, cessation-related benefits, use of the product to circumvent smoke-free policies and reduction of secondhand smoke exposure. Sites contained imagery of doctors and celebrities that imply endorsement of the product and videos or sponsorships that overtly promote the product, as well as testimonials, branded social networking sites, and programs recruiting consumers to become sellers of the products. Products came in various nicotine strengths that differed widely in corresponding nicotine content (e.g., products marked "high" corresponded with a range of nicotine content from 6-24mg). Products were offered in various flavors; most commonly tobacco, mint, candy, fruit and coffee flavors. In many countries, advertising techniques also include television and radio commercials, newspaper advertisement, pointof-sale displays and direct email marketing. Conclusions: E-cigarette marketing with unsubstantiated health, cessation and secondhand smoke exposure claims could result in negative population health effects if they deter or undermine cessation or encourage uptake by youth. Product content, labeling and safety should be evaluated and assured by a government regulatory authority.

Consumer perceptions of e-cigarette marketing should be a required component of regulation development in order to determine potential public health impact of the products.
Supported by NIH grant R25T: CA 113710.
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POS2-130
USE OF ELECTRONIC CIGARETTES AMONG STATE QUITLINE POPULATIONS: PREVALENCE, DEMOGRAPHICS, AND QUIT STATUS
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Little is known about the prevalence of e-cigarette use, reasons for use, and whether e-cigarettes impact a user's ability to successfully quit tobacco. Each year nearly 450,000 tobacco users call free state quitlines for help with quitting. Information regarding e-cigarette use among quitline callers is needed to better understand callers' cessation-related behaviors and to inform how e-cigarettes should be addressed in treatment protocols. We evaluated e-cigarette use among tobacco users who received cessation services through one of five state tobacco quitlines. Surveys were administered by phone seven months after participants called the quitline. Participants were asked about their past and current e-cigarette use, reasons for using e-cigarettes, and current quit status. Among 1,233 respondents, 30.0% reported ever using an e-cigarette and 8.7% reported current use of e-cigarettes. The majority of e-cigarette users reported using or trying e-cigarettes for a short period of time (62.2% for one month or less). Notably, more than half reported using e-cigarettes to quit or cut down on tobacco use. Other reasons included: switched from other tobacco, use when can't smoke, curious/ tried once, healthier/safer, and cost. Characteristics of e-cigarette users will be presented. Thirty-day point prevalence responder quit rates at the 7-month survey for current, past, and never e-cigarette users were 15.9%, 20.7%, and 30.9%, respectively; e-cigarette users (current or past) were significantly less likely to be quit for 30 or more days compared to participants who had never tried e-cigarettes ($ps<0.01$). This data shows that a significant proportion of state quitline participants reported using e-cigarettes and e-cigarettes are being used as cessation aids, despite the fact that the FDA has not approved them for therapeutic use. Policy and research implications of e-cigarette use will be addressed. For example, are tobacco users who quit other tobacco but still use e-cigarettes considered quit? Do treatment protocols, including NRT dosing, need to be altered to address e-cigarette use? Should quitlines provide treatment to e-cigarette users?
The five participating states provided funding for data collection. Alere Wellbeing sponsored the data analysis for this submission.
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POS2-131
THE EFFECT OF E-CIGARETTE SAMPLING ON SMOKING BEHAVIOR AND MOTIVATION AND CONFIDENCE TO QUIT SMOKING
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What effect e-cigarette (EC) use will have on smoking behavior and motivation and confidence to quit smoking is currently in question. To examine this question, we recruited 20 non-treatment seeking smokers (80% white, 60% female, Mage=40.1y, Mcpd=18.6, Mfagerstrom=5.1), naïve to ECs, to participate in a

three-phase, exploratory study. In phase 1 (Baseline), participants completed baseline demographic, smoking history, and smoking thoughts and behaviors questionnaires; phase 2 (Sampling) included sampling 3 different popular EC brands (bluCig, ProSmoke, and SmokeTip) and own brand cigarette (OBC), with pre- and post-measures of product liking/satisfaction and motivation/confidence; during phase 3 (ad libitum use), participants were sent home with a 1-week supply of their preferred EC and asked to use it ad libitum and then completed follow-up questionnaires 1-week post sampling. 16 participants completed all phases of the study. During sampling, on a scale from 1 “not at all” to 10 “very much”, OBC were rated as being the most liked/enjoyed (M=8.6, SD=1.8), satisfying (M=7.3, SD=3.3), and effective in reducing urges/craving (M=8.7, SD=1.7), p<.05. Of the ECs, no significant differences were found between brands but generally bluCig was found to be the preferred brand across all three domains: like/enjoy [bluCig M=6.6 (SD=2.4), ProSmoke M=4.7(SD=2.5), SmokeTip M=5.2 (SD=2.7)], satisfying [bluCig M=6.6 (SD=2.6), ProSmoke M=5.2(SD=2.9), SmokeTip M=5.0 (SD=2.8)], and effective [bluCig M=7.2 (SD=2.1), ProSmoke M=6.2(SD=2.4), SmokeTip M=6.1 (SD=2.4)]. bluCig was the brand that was selected by the most participants for the ad libitum phase (bluCig=63.2%, ProSmoke=26.3%, SmokeTip=10.5%). EC sampling led to a significant increase (p=.001) in “confidence to quit” smoking but not in “wanting to quit.” However, ad libitum use of preferred EC brand for 1-week led to a significant increase in “wanting to quit” (p=.01). Confidence to quit also continued to increase from end of sampling to end of ad libitum use, but it was not significant. Number of cigarettes per day decreased significantly (p=.001) from baseline (M=16.5, SD=5.0) to end of ad libitum use (M=9.3, SD=6.7).
Funding: Oklahoma Tobacco Research Center Seed Grant.
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POS2-132
A CROSS SECTIONAL STUDY OF TOBACCO AND OTHER DRUG USE BEHAVIORS IN ADOLESCENTS WHO SMOKE ELECTRONIC CIGARETTES AND CIGARETTES VS. CIGARETTES ONLY
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Electronic cigarettes are emerging tobacco products that are marketed as harm-reducing products and smoking cessation aids. The prevalence of e-cigarette use in adolescent populations is largely unknown. We ascertained whether adolescents who smoke e-cigarettes in addition to cigarettes (ECS) differ from cigarette smokers only (CS) in their tobacco and other drug use behaviors. We analyzed data from a cross-sectional survey of students attending 4 high schools in Connecticut and New York (n=3,912) in 2010. We collected information regarding current cigarette, e-cigarette, and other tobacco use. Alcohol, binge drinking and marijuana use was assessed in a subsample of students (n=1,957). We used multivariate linear regression to determine whether EC predicted use of a higher number of other tobacco products. Eleven percent of students reported current use of only cigarettes (n=421), and 1.4% (n=58) also reported current e-cigarette use. Only 0.4% (n=19) used e-cigarettes without cigarettes. The ECS and CS groups did not differ in their gender, grade, race, age of cigarette smoking initiation, days smoked cigarettes in past month, and cigarettes smoked per day. A larger proportion of ECS than CS reported current use of cigars (43.1% vs. 28.0%; p=0.02), bidis/kreteks (13.8% vs. 2.9%; p=0.01), hookahs (31.0% vs. 8.8%; p=0.01), cigars (43.1% vs. 28.0%; p=0.02), and blunts (69.0% vs. 53.0%; p=0.02) but the two groups did not differ in their alcohol, binge drinking or marijuana use patterns. Only 5% (n=4) of all e-cigarette users did not use any additional tobacco products. Multivariate regression showed that ECS independently predicted use of a higher number of other tobacco products (ß=0.59, t=3.75, p=0.0002) when adjusted for gender, grade, race, days smoked cigarettes in past month, and cigarettes smoked per day. Adolescents who smoke electronic cigarettes in addition to cigarettes did not differ in their cigarette smoking frequency or intensity,

marijuana, and alcohol use from adolescents who only smoke cigarettes. But, cigarette smokers who also smoke e-cigarettes were more likely to use other tobacco products.
Supported by NIH grant #R01DA026450.
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POS2-133
CONSUMER PERCEPTIONS OF ELECTRONIC NICOTINE DELIVERY DEVICES AS SMOKING CESSATION AIDS
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Background: Electronic nicotine delivery devices (ENDS; or e-cigarettes) have surged in popularity in recent years, however further research is needed to determine consumer perceptions of their acceptability as smoking cessation aids. The aim of this pilot study was to explore smokers' perceptions of the effectiveness of using ENDS during a 2-week cessation attempt. Methods: After a laboratory-based study that had the advantage of familiarizing participants with use of the ENDS, smokers motivated to quit were provided with an e-cigarette and a 2-week supply of cartridges in the style (menthol or non-menthol) of their choice. They received two in-person behavioral counseling sessions and two telephone counseling sessions. At the end of the two-week quit attempt, in-depth qualitative interviews were conducted to assess the subjects' perceptions of the effectiveness of using ENDS as a cessation tool. Sessions were audio-recorded and the data transcribed and analyzed using a thematic approach. Results: Themes that emerged included lower perceptions of nicotine content compared to own brand cigarettes, a higher sense of control with regards to nicotine self-administration compared to other cessation mechanisms (e.g., nicotine gum, patch), and an ease of transition to the e-cigarette to assist with a quit attempt. Additionally, similarities between own brand of cigarettes and e-cigarettes generally included similar smoking patterns (in terms of duration and time of day), but participants found greater resistance to draw with the e-cigarette compared to conventional cigarettes, and reported that they often failed to provide the level of satisfaction produced by conventional cigarette. Lastly, participants noted that the e-cigarette drew attention from by-standers who were interested in knowing more about the product, and some were uncomfortable with the attention the product elicited, opting to use the e-cigarette in private locations only. Conclusions: Understanding the consumer acceptability of using ENDS has important implications as to how these products could be used as smoking cessation devices and how they could potentially be prescribed to help smokers quit.
Supported by NIH/NIDA Grant #5R21DA030622.
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POS2-134
USE OF ELECTRONIC CIGARETTES AMONG ADULTS ENROLLED IN A GROUP RANDOMIZED SMOKING CESSATION TRIAL IN APPALACHIAN OHIO
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Electronic cigarette (ecig) use is growing in popularity. Little is known about the use of ecigs among adult smokers in Appalachian Ohio. The purpose of this study was to describe the use of ecigs among participants living in Appalachian Ohio enrolled in a group randomized cessation trial (n=467 participants) that included behavioral counseling and free nicotine replacement therapy (NRT) (i.e., 21 mg patch) over a 10 week protocol. Study eligibility criteria included: resident of a participating Appalachian county, 18 years or older, self-reported daily cigarette use, willing to quit in the next 30 days, no medical contraindication to NRT use, and if female, not pregnant. Data collection started in November 2010; items to

assess ecig use were added to the existing survey in April 2012. As a result, ecig use was not collected for all participants. This abstract reports on a subset of the sample (n=252 participants) and includes data collected at baseline, 3, 6, or 12 months post-intervention. Of the subset of participants, 10% reported currently using an ecig every day or some days. Most ecig users were between 25-54 years old (54%), female (65%) and had more than a HS/GED education (50%). Most were not employed (69%) but had health care coverage (77%). Most ecig users were living at 200% below poverty (77%). For those interviewed post-intervention, 5.9% (n=15 participants) reported use of ecigs, primarily to assist in efforts to quit smoking. Most were using ecigs with nicotine (67%) and most believed that ecigs are less harmful than regular cigarettes (87%). The primary reasons given for ecig use included: “they make it easier for you to cut down on the number of cigarettes you smoke” (53%), “they might help you quit” (47%). These findings support previous studies that demonstrate ecigs being used as a smoking cessation aid. Limitations of this study include a small sample size and a homogenous study population (i.e., those trying to quit, living in Appalachia, Ohio). This study emphasizes the importance of continued research into the efficacy and safety of the use of ecigs as a long-term smoking cessation aid.
This study was conducted while the first author was at The Ohio State University. Supported by NIH grant # R01 CA129771.
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POS2-135
SMOKERS WHO TRY E-CIGARETTES TO QUIT SMOKING: ARE THEY SERIOUS ABOUT QUITTING?
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Electronic cigarettes or e-cigarettes are commonly marketed as smoking cessation aids and their popularity appears to be on the rise. But little is known about the characteristics of smokers who use e-cigarettes to quit smoking, including their motivation to quit, quitting self-efficacy, and experience with Food and Drug Administration (FDA) approved cessation aids. In this study, we tested the associations between smokers’ ever use e-cigarettes for cessation and their demographic characteristics (e.g., gender, ethnicity), motivation to quit, and other smoking- and cessation-related characteristics. Cross-sectional data were obtained from 1567 adult daily smokers in Hawaii using paper-and-pencil survey in 2010-2012, as part of a smoking cessation study. Participants represented 50% women, 21% Asian, 31% Native Hawaiian, 34% White, and 14% Other ethnicity. e-Cigarette use was significantly associated with age (OR= 0.98, 95% CI [0.97, 0.99]), Native Hawaiian ethnicity (OR= 0.68, 95% CI [0.45, 0.99]), motivation to quit (OR= 1.14, 95% CI [1.08, 1.21]), quitting self-efficacy (OR= 1.18, 95% CI [1.06, 1.36]), and the use of conventional cessation products or medications such as nicotine replacement gum (OR= 3.72, 95% CI [2.67, 5.19]) and Bupropion (OR=2.29, 95% CI [1.38, 3.79]). Our data suggests that smokers who use e-cigarettes appear to be serious about wanting to quit. Research is needed to clarify the effectiveness of e-cigarette use in smoking cessation. Clinicians and public health practitioners need to be prepared to clearly communicate the risks and benefits of e-cigarette use to smokers who are highly motivated to quit.
This study was supported by an R01 grant (# CA2079905) from the National Cancer Institute to T.A. Herzog.
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POS2-136
YOUNG ADULTS’ EXPOSURE TO PRO-SNUS AND PRO-ELECTRONIC

CIGARETTE MESSAGES AND USE OF THESE PRODUCTS

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Objective: Young adults are experimenting with new tobacco products like snus and electronic cigarettes (e-cigarettes), and exposure to pro-snus and pro-e-cigarette messages may contribute to this phenomenon. We conducted the first analysis to examine young adults' exposure to these messages and its associations with trying these products. Methods: Young adults (ages 20-25) from the U.S. upper Midwest region were surveyed in 2009 and again in 2011 (n=2339). In 2011, participants were asked if they have received advertisements and coupons for non-cigarette products in the mail, have seen Facebook pages/ groups and advertisements for snus and e-cigarettes, and have seen kiosks in shopping malls promoting e-cigarettes. Ever use of these products was assessed in 2011. Baseline tobacco use behaviors were assessed in 2009 (before these products were available nationwide). Using multivariate logistic regression models, we assessed characteristics associated with exposure to different types of pro-snus and pro-e-cigarette messages in 2011, and the associations between message exposure and ever use of these products in 2011. Results: Regarding snus, 8% and 7% of the participants had received advertisements and coupons for non-tobacco products in the mail, respectively; <1% had seen snus Facebook pages/groups. Regarding e-cigarettes, 14% of the participants had seen kiosk at shopping malls promoting e-cigarettes; 7% and 1% had seen e-cigarettes advertisements and pages/groups on Facebook, respectively. Male, less educated participants, those who had friends who smoke, tobacco users were more likely to have received advertisements and coupons for non-cigarette products in the mail ($p<.05$). For every additional type of exposure to pro-snus and pro-e-cigarette messages, there was a 79% and 96% higher odds that participants had used snus and e-cigarettes, respectively, adjusted for demographics, peer smoking and tobacco use behaviors ($p<.05$). Conclusions: Exposure to pro-snus and pro-ecigarette messages were associated with experimenting with these products in our sample. Longitudinal studies are needed to confirm our findings.

This research was funded by the National Cancer Institute (R01 CA86191; J. Forster - PI).

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POS2-137

ELECTRONIC-CIGARETTES (E-CIGARETTES) IN GERMANY: A SMOKING CESSATION TOOL?

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Introduction: The use of an electronic-cigarette (e-cigarette) resulted in some previous studies in reduction and cessation of conventional cigarette smoking. Therefore, this study aims to examine the reasons of using e-cigarettes instead of and in addition to conventional cigarettes in Germany. Furthermore it is determined to what extent e-cigarettes are used as a smoking cessation tool. Method: A cross-sectional study was conducted in April – May 2012 in Munich, Germany. The I-Change Model was used as theoretical framework and existing questionnaires were used to build up the present questionnaire. 320 Smokers participated in the study, divided in three groups: E-cigarette smokers (e-smokers) (33%), conventional cigarette smokers (c-smokers) (37%) and smokers of both cigarettes (b-smokers) (30%). Pearson Chi Square tests and analyses of variance were used to assess differences among the group of smokers on demographic variables, smoking behaviour and the constructs of the I-Change Model. Results: About half of the e-cigarette users used the e-cigarette in addition to c. cigarettes and the other half instead of c. cigarettes. It seemed that e-smokers and b-smokers had the same reasons for using e-cigarettes overall. E-cigarette users were most often men, were less addicted to nicotine and had a higher motivation to stop smoking than c-smokers. In addition, e-smokers reported a more positive health and had a lower carbon monoxide concentration compared to c-smokers. Furthermore,

e-smokers had a more positive attitude towards e-cigarettes, a higher self-efficacy in terms of being abstinent from c. cigarettes in certain situations and a higher self-efficacy of using an e-cigarette instead of c. cigarettes. E-cigarettes were used more frequently if the social environment of a person vaporized as well or preferred the respondent to vaporize e-cigarettes instead of c. cigarettes. Discussion: The results confirmed most of the hypotheses and also important results of previous studies. In addition, a well-conducted randomized-control trial is needed to confirm the efficacy of e-cigarettes as a smoking cessation aid.
No funding.
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POS2-138
AWARENESS AND USE OF ELECTRONIC CIGARETTES AMONG COLLEGE STUDENTS IN NEW YORK STATE
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Electronic cigarettes (e-cigarettes) have been available in the United States for about five years. Recent studies have found that awareness and ever use of e-cigarettes among adults is increasing. To our knowledge, to date there are no published reports of e-cigarette awareness and use among college students in the United States. Some tobacco control advocates express concerns with e-cigarettes, including that e-cigarettes could be used as a starter product for younger or never smokers or they could delay cessation and result in a pattern of dual use of tobacco products. The objective of this study was to assess college students' awareness, use, and perceptions of e-cigarettes. In October and November of 2011, we conducted a cross-sectional survey among 1,187 undergraduate students attending two public universities in New York State. Participants completed an online survey that included questions on demographics, cigarette smoking behavior, smokeless tobacco use, awareness and use of e-cigarettes, beliefs about the harmfulness of e-cigarettes, and interest in using an e-cigarette. The prevalence of current cigarette smoking was 10.5%, and the prevalence of smokeless tobacco use (including chewing tobacco, snuff, or snus) was 2.7%. Current cigarette smokers were more likely than non-smokers to have heard of e-cigarettes (86% vs. 71%, $p<0.01$), ever try an e-cigarette (47% vs. 5%, $p<0.01$), and use an e-cigarette in the past month (4% vs. 0.1%, $p<0.01$), respectively. Only one participant reporting daily use of the e-cigarette. The vast majority (97%) of college students perceived that e-cigarettes were either less harmful or no different in terms of harm when compared to regular cigarettes. Among participants who had not tried an e-cigarette, cigarette smokers were more likely than non-smokers to report they would be interested in trying an electronic cigarette (39% vs. 5%, $p < 0.01$). We found the majority of college students were aware of e-cigarettes. While ever use of e-cigarettes was much more common in current cigarette smokers than non-smokers, past month use was much less common in the sample overall, and daily use was rare.
No funding.
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POS2-139
A PROSPECTIVE RANDOMIZED CONTROL DESIGN STUDY TO EVALUATE LONG TERM SAFETY, ABSTINENCE, AND REDUCTION RATES IN SMOKERS NOT WILLING TO QUIT: THE ECLAT STUDY
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E-cigarettes are becoming increasingly popular with smokers worldwide. Carefully conducted research on e-cigarettes is urgently needed in order to ensure that the decisions of regulators, healthcare providers and consumers are based on science. We designed a prospective 12-month double-blind, randomized, controlled trial to evaluate smoking reduction, smoking abstinence and adverse events in 300 smokers not intending to quit experimenting 2 different nicotine strengths of a very popular brand compared to the non nicotine alternative from the same brand. Study Group A (n =100) used 7.2 mg nicotine cartridges, Group B (n =100) used 5.4 mg nicotine cartridges and Group C (n =100) was given no-nicotine cartridges. Study participants were invited to attend a total of 9 study visits during which number of cigarettes smoked, and eCO levels were measured. Smoking reduction and abstinence rates were calculated. Adverse events and product preferences were also reviewed. Lastly, classic and novel static and dynamic factors predicting abstinence and reduction rates will be investigated. A significant reduction ($p<0.001$) cig/day use and eCO levels from baseline was observed at each study visits in all 3 study groups. By and large, no difference between study groups was observed in terms of changes in cig/day use and in eCO levels. A mean of 2.0 cartridges/day was used in each study group up to the 3-month time point, but falling thereafter. Smoking reduction was shown in 21% and 9% participants in group A, in 16% and 8% in group B and in 19% and 10% in group C, at 3- and 12-months respectively. Smoking abstinence was observed in 11 % and 13% participants in group A, in 17% and 9% in group B and in 4% and 4% in group C, at 3- and 12-months respectively. Only minor and transient adverse were reported, including mouth and throat irritation, and dry cough. They seem to attenuate over time. By and large, participants’ perception and acceptance of the product was positive. In smokers not intending to quit, the use of e-Cigarette decreased cigarette consumption and elicited enduring tobacco abstinence at 1-yr without causing significant side effects.
No funding.
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POS2-147
SNAPSHOT OF RETAIL TOBACCO MARKETING IN THE UNITED STATES 2010-2011
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Point of sale is the least regulated tobacco marketing channel in the U.S. Given the evidence of the causal role of marketing in the tobacco epidemic and FDA’s recently-charged role in regulating tobacco product marketing, it is important to examine the current status of retail tobacco marketing in the U.S. This research address this topic using the observational data from af national sample of tobacco outlets focusing on the availability of various tobacco products, point-of-sale promotions and marketing. Cross sectional data were collected in 2010 in 154 sites (in 43 states) and in 2011 in 157 sites (in 42 states) surrounding a national sample of public 8th-, 10th-, and 12th-grade schools . For this study, sites were defined as the area from which the schools drew the majority of their students (the school enrollment zone). A random sample of retail outlets in each site were selected for observation. Our analyses revealed that close to 80% of the observed retail outlets sold tobacco products. Differences exist in availability across different types of tobacco products. Availability also differs within each product type across sites with different racial/ethnic compositions and income levels. Availability of electronic cigarettes, pipe tobacco, dissolvable tobacco products, and cigarillos increased from 2010 to 2011. The percent of stores with promotions declined in 2011 in three promotional types (multi-pack discount, cents off coupon, and special price). Presence of promotions was higher in minority communities, presence of

menthol cigarettes with special price was higher in communities with low-and middle-income levels. Cigarette and snus ads were ubiquitous in stores selling these products in 2010, however, a reduction was observed in those ads in 2011 across all sites regardless racial/ethnic compositions or income levels. This study provided insights on the current status of tobacco retail marketing and has important implications for policies targeting point-of-sale marketing.
Support for this project was provided by the Robert Wood Johnson Foundation as part of the Bridging the Gap: Research Informing Practice and Policy for Healthy Youth program; and by a National Cancer Institute-funded grant (Grant #1U01CA154248), titled "Monitoring and Assessing the Impact of Tax and Price Policies on U.S. Tobacco Use." The Monitoring the Future study is funded by the National Institute on Drug Abuse. The opinions expressed here are those of the authors, and do not necessarily reflect those of the sponsors. None of the funding agencies played any role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for the conference.
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POS3-73
A SURVEY OF MORE THAN 250 E-CIGARETTE BRANDS ON THE INTERNET
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Electronic Cigarettes (E-Cigarettes) are an emerging tobacco product with a large presence on the Internet. To compile a list of e-cigarette brands, we performed keyword searches on the three most popular US search engines (Google, Bing, and Yahoo!). Review sites which were found during this process were also used to add to the list of e-cigarette brands. Brand websites were examined for specifics about each product (composition of starter kits, flavor and nicotine strength options for cartridge and e-Liquid refills), ingredients in their products, claims about the product such as whether they were safer than conventional cigarettes. During the survey process, a cataloging system for starter kits was developed. Prices were recorded for all parts and kits. We identified over 80 discrete flavor categories and 27 different nicotine strengths across the more than 250 brands found through this search. A partial or, in some cases, full list of ingredients was found for 71.7% of brands, with the most common ingredients being nicotine, propylene glycol, and water. More than half of the brands (64%) explicitly stated that their product could not be used as a smoking cessation device, while 27.2% gave no information on the topic. Almost 9/10ths of brands (89%) claimed that their product was healthier or safer than a conventional cigarette, with only 1.8% stating that their product was not safer. Most brands (80.2%) advertised their products as being suitable for use in places where conventional cigarettes would be banned. Finally, 65.8% of brands claimed that their product would save the user money. The results of this study provide a good starting point for researchers when considering further studies on this emerging tobacco product.
This work was supported a grant from the National Cancer Institute (5 U01 CA154280).
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POS3-88
THE IMPACT OF SMOKE FREE LAW ON ELECTRONIC CIGARETTES POPULARITY AND SALES IN POLAND
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Background: The amendment to the Act on Prevention of Negative Health Consequences of Tobacco Use was introduced in Poland on November 15, 2010, prohibiting smoking in almost all enclosed public places. Studies suggest that smoke-free laws are associated with decrease in smoking prevalence and increases in quit attempts. Electronic cigarettes (e-cigarettes) are battery-powered devices that deliver vaporized nicotine. They are promoted as a stop-smoking aid or as an alternative to conventional cigarettes. Aim of the study: This study investigates the impact of the smoke-free law on the popularity and time series of e-cigarette sales pre and post implementation of smoking-ban in Poland. Materials and methods: Polish-language Google searches conducted from January 2009 through May 2011 were analyzed. We used two key words: 'e-cigarette' and 'electronic cigarette'. Searches for each week were scaled to the highest weekly search proportion. The following search filters were applied: various country sub-regions, dates, and categories. Since it is unclear whether search queries indicate curiosity or shopping, we analyzed sale offers of e-cigarettes through the biggest Polish auction service allegro.pl. Results: Six months before the smoking ban the mean relative search volume of e-cigarettes was 20.6%±5.2%. Six months post implementation of the ban the mean value was 25.1%±8.0% ($p>0.05$). We recorded consistently higher numbers of e-cigarettes searches between January and March 2010 (74.7%±15.0%). We did not observed any significant changes in e-cigarette sales during six months after the introduction of the 2010 Polish smoke-free legislation ($p>0.05$). Conclusions: Real-time monitoring of Internet searches and sales of e-cigarettes can help assess the effects of public policies on popularity of the alternative nicotine products. Implementation of smoking ban in public places was not associated with increased popularity of e-cigarette in Poland.
No funding.
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POS3-94
MARKETING STRATEGIES PROMOTING DUAL AND POLY-TOBACCO PRODUCT USE

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Dual use of cigarettes and other tobacco products has been increasing in recent years, particularly among young people. This may be due in part to tobacco industry responses to increased tobacco taxes and clean indoor air policies in the U.S. and in other countries, which include advertising messages promoting the use of smokeless tobacco products in addition to cigarettes. To identify promotional messages that may encourage dual use, we identified historical and current themes from print magazine ads, direct mail advertising, and branded websites for smokeless tobacco products and compared to themes identified in a formal content analysis of electronic cigarette retail websites sampled between May to July 2012. Results show that marketing of smokeless tobacco products, particularly snus and dissolvable tobacco products, has been explicitly targeted at smokers. Most marketing messages promoted temporary or situational use of smokeless tobacco, which may result in dual use of smokeless tobacco and cigarettes rather than complete switching from cigarettes to smokeless tobacco. Ad text and imagery contained both overt and subtle appeals to use the smokeless product when users were unable to smoke. Smokeless tobacco products bearing cigarette brand names and contests such as the "camel pleasure switch challenge" that promote switching for several days may also encourage adoption and dual use of both products among smokers. Electronic cigarette companies also include appeals on their retail websites that may result in dual product use, such as promoting the product for circumventing clean indoor air laws and using the product in specific indoor environments (e.g., an office). Marketing that promotes dual or poly tobacco use patterns may exacerbate the total tobacco use burden

and have negative public health impact due to effects on addiction, deterred quit attempts and decreased effectiveness of successful tobacco control policies.
This work is supported by grants R25T CA 113710 and R01-CA141661.
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POS3-102
SETTING A RATIONAL PRICING STRUCTURE FOR NICOTINE AND TOBACCO PRODUCTS: RESULTS OF AN EXPERT PANEL STUDY
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Twenty-six of 40 invited tobacco harm reduction experts completed a survey on what factors should be considered in setting a price for tobacco and nicotine products. The aim was to explore the possibility of creating a rational pricing policy to encourage smokers away from cigarettes to less harmful products (LHPs) while minimising uptake among non-smokers. Most participants (92.3%) agreed that it was a good idea to use price to encourage smokers to use LHPs, with the remainder unsure. All supported encouraging use of medicinal nicotine products, followed by non-smoked recreational clean nicotine (N=25), low toxin smokeless tobacco (SLT) (N=23), electronic nicotine delivery systems (ENDS) (N=22), then very low nicotine content cigarettes (N=7). None wanted to encourage use of pipes or cigars. Desirable attributes of LHPs included: containing only medicinal quality nicotine (N=25), able to be used discreetly (N=18), being an acquired taste (N=11), not tasting like candy (N=7). Undesirable attributes included: being easy to consume a large quantity quickly (N=25), looks like candy (N=22), and taste appealing to young people (N=20). Participants were split on whether a cigarettelike appearance was good (N=6) or bad (N=6), half were unsure or thought it unimportant. Most favoured a large price discount for medicinal nicotine but split between a large and a small discount for ENDS and dissolvable SLT. Half felt snus should have a small discount. Five were uncertain about and six thought nicotine lollipops should be banned. Assuming that a cigarette pack costs $15, 82% of participants accepted a suggested price of $7.50 for medicinal nicotine (9% suggested lower prices and 9% gave no alternative price); 68% accepted $10 for non-smoked recreational nicotine (14% suggested lower) and SLT (9% suggested lower, 5% higher); 64% accepted $10 for ENDS (9% suggested lower, 5% suggested higher); and 27% accepted $10 for low nicotine cigarettes (9% suggested lower, 41% higher and 23% gave no alternative price). The idea of differential pricing was accepted and, apart from low nicotine cigarettes, the model we presented was considered appropriate.
This project was supported by an NHMRC Project Grant (GT1020123). CG is supported by an NHMRC Early Career Research Fellowship (GT519783) and WH is supported by an NHMRC Australia Fellowship (GT569738).
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POS3-120
ASSESSMENT OF THE IMPACT OF A BAN ON PHARMACY SALE OF TOBACCO PRODUCTS: LESSONS FROM MASSACHUSETTS
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BACKGROUND: New tobacco control policies have been introduced in some U.S. jurisdictions which restrict tobacco product sales in pharmacies. This study aimed to outline the scope of pharmacy involvement in a state-wide

tobacco market by assessing the availability and range of tobacco products sold in Massachusetts pharmacies. METHODS: Public listings of licensed pharmacies and tobacco retailers in Massachusetts were examined to determine the proportion of pharmacies licensed to sell tobacco, and the proportion of tobacco retailers that possessed a pharmacy license. Telephone interviews were conducted with a random sample (n=70) of pharmacies that held a tobacco license, to assess the availability and range of tobacco products for sale. The availability of NRT products was assessed as a comparison. RESULTS: The majority of pharmacies in Massachusetts possessed a tobacco license (69%), and pharmacies made up 9% of licensed tobacco retailers. Among pharmacies that reported selling tobacco (90%), cigarettes were the most available tobacco product for sale (100%), followed by cigars (69%), little cigars/cigarillos (66%), moist snuff (53%), pipe tobacco (49%), roll-your-own tobacco (34%), snus (14%), dissolvable tobacco (11%), and electronic cigarettes (2%). Nearly all pharmacies that sold tobacco offered the nicotine patch (100%), gum (100%), and lozenge (98%) CONCLUSIONS: In Massachusetts, a tobacco-free pharmacy policy would affect a majority of pharmacies and remove a wide range of tobacco products from store shelves. Further, nearly one in ten tobacco retailers would be eliminated by a ban on tobacco sales in Massachusetts pharmacies.
No funding.
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POS3-121
ELECTRONIC CIGARETTES IN CANADA: PREVALENCE OF USE AND PERCEPTIONS AMONG YOUNG ADULTS
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Background: Electronic cigarettes (e-cigarettes) are a type of potentially reduced exposure product (PREP) that deliver vaporized nicotine without the harmful chemicals and carcinogens found in tobacco smoke formed during pyrolysis. E-cigarettes containing nicotine are prohibited for sale in Canada, although e-cigarettes without nicotine are widely available for sale and are becoming increasingly prominent. To date, there is very little evidence on prevalence and patterns of use of e-cigarettes in Canada. Methods: A sample of 1,211 young adults aged 16-30 (456 smokers and 755 non-smokers), were recruited from an online panel of Canadians. After viewing an image of an e-cigarette, respondents answered questions regarding use and perceptions of e-cigarettes. Results: Close to half of young adults (43.6%) had seen e-cigarettes advertised or for sale. A total of 16.0% reported “ever tried” e-cigarettes (32.8% smokers vs. 5.9% non-smokers); 5.7% reported use in the past 30 days (13.8% smokers vs. 1% non-smokers). Approximately 13.7% reported purchasing e-cigarettes from: “regular” stores in Canada (69.4%), the internet (33.3%), sources outside of Canada (8.3%), and other sources (6.9%). Although 77.2% of all respondents perceived e-cigarettes as at least somewhat harmful to their health, approximately half (48.5%) reported at least some interest in trying e-cigarettes. Among smokers who had tried e-cigarettes, between 77.5% and 81.0% indicated “yes” or “maybe” to using e-cigarettes as an alternative or replacement for cigarettes or as a cessation tool. A total of 11.9% of e-cigarette “ever users” reported side-effects of use. Among previous users, only 9.5% were “not at all likely” to recommend e-cigarettes to their friends. Conclusions: Despite a ban on the sale of e-cigarettes containing nicotine in Canada, awareness of e-cigarettes among young adults is quite high. Approximately one third of young adult smokers reported trying e-cigarettes, with evidence of use among non-smokers. Future research should examine the content and design of e-cigarettes in Canada to determine compliance with the ban on nicotine.

This research was supported by the Canadian Institutes of Health Research Training Grant in Population Intervention for Chronic Disease Prevention: A Pan-Canadian Program (Grant #: 53893) (Czoli), the Ontario Tobacco Research Unit Ashley Studentship for Research in Tobacco Control (Czoli), the Ontario Graduate Scholarship (Czoli), the Propel Centre for Population Health Impact, a CIHR New Investigator Award (Hammond), and a Canadian Cancer Society Research Institute Junior Investigator Research Award (Hammond).
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POS3-122

AWARENESS, TRIAL, AND CURRENT USE OF ELECTRONIC CIGARETTES: FINDINGS FROM ITC FOUR COUNTRY SURVEY

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Background: Electronic cigarettes (e-cigarettes) initially emerged in 2003 and have since become widely available globally, particularly over the internet. Purpose: Because e-cigarettes are relatively new, data on usage patterns are limited. The current study examines patterns of e-cigarette awareness, trial, use, and product-associated beliefs among current and former smokers in four countries. Methods: Data come from Wave 8 of the International Tobacco Control Four-Country Survey, collected from July 2010 to June 2011 and analyzed through to June 2012. Respondents included 5,939 current and former smokers in Canada (N=1581), US (N=1520), UK (N=1325), and Australia (N=1513). Results: Overall, 47% were aware of e-cigarettes (US: 73%, UK: 54%, Canada: 40%, Australia: 20%), 7.6% had tried e-cigarettes (16% of those aware of e-cigarettes), and 2.9% were current users (39% of triers). Awareness of e-cigarettes was higher among younger, non-minority smokers with higher incomes who were heavier smokers. Prevalence of trying e-cigarettes was higher among younger, non-daily smokers with a high income and among those who perceived e-cigarettes as less harmful than traditional cigarettes. Current use was more likely among both non-daily and heavy (20+ cigarettes per day) smokers. Nearly 80% reported using e-cigarettes because they were considered less harmful than traditional cigarettes, 75.4% stated that they used e-cigarettes to help them cut down, and 85.1% reported using e-cigarettes to help them quit smoking. Conclusions: Awareness of e-cigarettes is high, especially in countries where they are legal (i.e., US and UK). Because trial was associated with non-daily smoking and a desire to quit smoking, e-cigarettes could potentially serve as cessation aids once enforceable product standards are developed and efficacy and safety are firmly established. Future research should evaluate whether e-cigarette use effectively reduces the number of cigarettes smoked and/or improves cessation efforts and how the marketing of these devices influences usage patterns among both tobacco users and nonusers.
The ITC Four Country Project was supported by the U.S. National Cancer Institute (RO1 CA100362 and P01 CA138389), Canadian Institutes of Health Research (79551 and 115016), National Health and Medical Research Council of Australia (450110, APP1005922), Cancer Research UK (C312/A11943), Ontario Institute for Cancer Research (Senior Investigator Award to GTF), and Canadian Cancer Society Research Institute (Prevention Scientist Award to GTF).
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POS3-165
ELECTROPHYSIOLOGICAL ASSESSMENT OF CONSUMER ACCEPTABILITY OF ELECTRONIC NICOTINE DELIVERY SYSTEMS (ENDS)
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Background: Despite drastic increase in awareness and use, scientific evidence is inconclusive on the efficacy of electronic nicotine delivery systems (ENDS), better known as “e-cigarettes.” The aim of this study was to determine the abuse liability potential of ENDS in a sample of smokers using event-related brain potentials (ERPs). ERPs provide a convenient and objective index of regional cortical arousal that can be associated with varying levels of nicotine administration. The primary ERP component of interest was the parietal P3b, as this component has previously been linked to addiction liability. Methods: In this within subjects study, cigarette smokers, during four separate laboratory visits, smoked ENDS, ENDS placebo, their own brand cigarettes, and “sham” smoked their own brand cigarette in a Latin-square order. During smoking sessions, ERPs elicited by stimuli presented in the context of a two-stimulus oddball task were recorded. ERPs were recorded immediately before and after smoking, as were subjective measures (relief of craving/withdrawal). Results: Preliminary results suggest that the P3b component of the ERP was elevated following smoking ENDS, but not participants’ own brand of cigarette. However, the P3a component, an index of the involuntary orienting of attention, appeared to be increased following smoking own brand but not ENDS. Thus, there appears to have been a double dissociation between which of these ERP components were affected by ENDs or cigarettes. Conclusions: These preliminary findings suggest that ENDS may produce qualitatively different neurocognitive effects as compared to cigarettes. This suggests that product acceptability of ENDS and cigarettes may be determined by different cognitive mechanisms.
This study was conducted while the first author was at the University of Maryland. Supported by NIH/NIDA grant #5R21DA030622.
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POS4-41
BROAD APPEAL OF ELECTRONIC CIGARETTES IN THE SMOKER POPULATION CONTRASTS WITH RELATIVELY LOW APPEAL OF SNUS
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Background: Since 2006 when RJ Reynolds and Philip Morris started promoting snus, there has been considerable research directed at snus and its controversial status as a potential harm reduction strategy for cigarette smokers. Studies of snus trial have been published, showing robust interest primarily among young adult male smokers, but little has been learned about the rate of progression to regular use. Electronic cigarettes, which appeared on the American market at about the same time as snus, have received much less attention. We carried out a population-based study in 2011 and 2012 in the two US metropolitan areas where the Camel and Marlboro Snus have been available the longest. The survey included questions on trial and current use of electronic cigarettes, allowing us to compare the appeal of both of these novel tobacco products at the population level. Methods: Data are from a telephone survey of a dual frame, representative address-based sample of 3364 adults in Indianapolis and Dallas/Fort Worth, supplemented by a mail survey of 1786 adults for whom no phone numbers could be obtained. Results: Among males, snus trial was slightly higher than e-cigarette trial (29.9% vs 22.7%); but current use of snus was only half that of current e-cigarette use (4.2% vs 8.6%). Among females, trial of snus is only one third that of e-cigarettes(8.5% vs 25.5%; p<.05) and while almost no females are current

snus users, 6% of female smokers reported current use of e-cigarettes. There is a clear age gradient for snus trial and use among male smokers with younger men much more receptive to snus than older. For e-cigarette use, smokers 50 to 65 years of age show the highest rates of current use. Conclusions: Smokers seem more receptive to adoption of e-cigarettes than snus. The very different demographic profile of snus and e-cigarette users suggests different motivations for use. These findings underscore the importance of devoting more attention to the e-cigarette phenomenon in the future.
The research was supported by a grant from the National Cancer Institute.
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POS4-42

FACTORS INFLUENCING THE TOXICANT CONTENT OF ELECTRONIC CIGARETTE VAPOR: DEVICE CHARACTERISTICS AND PUFF TOPOGRAPHY

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Background: “Electronic cigarettes” (ECIGs) heat a nicotine-containing solution to produce a vapor for inhalation. There is considerable variability in device characteristics and puff topography and each of these factors may be related to vapor toxicant content. Method: We investigated the role of device voltage and puff duration on vapor toxicant content. We examined total particulate matter, nicotine, and volatile aldehyde emissions from 15 consecutive puffs of V4L™ ECIG cartridges (18 mg/ml nicotine) while varying device voltage (3.7 vs 5.2 volts) and machine-produced puff duration (1.8 vs 3.6 s). We used a puff velocity of 38.8 ml/s and 10 s interpuff interval (Goniewicz et al., 2012). In another study, we investigated a non-cartridge ECIG use method that involves dripping nicotinecontaining liquid directly onto a heating element and inhaling the resulting vapors.
We measured aldehyde emissions from dripping 3 drops of e-liquid (16 microL, similar to the amount of e-liquid consumed in 15 e-cig puffs) onto a 300 C heater surface. Results: The higher voltage tripled vapor nicotine content, and doubling puff duration doubled nicotine content. We also found that longer puffs resulted in greater cartridge temperatures, and that, for a given puff duration, higher puff velocities resulted in lower temperatures. Dripping liquid onto a heater surface produced more than 200 micrograms of formaldehyde, compared to 0.03 micrograms for 15 puffs of an ECIG cartridge (V4L™cartridge, topography of Goniewicz et al., 2012). We also measured 2-20 fold greater emissions of other aldehydes (9 species in total). Conclusions: Overall, these results demonstrate that device characteristics (e.g., voltage), puff topography, and use behavior (i.e., “dripping”) can influence vapor toxicant content. Indeed, these findings suggest that ECIG aficionados who take longer duration, slower puffs (Hua et al., 2011) are working to obtain higher nicotine doses and that those who drip liquid directly on the heater (McQueen et al., 2011) risk significant exposure to formaldehyde that is a human carcinogen and is associated with COPD in conventional tobacco product users.
This work was supported by USPHS grants R01CA120142 and R01 DA025659.
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POS4-49

SUBSTANTIAL REDUCTION IN EMISSION OF SELECTED CARBONYLS AND VOLATILE ORGANIC COMPOUNDS FROM ELECTRONIC CIGARETTES COMPARED TO TOBACCO CIGARETTES

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Significance: Electronic cigarettes (ECs) are purported to deliver nicotine vapor without any toxic substances generated from tobacco combustion. However, using ECs involves heating a nicotine solution to high temperatures. This may induce chemical reactions which result in the possible formation of carbonyl compounds (CCs) and volatile organic compounds (VOCs). Many CCs and VOCs are common tobacco-specific toxicants with proven carcinogenic and cardiotoxic properties. Aim of the study:The aim of the study was to quantify and compare the levels of selected CCs (formaldehyde, acetaldehyde, acrolein, acetone, propanal, butanal) and VOCs (benzene, toluene, etylobenzene and ortho-, meta-, para-xylene) in EC nicotine refill solutions, vapors generated from ECs,and mainstream smoke from tobacco cigarettes. Methods: Six commercially available nicotine refill solutions for ECs (Chic Group Ltd. Poland) were examined. Three solutions contained a mixture of propylene glycol and glycerin (Volish brand) as a solvent for nicotine, while the other three contained only propylene glycol (Mild brand). Thirtypuffs were taken using an automatic smoking machine. Mainstream smoke was generated from a3R4F reference tobacco cigarette. CCs were extracted from vapor and smoke to solid phase with 2,4-dinitrophenylhydrazine, and analyzed using HPLC/DAD. VOCs were absorbed on activated carbon and analyzed with GC/MS. Results:Traces of acetaldehyde were detected in all examined EC solutions(0.081±0.042 µg/mL). Acetaldehyde was found in all EC vapors (0.153±0.116 µg/30 puffs), but at levels more than a thousand-fold lower than in tobacco smoke. Formaldehyde and acrolein were only found in vapors generated from glycerin-based solutions (0.116±0.022 and0.110±0.190µg/30 puffs) and in tobacco smoke (12 and 32-fold higher levels, respectively).None of the examined VOCs were detected in the vapors, while all were found in tobacco smoke. Conclusions: In contrast to tobacco smoke, the vapors generated from ECs does not contain VOCs. Exposure to CCs from ECs is significantly reduced compared to tobacco smoke and may be attributable to the glycerin content in the nicotine refill solution.
The study was supported by research funds received from Chic Group LTD, manufacturer of electronic cigarettes in Poland, and paid to the Institute of Occupational Medicine and Environmental Health.
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POS4-70
SMOKERS' RATING OF ELECTRONIC CIGARETTES: WOULD MORE SMOKERS QUIT IF ELECTRONIC CIGARETTES WERE ON SALE?
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BACKGROUND: Nicotine electronic cigarettes (NECs) were illegal to sell or advertise in New Zealand during 2012, where 17% of adults smoke tobacco cigarettes daily. METHODS: Smokers age 18 and over who purchased their own cigarettes were recruited on worksites and by newspaper publicity; 343 were interviewed face to face in four cities and rewarded with a voucher for $15 (NZ$; 1 NZ$ = 0.85 USD) and a chance to win an electronic tablet. Participants completed the Cigarette Purchase Task (CPT; MacKillop et al., 2008) in which they reported how many cigarettes per day they would smoke at various price points. Then they sampled an NEC and rated preference for it against their own brand on a 10-point scale. The NEC used was SafeCig 18mg (SafeCig LLC. Los Angeles), notionally priced at $5 per day. RESULTS: Participants smoked a mean 14.9 cigarettes per day (cpd) and spent $8.72 daily on cigarettes, 33% paying $0.38 per roll-your-own (RYO) tobacco cigarette, 67% paying $0.72 per factory-made (FM) cigarette. After 3 puffs from the NEC, smokers liked it 83% as much as their own brand: average preference ratings for NEC and own brand were 6.26 and 7.51, respectively. If cigarettes cost $0.70 each, smokers estimated they would smoke 14.5 cpd, but only 7.08 cpd if they could buy NECs ($t[312] = 15.39$, $p < .001$). Using NECs,

31.6% said they would quit smoking their own brand completely. If cigarette price doubled to $1.40, 59.5% of smokers estimated they would quit, and a further 11.1% would quit by using NECs if NECs were on sale. Those continuing to smoke at this price would smoke 10.63 cpd; but if NECs were on sale, would smoke 6.34 cpd ($t[125] = 4.29$, $p < .001$). CONCLUSIONS: If cigarettes cost $0.70 each (20% above the mean 2012 price), and NECs cost 36% of this ($5 a day), three in ten smokers would use NECs to switch off tobacco smoking entirely. If the price of cigarettes doubled, price would be the main motivator of quitting, but even more intended to quit if NECs were on sale. Most smokers liked the NEC and given its price advantage, especially as tobacco excise increases, many would switch to NECs and stop smoking tobacco, if NECs were available.
Funding: End Smoking NZ from Canterbury Community Trust; Univ. of Canterbury, Tobacco Control Research Turanga Fund, University of Auckland.
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POS4-165
FORENSIC ANALYSIS OF ONLINE MARKETING OF ELECTRONIC CIGARETTES
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INTRODUCTION: Marketing of electronic cigarettes (e-cigs) by making therapeutic claims remains illegal in the US. We sought to describe complex networks of online e-cig marketing and to examine the connections between online advertisers of e-cig products (“affiliates”) and companies that sell the devices (“sellers”). METHODS: To identify online e-cig sellers, four keywords were entered into Google search and the first two pages of results were examined. Eligible webpages were archived and coded by two researchers. Coding included age verification, sale of nicotine liquid, therapeutic claims, health or toxicant exposure claims, and availability of an affiliate program. To examine the relationships between affiliates and sellers we manually identified three forms of marketing: SMS/text message, email-based, and banner advertisements. The forensic web proxy software Charles, was used to log an entire browsing session including identifiable objects (eg webpages, source files, servers) and their ties to each other via links, redirection or shared physical resources. The network analysis software ORA was used to graphically examine the relationship between affiliates and sellers. RESULTS: 20 unique e-cig sellers were identified. 6 used an age verification mechanism, all sold nicotine liquid, 4 made explicit therapeutic claims, 11 made health/toxicant exposure claims, and 12 offered an affiliate program. Forensic analysis of 4 ads revealed a multi-level relationship between consumers who received advertising and the seller, with logs demonstrating multiple layers of redirection. Textual analysis of advertising by these marketers, but not their linked sellers, included both misleading health and therapeutic claims. DISCUSSION: Misleading marketing claims are present on both affiliate advertisements and the websites of some e-cig sellers. Forensic analysis demonstrates that e-cig sellers also may be using a shadow network to distance potentially illegal marketing efforts from legal sales. These mechanisms, often used to market other unregulated health products, may attenuate efforts to regulate the health claims of nicotine based products.
No funding.
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