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Young adults' risk perceptions of various tobacco products relative to cigarettes – results from the National Young Adult Health Survey

Olivia A. Wackowski, PhD, MPH and

Assistant Professor, Center for Tobacco Studies, Department of Health Education & Behavioral Science, Rutgers School of Public Health, 335 George Street, Suite 2100, New Brunswick, NJ 08903, USA, 732-235-9731

Cristine D. Delnevo, PhD, MPH

Professor, Director, Center for Tobacco Studies, Chair, Department of Health Education & Behavioral Science, Rutgers School of Public Health, 335 George Street, Suite 2100, New Brunswick, NJ 08903, USA

Olivia A. Wackowski: wackowol@sph.rutgers.edu

Abstract

Objectives—Tobacco product risk perceptions may influence whether individuals use those products instead of or in addition to regular cigarettes. This study aimed to explore risk perceptions of various tobacco products relative to traditional cigarettes with young adults, a group with higher rates of tobacco use.

Methods—We examined risk perception responses among a nationally representative sample of young adults (ages 18–34)(n=2871)(including tobacco and non-tobacco users) from the 2011 National Young Adult Health Survey.

Results—Most (57.8%) respondents believed that e-cigarettes were less risky than cigarettes. Respondents were more likely to rate combustible products hookah (24.5%) and cigars (13.9%) as being less risky compared to non-combustible snus (10%) and other smokeless tobacco (SLT) products (7.1%) relative to cigarettes. Few (2.5%) rated menthol cigarettes as less risky. For e-cigarettes, hookah, and SLT, less risky beliefs were significantly higher among ever or current versus never product users. Between 22–33% of all respondents believed that SLT, snus, menthol cigarettes and cigars were *more* risky than cigarettes, but differences in this belief between current and non-users of these products were small and insignificant. Younger young adults were more likely to rate e-cigarettes and hookah as being “less risky” and rate cigars and SLT as being “more risky” than older young adults.

Correspondence to: Olivia A. Wackowski, wackowol@sph.rutgers.edu.

DECLARATION OF INTERESTS

None declared.

Data sharing

No additional data available.

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Conclusion—The public’s views of comparative tobacco risk perceptions vary widely by tobacco product type, and age group. While “less risky” perceptions may be associated with product use, perceptions that products are “more risky” than cigarettes may not necessarily dissuade people from their use.

Background

Health behavior theories such as the Theory of Planned Behavior and the Health Belief Model suggest that individuals’ knowledge and beliefs about tobacco products, which may include beliefs about their risks, may be associated with and predict use of those products (Glanz, Rimer & Lewis, 2002). For example, a recent prospective study with young adults found that those who perceived e-cigarettes to be less harmful than tobacco cigarettes at baseline were more likely to report experimentation with e-cigarettes at follow up (Choi & Forster, 2014). As such, risk perception measures have commonly been included in tobacco research. Studies comparing the risk perceptions of non-cigarette products to cigarettes are important in the context of declining cigarettes sales and increasing sales for other products such as cigars, smokeless tobacco and e-cigarettes (Delnevo et al., 2014; Hanson, 2013; U.S. Department of Treasury, 2012). As smokers reduce their cigarette consumption in the face of high cigarette taxes, smoking bans and health concerns, they may choose alternatives they believe pose a comparable if not lower risk.

Continued risk perception research is also relevant and timely given the current tobacco control regulatory climate. The 2009 Family Smoking Prevention and Tobacco Control Act (herein referred to as “the Act”) gave the Food and Drug Administration authority to regulate how tobacco products covered under the law (i.e., cigarettes, roll-your-own tobacco and smokeless tobacco) may be labeled and communicated, and these policies may impact tobacco risk perception beliefs. For example, the Act banned cigarette pack and advertising descriptors such as “light”, “low” and “mild” in an effort to reduce misperceptions that so called “light”/“low tar” cigarettes are less harmful (Food & Drug Administration, 2013). FDA documents also suggest that it recognizes that different tobacco products may fall onto a continuum of differing levels of risk (Food & Drug Administration, 2012; Food & Drug Administration, 2014) and future policies might reflect this. Already the Act allows for tobacco companies to apply to market a tobacco product as being “modified” or “lower risk” (although none have been approved to date)(Food & Drug Administration, 2012). Risk perceptions for currently still unregulated products such as e-cigarettes and hookah may also change over time as they become regulated and if policies evolve to restrict their advertising and impose warning labels on them. Meanwhile current tobacco beliefs and risk perceptions may be shaped by current policies (or lack thereof) as well as other sources of information such as health providers, friends and family, the Internet, tobacco advertising, warning labels, educational programs and the news (Cotton & Gupta, 2004; Hammond, Fong, McNeill, Borland, & Cummings, 2006; Lundborg, 2007; Malone, Yerger, & Pearson, 2001; Stoddard & Augustson, 2006; Pierce & Gilpin, 2001).

This study aims to contribute to risk perception literature by presenting data from a nationally representative sample of young adults, an important population subgroup which has the highest rate of adult tobacco use (Substance Abuse and Mental Health Services

Administration, 2013), and which includes individuals still experimenting with and establishing tobacco use (Bernat, Klein, & Forster, 2012; Richardson, Williams, Rath, Villanti & Vallone, 2014). Previous research also shows that young adults have different risk perceptions about various products than older age groups (Borland, Cooper, McNeill, O'Connor & Cummings, 2011; Tan & Bigman, 2014; Wackowski, Delnevo & Lewis, 2010), and that younger people are also less likely to be realistic about the risks of tobacco products and overly optimistic about their ability to quit them (Murphy-Hoefer, Adler & Higbee, 2004; Sami, Timberlake, Nelson, et al., 2012; Weinstein, Slovic & Gibson, 2004). Young adults also represent the youngest legal age group for tobacco company marketing (Gilpin, White, & Pierce, 2005; Ling & Glantz, 2002).

Two published survey studies have reported young adults' risk perceptions about multiple tobacco products. Smith and colleagues surveyed a small sample of college freshman in 2004, before the introduction of e-cigarettes (Smith, Curbow, & Stillman, 2007). In 2012, Latimer and colleagues surveyed college students from seven urban universities within one large public university system, and did not include measures that compared the harm perceptions of various products to cigarettes (Latimer, Batanova, & Loukas, 2014). We aimed to contribute to the literature on this topic by providing risk perception data about multiple tobacco products relative to cigarettes from a national sample of young adults.

METHODS

We examined data from 2871 respondents of the 2011 National Young Adult Health Survey (NYAHS), a stratified random digit dial (RDD) cell phone survey of 18 to 34 year olds about tobacco use, attitudes, susceptibility, and behaviors. The NYAHS was designed to provide representative estimates of health behaviors stratified by US Census regions (Northeast, South, Midwest, and West) with random selection of cellular-dedicated numbers based on the Telcordia Local Exchange Routing Guide (iconectiv, Piscataway, New Jersey). Data were collected between June and November 2011 via computer-assisted telephone interviewing and participants were offered a \$10 electronic gift card. Data were weighted to adjust for varying probabilities of select and post-stratification to demographics. The survey was developed by the second author (CD) and the institutional review board at Rutgers Biomedical and Health Sciences approved the procedures. Additional details about the survey's sampling methodology, weighting procedures and benchmarks are reported elsewhere (Gundersen, ZuWallack, Dayton, Echeverria, & Delnevo, 2014).

We defined current smokers as those indicating that they have ever smoked 100 cigarettes and now smoke every day or some days. Menthol smokers were defined as current smokers who answered a menthol status question ("is the brand you usually smoke menthol or non-menthol cigarettes?") with the answer of "menthol". Current users of cigars, smokeless tobacco (including snus), and/or hookah/water pipe were defined as individuals who indicated using one of those respective products in the last 30 days. Current use of e-cigarettes was not measured but those indicating having "ever used electronic cigarettes" were categorized as ever e-cigarette users.

To measure beliefs about the comparative risk of different tobacco products relative to cigarettes, participants were asked the following question: “compared to cigarettes, how risky do you think the following tobacco products are?” Participants were asked this question about cigars; e-cigarettes; hookah; snuff, dip or chew; and snus, and the order of these products was randomized. Participants were asked about snus separately from “snuff, dip or chew”, but were not asked about different types of “cigars” separately. If a respondent asked for some clarification about the term “cigars” they were told by the interviewer that: “Regular cigars can be large cigars or smaller in size such as cigarillos. They are not little cigars that have spongy filters like cigarettes. They are usually sold individually or in packs of 5 or 8. Some common brands are *Black and Mild’s*, *Swisher Sweets cigarillos*, and *Phillies Blunts*, but there are others.” For menthol cigarettes, participants were asked a nearly identical question: “Compared to non-menthol cigarettes, how risky do you think menthol cigarettes are?” For both questions, response options were “less risky”, “about the same” or “more risky” and responses of “don’t know” or “not sure” were coded by the survey operator if the respondent offered this response.

Prevalence estimates and their 95% confidence limits are reported. We also conducted Chi-Square tests to look for bivariate associations between risk perception beliefs and several covariates and logistic regressions to examine factors associated with the odds of responding that a product was “more” or “less” risky than regular cigarettes, such as basic demographics (gender, age, race/ethnicity, education), smoking status, and use of that respective product. For all analyses, sample weights were applied and analyses were performed using SUDAAN statistical software (Version 11), which corrects for the complex sample design.

Results

The sample of respondents (n=2,871) was evenly split by gender (49.8% male, 50.2% female), 42.1% were younger young adults ages 18–24, 61.3% had at least some college education or more, and 55.7% were non-Hispanic white (12.8% non-Hispanic black, 18.8% Hispanic, 5% non-Hispanic Asian, and 7.6% non-Hispanic other). Overall, 23.8% were current smokers and 40.3% of current smokers were menthol smokers. In addition, 8.7% currently used cigars, 5.7% currently used hookah, and 3.6% currently used some form of smokeless tobacco. Overall, 31.2% currently used some form of tobacco. In addition, 10.1% reported ever using an e-cigarette.

For all products except e-cigarettes, at least 50% of all respondents believed the products were about as risky as cigarettes (see Table 1). In contrast, the majority of respondents (57.8%) believed that e-cigarettes were less risky than cigarettes, although 11.4% indicated that they did not know or were unsure. Almost a quarter (24.5%) of respondents believed hookah use to be less risky and about 14% indicated that cigars were less risky than cigarettes. The proportion of respondents who believed that snus was less risky than cigarettes was significantly higher (10%) than for smokeless tobacco in general (7.1%)($p < .0001$). However, a significantly greater proportion of respondents were unsure about snus (8.8%) as compared to smokeless tobacco (2.8%)($p < .0001$). Few respondents (2.5%) believed that menthol cigarettes are less risky than regular cigarettes.

Factors associated with respondents' beliefs that the various products are less risky than regular cigarettes are found in Table 2. For all products except menthol cigarettes, this belief was significantly higher for males versus females ($p < .01$), and was significantly higher among younger young adults (18–24) than older young adults (25–34) for e-cigarettes, hookah, and menthol cigarettes ($< .01$). For e-cigarettes, hookah and cigars, this belief was also significantly higher for those with more education (AOR=1.54, 1.5 and 1.6, respectively) and was significantly associated with race ($p < .01$) for e-cigarettes and cigars, where having this belief was less likely among blacks, Hispanics and Asians (for e-cigarettes only) relative to whites as the referent group.

Having this less risky belief was significantly higher for current versus never smokers only with respect to e-cigarettes (AOR=1.86). The prevalence of this belief was notably high and similar for both current and never cigarette smokers with respect to hookah (approximately 25%) and cigars (~13–14%). For all product types except menthol cigarettes and cigars, the odds and prevalence of the less risky belief was significantly associated with current use of that product (or ever use, in the case of e-cigarettes), with the prevalence being between 20–35 percentage points higher for current/ever versus never users of those respective products.

On the other hand, between 22–33% of respondents believed that SLT, snus, menthol cigarettes and cigars were *more* risky than cigarettes (see Table 1). For all products except menthol cigarettes, whites were least likely to hold this belief relative to other race/ethnicities (see Table 3). The odds of holding this “more risky” belief were also significantly higher for younger young adults and for current versus never smokers for cigar and smokeless tobacco products in general (not including snus) ($p < .001$). This “more risky” belief was significantly higher for males versus females (AOR 1.56) and for those with less than a college education (AOR 1.29) for cigar products only. For each product type the difference in prevalence of this belief between current users and non-users of that product were small (i.e., 1–6 percentage points) and insignificant.

Discussion

This study uses a nationally representative sample to provide a picture of young adults' risk perceptions of various tobacco products relative to regular tobacco cigarettes. We found that e-cigarettes were the product most frequently rated by young adults as being “less risky” compared to traditional cigarettes, while menthol cigarettes were the product least likely to be rated as being “less risky” relative to traditional cigarettes. In general, this appears to be consistent with perspectives shared by some professionals in the tobacco control field that have suggested tobacco products possess a continuum of risk, with combustible tobacco cigarettes representing the most harmful type of product to individual health, and non-combustible, and non-tobacco products representing less harmful products on the spectrum with respect to individual health (Fiore, Schroeder, & Baker, 2014; Royal College of Physicians, 2007; Royal College of Physicians, 2014; Statement from specialists in nicotine science and public health policy, 2014; Zeller & Hatsukami, 2009; Zeller, 2013).

Our results are also consistent with previous studies finding that a majority of people believe e-cigarettes to be less harmful than smoking (Choi & Forster, 2013; Pearson, Richardson,

Niaura, Vallone, & Abrams, 2012; Sutfin, McCoy, Morrell, Hoeppe, & Wolfson, 2013; Tan & Bigman, 2014), and that associations exist between reduced risk perceptions and e-cigarette use (Choi & Forster, 2014; Sutfin et al., 2013). However, the prevalence of this belief may be falling – Tan and Bigman (2014) noted that the proportion of smokers who found e-cigarettes to be less harmful than smoking decreased from 84.7% in 2010 to 65% in 2013. This may be due to increased media attention on e-cigarettes and their potential risks and consequences.

Also of note, we found that young adults are more likely to rate combustible products, such as hookah and cigars, as being less risky than they are to do so for smokeless tobacco products relative to cigarettes. This is inconsistent with the scientific evidence that smokeless tobacco products are less harmful than combusted tobacco products to individual health (Fiore, Schroeder, & Baker, 2014; Royal College of Physicians, 2007; World Health Organization Study Group on Tobacco Product Regulation, 2008; Zeller & Hatsukami, 2009; Zeller, 2013). Other research has also documented that smokers largely view SLT products to be as or more harmful than cigarettes and to be unacceptable alternatives (Borland et al., 2011; O'Connor et al., 2005; O'Connor et al., 2007; Smith et al., 2007; Timberlake 2009;). Qualitative studies have suggested that smokers may rate smokeless tobacco and cigarettes to be equally harmful, even if they recognize a reduced risk for lung cancer associated with SLT, because of the perception that SLT carries its own risks (e.g., oral cancer) and the perception that “cancer is cancer” (Choi, Fabian, Mottey, Corbett, & Forster, 2012; Sami et al., 2012; Wray, Jupka, Berman, Zellin, & Vijaykumar, 2012). These studies also suggest that some believe SLT to be more harmful than cigarettes because of the prolonged and direct contact with the tobacco product on users’ body/mouth (Choi et al., 2012; Sami et al., 2012). Although beliefs that SLT products pose fewer risks than cigarettes were low, we did find that such beliefs were somewhat more prevalent with respect to snus versus other SLT (i.e., snuff, dip or chew), which is consistent with views that snus may represent a less harmful version of SLT because of its lower tobacco-specific nitrosamine profile (Foulds, Ramstrom, Burke, & Fagerström, 2003; Zeller & Hatsukami, 2009). On the other hand a larger proportion of young adults were unable to provide an answer about snus than they were about SLT in general.

In contrast approximately a quarter of young adults believed that hookah is less risky than cigarettes, a belief that was equally prevalent among current and never cigarette smokers. This is concerning as it suggests that even a substantial proportion of non-smokers may view hookah as being a relatively safer and acceptable way to use tobacco. Previous studies have indicated that hookah-related sensory perceptions (i.e., that it feels less harsh when inhaled and has a pleasant smell) contribute to reduced risk perceptions (Jawad, Jawad, Mehdi, et al., 2013; Richter, Pederson, & O’Hegarty, 2006; Wray et al., 2012) as well as beliefs that the hookah pipe acts as a filtering system (Jawad et al., 2013; Wray et al., 2012) and that hookah is used less frequently than cigarettes (Richter et al., 2006).

This study was also consistent in finding that some believe cigars to be less risky than cigarettes, a belief that may be attributed to perceptions that cigars are used less frequently than cigarettes, that they are more “natural” types of tobacco products (with fewer additives) and/or that their smoke is not inhaled (Jolly, 2008; Richter et al., 2006; Wray et al., 2012;

Malone et al., 2001). However, a substantial number of young adults (almost one-third) believe that cigars may be *more* risky than cigarettes, which may due to perceptions that cigars contain more tobacco, take longer to smoke, lack filters and have a stronger, more harsh taste (Jolly, 2008; Nasim, Blank, Cobb, et al., 2014; Richter et al., 2006). In fact previous research has shown that people engage in cigar product modification for certain brands/styles to make them taste more smooth and reduce their risks (Jolly, 2008; Nasim et al., 2014). It should be noted however that our survey question did not ask participants to distinguish between different types of cigar products (e.g., “large cigars”, “little cigars”, “cigarillos”) which may be associated with different comparative risk perceptions. Future research should explore this.

We also documented differences in risk perceptions by age. Specifically we found that younger young adults (ages 18–24) were more likely to find e-cigarettes and hookah to be less risky than cigarettes relative to the older young adults (ages 25–34). Conversely, these younger young adults were also more likely to view cigars and smokeless tobacco as being “more risky” relative to cigarettes than did the 25–34 year olds. This might be associated with differences in advertising messages these groups are exposed to, the variety of flavors these different products are offered in, how and where these products might be used by these groups (e.g., for social purposes versus for smoking cessation or reduction), perceptions that some products like e-cigarettes and hookah are more “novel”, “exotic”, interesting or fun to use, and in the case of e-cigarettes, possibly an inclination for younger people to attribute more positive feelings towards newer products that are seen as new and “techy”. Although belief that menthol cigarettes are less risky than non-menthol cigarettes was also more prominent in younger (4.3%) versus older young adults (1.2%)(AOR=9.1), the prevalence of this belief was low overall (2.5%).

Lastly, we also noted that the “less risky” product beliefs were considerably more prevalent in current (or ever) versus never users of most of the products (i.e., e-cigarettes, hookah, SLT and snus), while there were no significant differences in the prevalence of the “more risky” belief between current and non-users of those products (i.e., e-cigarettes, hookah, menthol cigarettes, SLT, snus, cigars). This may suggest that while “less risky” perceptions may be associated with product use, perceptions that products are “more risky” than cigarettes may not necessarily dissuade people from their use.

A few limitations of our study should be noted. This was a secondary data analysis of the NYAHS which was not designed specifically to study product risk perceptions. As such it only included one close-ended survey item to measure comparative risk perceptions for each product, which may not capture the nuances of one’s actual risk beliefs. For example, someone who answers that they believe SLT is “just as” risky as cigarettes may actually believe that SLT poses *less* risk for lung cancer but *more* risk for oral cancer. Furthermore, it is not known exactly how respondents may have interpreted this risk comparison question, the meaning of “less risky” and “more risky” than cigarettes, and the types of risks they may have considered (health risks or other risks), and our measure may not be considered as strong as ones in other studies that phrased the question in terms of relative “harmfulness” specifically. However a broader risk measure such as the one used here might also be considered valuable given that the FDA’s MRTP policy decisions are to consider both

individual health risks and other population level risks (as discussed below). Either way, that fact that our results were largely consistent with findings of others studies should increase confidence that participants did consider health risks in their responses.

In addition, we only used a “direct” measure of comparative risk – i.e., our question directly asked respondents to compare the risk of each product to cigarettes, and is consistent with numerous previous survey studies. However, one recent study found that different relative risk estimates of snus versus cigarettes were obtained when using a direct measure or two “indirect” measures – i.e., estimating the health risks of snus and cigarettes in two separate questions and comparing those answers to each other. Popova and Ling (2013) found that when asked indirectly, a significantly larger proportion of smokers appeared to find snus to be less risky than cigarettes than when asked about this comparison directly. Popova and Ling suggest that the discrepancy may be attributed to a greater proportion of individuals providing what they perceive is the more socially correct or desired answer when they are asked the direct question, versus when they are asked the two questions indirectly, which they argue better gets at their true perceptions. However, data from the consumer research field suggest that some items (or their attributes) may be difficult to evaluate without some context for comparison, and that this issue can account for differences in ratings of items compared directly or evaluated separately (Hsee, 1996). We agree with Popova and Ling that additional research into this topic would be useful. Finally, this study was limited in only having an “ever use” measure for e-cigarettes rather than a “current use” measure, as available for the other tobacco products studied.

Finally, it should also be emphasized that our references to the consistency of individuals’ product risk perceptions with tobacco “continuum of risk” perspectives have been made specifically with respect to the idea that different tobacco products may pose different levels of risk to users’ *individual health*. However, for many products the actual magnitude of these potential differences in risks is not precisely known. Furthermore, as many in the tobacco control community have pointed out (Glantz, 2014a; Glantz, 2014b; World Health Organization Study Group on Tobacco Product Regulation, 2008; Zeller & Hatsukami, 2009), the *population-level* impact that these products might have should also be factored into perspectives about their risks. For example, individual level risks that might be reduced by switching from one product to another product (e.g., cigarettes to snus) may be negated if promotion of the alternative product as “lower risk” actually facilitates dual product use rather than total switching/smoking cessation, and/or encourages product uptake among former smokers or never users. According to the Tobacco Control Act, the FDA is to consider and weigh the balance of these potential benefits and risks in its regulations of “modified risk tobacco products” (Food & Drug Administration, 2012).

Overall, this study contributes to the literature by providing nationally representative data on young adults’ risk perceptions for multiple tobacco products relative to cigarettes, by including a broader age group of young adults, and by framing results with respect to continuum of risk perspectives. Results suggest that while the majority of young adults perceive most tobacco products (except e-cigarettes) to be just as risky as cigarettes, many are perceived as falling on a spectrum of risk, as either more or less risky than traditional cigarettes. Risk perceptions may also differ by young adult age group, with younger young

adults more likely to rate e-cigarettes and hookah as being “less risky” and rate cigars and smokeless tobacco products as being “more risky” than older young adults. Overall risk perceptions for various tobacco products should continue to be monitored given changes in the acceptability, accessibility and regulation of these respective products.

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References

- Bernat DH, Klein EG, Forster JL. Smoking initiation during young adulthood: a longitudinal study of a population-based cohort. *Journal of Adolescent Health*. 2012; 51:497–502. [PubMed: 23084172]
- Borland R, Cooper J, McNeill A, O’Connor RM, Cummings KM. Trends in beliefs about the harmfulness and use of stop-smoking medications and smokeless tobacco products among cigarettes smokers: Findings from the ITC four-country survey. *Harm Reduction Journal*. 2011; 8:21. [PubMed: 21859499]
- Choi K, Forster J. Characteristics associated with awareness, perceptions, and use of electronic nicotine delivery systems among young US Midwestern adults. *American Journal of Public Health*. 2013; 103:556–61. [PubMed: 23327246]
- Choi K, Forster JL. Beliefs and experimentation with electronic cigarettes: a prospective analysis among young adults. *American Journal of Preventive Medicine*. 2014; 46:175–8. [PubMed: 24439352]
- Choi K, Fabian L, Mottey N, Corbett A, Forster J. Young adults’ favorable perceptions of snus, dissolvable tobacco products, and electronic cigarettes: findings from a focus group study. *American Journal of Public Health*. 2012; 102:2088–93. [PubMed: 22813086]
- Cotten SR, Gupta SS. Characteristics of online and offline health information seekers and factors that discriminate between them. *Social Science & Medicine*. 2004; 59(9):1795–1806. [PubMed: 15312915]
- Delnevo CD, Wackowski OA, Giovenco DP, Manderski MT, Hrywna M, Ling PM. Examining market trends in the United States smokeless tobacco use: 2005–2011. *Tobacco Control*. 2014; 23(2):107–12. [PubMed: 23117999]
- Fiore M, Schroeder S, Baker T. Smoke, the Chief Killer — Strategies for Targeting Combustible Tobacco Use. *New England Journal of Medicine*. 2014; 370:297–299. [PubMed: 24450888]
- Food & Drug Administration. Modified Risk Tobacco Applications. 2012. Retrieved from <http://www.fda.gov/TobaccoProducts/GuidanceComplianceRegulatoryInformation/ucm297750.htm>
- Food & Drug Administration. Light, Low, Mild or Similar Descriptors. July 22 Milestone: Putting Out the Myth on Light, Low, and Mild Cigarettes. 2013. Retrieved from <http://www.fda.gov/TobaccoProducts/Labeling/Labeling/MisleadingDescriptors/default.htm>
- Food & Drug Administration. Proposed Rule: Deeming Tobacco Products To Be Subject to the Federal Food, Drug, and Cosmetic Act. 2014. Retrieved from <http://www.fda.gov/downloads/TobaccoProducts/GuidanceComplianceRegulatoryInformation/UCM394914.pdf>
- Foulds J, Ramstrom L, Burke M, Fagerström K. Effect of smokeless tobacco (snus) on smoking and public health in Sweden. *Tobacco Control*. 2003; 12:349–59. [PubMed: 14660766]
- Gilpin EA, White VM, Pierce JP. How effective are tobacco industry bar and club marketing efforts in reaching young adults? *Tobacco Control*. 2005; 14:186–192. [PubMed: 15923469]
- Glantz, SA. FDA should not assume a “continuum of risk” until there is proof that it exists for e-cigs as they are actually used. 2014a. Retrieved from: <https://tobacco.ucsf.edu/fda-should-not-assume-continuum-risk-until-there-proof-it-exists-ecigs-they-are-actually-used>

- Glantz, SA. 129 public health and medical authorities from 31 countries write WHO DG Chan urging evidence-based approach to ecigs. 2014b. Retrieved from: <https://tobacco.ucsf.edu/129-public-health-and-medical-authorities-31-countries-write-who-dg-chan-urging-evidence-based-approach>
- Glanz, K.; Rimer, BK.; Lewis, FM. Health behavior and health education: Theory, research, and practice. 3. San Francisco: Jossey-Bass; 2002.
- Gundersen DA, ZuWallack RS, Dayton J, Echeverria SE, Delnevo CD. Assessing the feasibility and sample quality of a national random digit dial cell phone survey of young adults. *American Journal of Epidemiology*. 2014; 179:39–47. [PubMed: 24100957]
- Hammond D, Fong GT, McNeill A, Borland R, Cummings KM. Effectiveness of cigarette warning labels in informing smokers about the risks of smoking: findings from the International Tobacco Control (ITC) Four Country Survey. *Tobacco Control*. 2006; 15(Suppl 3):iii, 9–25.
- Hanson, A. E-cigarettes – a path to the future. *Convenience Store News*. Nov 18. 2013 Retrieved at <http://www.csnews.com/product-categories/tobacco/e-cigarettes-path-future>
- Hsee CK. The evaluability hypothesis: an explanation for preference reversals between joint and separate evaluations of alternatives. *Organizational Behavior & Human Decision Processes*. 1996; 67:247–257.
- Jawad M, Jawad S, Mehdi A, Sardar A, Jawad AM, Hamilton FL. A qualitative analysis among regular waterpipe tobacco smokers in London universities. *International Journal of Tuberculosis and Lung Disease*. 2013; 17:1364–9. [PubMed: 24025391]
- Jolly DH. Exploring the use of little cigars by students at a historically black university. *Preventing Chronic Disease*. 2008; 5:A82. [PubMed: 18558032]
- Latimer LA, Batanova M, Loukas A. Prevalence and harm perceptions of various tobacco products among college students. *Nicotine & Tobacco Research*. 2014; 16:519–26. [PubMed: 24212764]
- Ling PM, Glantz SA. Why and how the tobacco industry sells cigarettes to young adults: evidence from industry documents. *American Journal of Public Health*. 2002; 6:908–16. [PubMed: 12036776]
- Lundborg P. Smoking, information sources, and risk perceptions – new results on Swedish data. *Journal of Risk Uncertainty*. 2007; 34:217–240.
- Malone RE, Yerger V, Pearson C. Cigar risk perceptions in focus groups of urban African American youth. *Journal of Substance Abuse Treatment*. 2001; 13:549–61.
- Murphy-Hoefer R, Alder S, Higbee C. Perceptions about cigarette smoking and risks among college students. *Nicotine & Tobacco Research*. 2004; 6(Suppl 3):S371–4. [PubMed: 15799600]
- Nasim A, Blank MD, Cobb CO, Berry BM, Kennedy MG, Eissenberg T. How to freak a Black & Mild: a multi-study analysis of YouTube videos illustrating cigar product modification. *Health Education Research*. 2014; 29:41–57. [PubMed: 24162926]
- O'Connor R, Hyland A, Giovino G, Fong G, Cummings K. Smoker Awareness of and Beliefs About Supposedly Less-Harmful Tobacco Products. *American Journal of Preventive Medicine*. 2005; 29:85–90. [PubMed: 16005803]
- O'connor R, Mcneill A, Borland R, Hammond D, King B, Boudreau C, Cummings K. Smokers' beliefs about the relative safety of other tobacco products: Findings from the ITC Collaboration. *Nicotine & Tobacco Research*. 2007; 9:1033–1042. [PubMed: 17943619]
- Pearson JL, Richardson A, Niaura RS, Vallone DM, Abrams DB. E-Cigarette awareness, use, and harm perceptions in US adults. *American Journal of Public Health*. 2012; 102:1758–66. [PubMed: 22813087]
- Pierce JP, Gilpin EA. News media coverage of smoking and health is associated with changes in population rates of smoking cessation but not initiation. *Tobacco Control*. 2001; 10:145–153. [PubMed: 11387535]
- Popova L, Ling PM. Perceptions of relative risk of snus and cigarettes among US smokers. *American Journal of Public Health*. 2013; 103:e21–3. [PubMed: 24028247]
- Richardson A, Williams V, Rath J, Villanti AC, Vallone D. The next generation of users: prevalence and longitudinal patterns of tobacco use among US young adults. *American Journal of Public Health*. 2014; 104:1429–36. [PubMed: 24922152]

- Richter PA, Pederson LL, O'Hegarty MM. Young adult smoker risk perceptions of traditional cigarettes and nontraditional tobacco products. *American Journal of Health Behavior*. 2006; 30:302–12. [PubMed: 16712444]
- Royal College of Physicians. A report by the Tobacco Advisory Group of the Royal College of Physicians. London: RCP; 2007. Harm reduction in nicotine addiction: helping people who can't quit. Retrieved from <http://www.tobaccoprogram.org/pdf/4fc74817-64c5-4105-951e-38239b09c5db.pdf>
- Royal College of Physicians. RCP statement on e-cigarettes. 2014. Retrieved from: <https://www.rcplondon.ac.uk/press-releases/rcp-statement-e-cigarettes>
- Sami M, Timberlake DS, Nelson R, Goetsch B, Ataian N, Libao P, Vassile E. Smokers' perceptions of smokeless tobacco and harm reduction. *Journal of Public Health Policy*. 2012; 33:188–201. [PubMed: 22377777]
- Smith SY, Curbow B, Stillman FA. Harm perception of nicotine products in college freshmen. *Nicotine & Tobacco Research*. 2007; 9:977–82. [PubMed: 17763115]
- Statement from specialists in nicotine science and public health policy. May 26, 2014. Letter to Dr Margaret Chan. Reducing the toll of death and disease from tobacco – tobacco harm reduction and the Framework Convention on Tobacco Control. Retrieved from: <http://nicotinepolicy.net/documents/letters/MargaretChan.pdf>
- Stepanov I, Jensen J, Hatsukami D, Hecht SS. New and traditional smokeless tobacco: comparison of toxicant and carcinogen levels. *Nicotine & Tobacco Research*. 2008; 10:1773–82. [PubMed: 19023828]
- Stoddard JL, Augustson EM. Smokers who use internet and smokers who don't: data from the Health Information and National Trends Survey (HINTS). *Nicotine & Tobacco Research*. 2006; 8(Suppl 1):S77–85. [PubMed: 17491174]
- Substance Abuse and Mental Health Services Administration. Results from the 2012 National Survey on Drug Use and Health: Summary of National Findings. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2013. NSDUH Series H-46, HHS Publication No. (SMA) 13-4795
- Sutfin EL, McCoy TP, Morrell HE, Hoepfner BB, Wolfson M. Electronic cigarette use by college students. *Drug and Alcohol Dependence*. 2013; 131:214–21. [PubMed: 23746429]
- Tan AS, Bigman CA. E-cigarette awareness and perceived harmfulness: prevalence and associations with smoking-cessation outcomes. *American Journal of Preventive Medicine*. 2014; 47:141–9. [PubMed: 24794422]
- Timberlake DS. Are smokers receptive to using smokeless tobacco as a substitute? *Preventive Medicine*. 2009; 49:229–232. [PubMed: 19631684]
- U.S. Department of Treasury. The Alcohol and Tobacco Tax and Trade Bureau. Tobacco Statistics. 2012. Retrieved from http://www.ttb.gov/tobacco/tobacco_stats.html
- Wackowski OA, Delnevo CD, Lewis MJ. Risk perceptions of menthol cigarettes compared with nonmenthol cigarettes among New Jersey adults. *Nicotine & Tobacco Research*. 2010; 12:786–90. [PubMed: 20522521]
- Weinstein ND, Slovic P, Gibson G. Accuracy and optimism in smokers' beliefs about quitting. *Nicotine & Tobacco Research*. 2004; 6(Suppl 3):S375–80. [PubMed: 15799601]
- World Health Organization Study Group on Tobacco Product Regulation. The scientific basis of tobacco product regulation. Switzerland: WHO; 2008. Retrieved from: http://www.who.int/tobacco/global_interaction/tobreg/publications/tsr_951/en/
- Wray RJ, Jupka K, Berman S, Zellin S, Vijaykumar S. Young adults' perceptions about established and emerging tobacco products: results from eight focus groups. *Nicotine & Tobacco Research*. 2014; 14:184–90.
- Zeller M, Hatsukami D. The Strategic Dialogue on Tobacco Harm Reduction: a vision and blueprint for action in the US. *Tobacco Control*. 2009; 18:324–32. [PubMed: 19240228]
- Zeller M. Reflections on the 'endgame' for tobacco control. *Tobacco Control*. 2013; 22:i40–i41. [PubMed: 23591507]

Table 1
Risk perceptions relative to cigarettes by product, among all respondents (n=2,871)

	Less risky		About the same		More risky		Don't Know	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Menthol cigarettes	2.5	(1.8–3.2)	58.3	(55.7–60.9)	31.8	(29.4–34.3)	7.3	(6.0–8.7)
Smokeless tobacco	7.1	(5.9–8.4)	58.2	(55.7–60.8)	31.8	(29.4–34.2)	2.8	(1.9–3.7)
Snus	10.0	(8.5–11.5)	58.9	(56.3–61.5)	22.3	(20.1–24.5)	8.8	(7.2–10.4)
Cigars	13.9	(12.2–15.6)	50.9	(48.3–53.6)	32.7	(30.2–35.1)	2.5	(1.6–3.3)
Hookah	24.5	(22.3–26.6)	55.2	(52.6–57.8)	13.6	(12.0–15.3)	6.7	(5.3–8.2)
E-cigarettes	57.8	(55.1–60.4)	25.6	(23.4–27.9)	5.2	(4.0–6.3)	11.4	(9.4–13.5)

Table 2
Percentage and adjusted odds of believing various tobacco products are “less risky” than cigarettes, among all respondents (n=2,871)

	E-cigarettes			Hookah			Smokeless Tobacco ^a			Snus			Menthol cigarettes			Cigars			
	%	(95% CI) ^d	AOR (95% CI) ^b	%	(95% CI)	AOR (95% CI)	%	(95% CI)	AOR (95% CI)	%	(95% CI)	AOR (95% CI)	%	(95% CI)	AOR (95% CI)	%	(95% CI)	AOR (95% CI)	
Gender																			
Male	65.2	(61.7–68.7)	1.84 (1.5–2.3)	27.5	(24.4–30.7)	1.4 (1.1–1.8)	9.7	(7.7–11.7)	2.1 (1.4–3.3)	13.5	(11.2–15.9)	2 (1.4–3.0)	2.4	(1.4–3.4)	0.6 (0.2–2.2)	17.2	(14.6–19.9)	1.8 (1.3–2.4)	
Female	50.4	(46.6–54.2)	Ref	21.4	(18.5–24.4)	Ref	4.6	(3.1–6.1)	Ref	6.5	(4.6–8.4)	Ref	2.6	(1.7–3.6)	Ref	10.6	(8.6–12.7)	Ref	
		p<0.0001	p<0.0001		p=0.0055	p=0.0105		p<0.0001	p=0.0005		p<0.0001	p=0.0002		p=0.7495	p=0.4585		p<0.0001	p=0.0002	
Race/Ethnicity																			
White ^b	62.2	(58.9–65.5)	Ref	25.0	(22.2–27.7)	Ref	7.8	(6.1–9.5)	Ref	10.8	(8.8–12.8)	Ref	1.8	(1.1–2.5)	Ref	17.4	(15.0–19.8)	Ref	
Black ^b	46.3	(39.0–53.7)	0.62 (0.4–0.9)	21.8	(15.8–27.8)	0.9 (0.6–1.3)	7.0	(3.3–10.6)	1.1 (0.6–2.1)	8.0	(3.7–12.3)	0.9 (0.5–1.6)	3.8	(1.5–6.1)	3.2 (0.8–12.7)	5.4	(2.5–8.3)	0.3 (0.2–0.5)	
Hispanic	54.2	(46.9–61.5)	0.78 (0.6–1.1)	23.1	(17.2–28.9)	0.8 (0.6–1.2)	5.6	(2.7–8.5)	0.8 (0.4–1.4)	9.0	(5.3–12.7)	0.9 (0.5–1.4)	3.3	(1.0–5.6)	0.5 (0.1–3.1)	6.9	(3.9–10.0)	0.4 (0.2–0.6)	
Asian ^b	48.1	(38.3–57.9)	0.52 (0.3–0.8)	30.4	(21.4–39.3)	1.1 (0.7–1.8)	6.8	(2.3–11.4)	0.7 (0.4–1.3)	9.2	(4.1–14.3)	0.8 (0.4–1.4)	3.2	(0.5–5.8)	1.9 (0.2–16.8)	15.5	(7.3–23.8)	0.8 (0.4–1.5)	
Other ^b	63.1	(54.2–72.0)	0.97 (0.6–1.5)	22.5	(15.1–29.8)	0.8 (0.5–1.2)	6.2	(2.0–10.5)	0.7 (0.3–1.7)	9.7	(4.5–15.0)	0.8 (0.4–1.6)	2.1	(0.1–4.1)	2.6 (0.5–13.4)	18.4	(11.6–25.3)	1.1 (0.7–1.7)	
		p<0.0001	p=0.0049		p=0.3372	p=0.6336		p=0.7747	p=0.6515		p=0.7590	p=0.8923		p=0.2303	p=0.3494		p<0.0001	p<0.0001	
Age Group																			
18–24 yrs	62.1	(58.6–65.7)	1.57 (1.3–2.0)	32.7	(29.3–36.1)	2.0 (1.6–2.6)	7.4	(5.7–9.2)	1 (0.7–1.5)	11.0	(8.8–13.2)	1.2 (0.8–1.7)	4.3	(2.9–5.8)	9.1 (2.3–36.6)	15.2	(12.7–17.6)	1.3 (1.0–1.7)	
25–34 yrs	54.6	(50.9–58.4)	Ref	18.5	(15.9–21.1)	Ref	6.9	(5.2–8.6)	Ref	9.3	(7.2–11.3)	Ref	1.2	(0.7–1.8)	Ref	13	(10.7–15.3)	Ref	
		p<0.0043	p<0.0001		p<0.0001	p<0.0001		p=0.6841	p=0.8881		p=0.2636	p=0.3569		p<0.0001	p=0.0019		p=0.2052	p=0.0900	
Education																			
<= HS	54	(49.4–58.5)	Ref	20.9	(17.5–24.2)	Ref	7.1	(5.1–9.2)	Ref	11.5	(8.7–14.2)	Ref	2.8	(1.6–4.1)	0.8 (0.2–3.3)	10.1	(7.7–12.5)	Ref	
> HS	60.3	(57.0–63.5)	1.54 (1.2–2.0)	26.6	(23.8–29.4)	1.5 (1.1–2.0)	7.0	(5.4–8.5)	1.1 (0.7–1.7)	8.9	(7.1–10.6)	0.9 (0.6–1.3)	2.2	(1.4–3.0)	Ref	16.2	(13.9–18.5)	1.6 (1.1–2.2)	
		p=0.0247	p=0.0004		p=0.0120	p=0.0056		p=0.9201	p=0.6368		p=0.1012	p=0.4578		p=0.3897	p=0.7518		p=0.0006	p=0.0089	
Smoking Status																			
Current	68.9	(63.6–74.2)	1.86 (1.4–2.5)	25.2	(20.4–30.0)	1.1 (0.8–1.5)	8.2	(5.4–11.0)	1 (0.6–1.7)	13.8	(10.3–17.4)	1.4 (1.0–2.1)	1.5	(0.5–2.5)	0.5 (0.1–2.9)	12.6	(9.2–16.1)	0.9 (0.6–1.3)	
Former	62	(54.0–70.0)	1.46 (1.0–2.1)	18.0	(12.2–23.8)	0.7 (0.5–1.2)	8.5	(4.2–12.7)	1.2 (0.6–2.3)	10.9	(5.9–15.9)	1.3 (0.7–2.4)	0.8	(0.0–1.7)	0.4 (0.1–2.8)	13.6	(8.1–19.1)	0.8 (0.5–1.4)	
Never	53	(49.8–56.2)	Ref	25.3	(22.7–28.0)	Ref	6.5	(5.1–8.0)	Ref	8.5	(6.8–10.2)	Ref	3.2	(2.2–4.2)	Ref	14.5	(12.4–16.5)	Ref	
		p<0.0001	p=0.0003		p=0.1270	p=0.3269		p=0.4586	p=0.8815		p=0.0172	p=0.1925		p=0.0081	p=0.6443		p=0.6992	p=0.6493	
Product Use^c																			
Yes	77.3	(70.9–83.6)	1.75 (1.1–2.7)	57.3	(46.1–68.5)	3.5 (2.1–5.9)	25.9	(14.1–37.7)	4 (1.9–8.4)	37.5	(24.8–50.1)	4 (2.2–7.5)	1.5	(0.2–2.8)	0.5 (0.2–1.6)	17	(10.5–23.5)	1.2 (0.7–2.1)	
No	55.6	(52.8–58.4)	Ref	22.5	(20.4–24.6)	Ref	6.4	(5.2–7.6)	Ref	9.0	(7.5–10.4)	Ref	1.5	(0.4–2.6)	Ref	13.6	(11.9–15.4)	Ref	
		p<0.0001	p=0.0121		p<0.0001	p<0.0001		p<0.0001	p=0.0003		p<0.0001	p<0.0001		p=0.9617	p=0.2462		p=0.2908	p=0.4702	
Total	57.8	(55.1–60.4)		24.5	(22.3–26.6)		7.1	(5.9–8.4)		10.0	(8.5–11.5)		2.5	(1.8–3.2)		13.9	(12.2–15.6)		

^aExcluding snus

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^qNon-Hispanic

^c Adjusted for ever (e-cigarettes) or current (hookah, smokeless tobacco/snus, menthol cigarettes, and cigars) use of the product being modeled

^d Prevalence P-values are for Rao-Scott Chi-Square test of covariate by binomial risk perception; AOR P-Values are Wald Chi-Square Type 3 Analysis of Effects

Table 3 Percentage and adjusted odds of believing various tobacco products are “more risky” than cigarettes, among all respondents (n=2,871)

	E-cigarettes			Hookah			Smokeless Tobacco ^a			Snus			Menthol cigarettes			Cigars								
	%	(95% CI) ^d	AOR (95% CI) ^b	%	(95% CI)	AOR (95% CI)	%	(95% CI)	AOR (95% CI)	%	(95% CI)	AOR (95% CI)	%	(95% CI)	AOR (95% CI)	%	(95% CI)	AOR (95% CI)						
Gender																								
Male	4.9	(3.3–6.5)	0.916	14.7	(12.2–17.3)	1.2	(0.9–1.6)	33.0	(29.5–36.6)	1.15	(0.9–1.44)	23.1	(19.8–26.3)	1.1	(0.9–1.5)	34.2	(30.7–37.8)	1.02	(0.7–1.5)	37.6	(34.0–41.2)	1.56	(1.2–2.0)	
Female	5.4	(3.8–7.0)	Ref	12.5	(10.3–14.6)	Ref	--	30.6	(27.4–33.8)	Ref	--	21.5	(18.5–24.5)	Ref	--	29.5	(26.0–32.9)	Ref	--	27.8	(24.6–31.0)	Ref	--	
		p=0.6894			p=0.1755				p=0.3146									p=0.0604					p=0.0002	
Race/Ethnicity																								
White ^b	2.9	(1.8–4.0)	Ref	9.3	(7.5–11.1)	Ref	--	28.4	(25.4–31.4)	Ref	--	17.2	(14.7–19.8)	Ref	--	31.5	(28.3–34.7)	Ref	--	28.5	(25.3–31.6)	Ref	--	
Black ^b	10.3	(6.0–14.5)	3.063	19.8	(14.4–25.2)	2.2	(1.5–3.3)	36.6	(29.7–43.4)	1.48	(1.1–2.06)	28.8	(22.6–35.1)	2.0	(1.4–2.8)	31.2	(24.2–38.3)	0.94	(0.5–1.9)	40.2	(33.1–47.3)	1.83	(1.3–2.6)	
Hispanic	8.2	(4.9–11.6)	2.569	19.7	(14.6–24.8)	2.2	(1.5–3.2)	34.9	(28.3–41.5)	1.32	(1.0–1.81)	27.3	(20.5–34.1)	1.8	(1.2–2.7)	31.4	(25.0–37.9)	1.24	(0.7–2.1)	36.5	(29.9–43.1)	1.39	(1.0–1.9)	
Asian ^b	7.8	(0.6–15.0)	3.679	20.8	(13.2–28.5)	2.9	(1.7–5.0)	35.9	(26.0–45.8)	1.43	(0.9–2.31)	29.6	(19.7–39.4)	2.1	(1.2–3.5)	34.2	(23.8–44.5)	1.04	(0.4–2.6)	36.2	(26.7–45.7)	1.55	(1.0–2.5)	
Other ^b	2.7	(0.0–5.9)	0.887	14.2	(8.4–19.9)	1.5	(0.9–2.6)	37.9	(29.2–46.6)	1.49	(1.0–2.23)	30.2	(21.7–38.6)	2.1	(1.3–3.2)	36.0	(27.0–45.1)	1.4	(0.7–2.6)	38.7	(29.8–47.6)	1.51	(1.0–2.2)	
		p<0.0001			p<0.0001				p=0.0428									p=0.8979					p=0.0022	
Age Group																								
18–24 yrs	5.7	(3.9–7.5)	1.131	15.1	(12.6–17.6)	1.1	(0.9–1.5)	38.6	(35.0–42.1)	1.78	(1.4–2.23)	24.4	(21.2–27.6)	1.2	(0.9–1.6)	30.4	(27.0–33.9)	1.23	(0.8–1.8)	36.8	(33.3–40.4)	1.46	(1.2–1.8)	
25–34 yrs	4.7	(3.3–6.2)	Ref	12.5	(10.3–14.7)	Ref	--	26.9	(23.8–30.1)	Ref	--	20.7	(17.7–23.8)	Ref	--	32.9	(29.4–36.4)	Ref	--	29.7	(26.3–33.0)	Ref	--	
		p=0.3946			p=0.1302				p<0.0001									p=0.1248					p=0.0014	
Education																								
<= HS	8.0	(5.7–10.3)	Ref	18.8	(15.6–22.1)	Ref	--	31.2	(27.3–35.1)	Ref	--	22.3	(18.6–26.1)	Ref	--	34.7	(30.4–38.9)	Ref	--	38.2	(33.9–42.5)	Ref	--	
> HS	3.2	(2.0–4.3)	0.421	10.1	(8.3–11.8)	0.5	(0.4–0.7)	32.2	(29.2–35.2)	1.22	(1.0–1.55)	22.2	(19.3–24.8)	1.1	(0.8–1.5)	30.0	(26.9–33.0)	0.89	(0.6–1.3)	29.1	(26.1–32.0)	0.78	(0.6–1.0)	
		p<0.0001			p<0.0001				p=0.6810									p=0.0786					p=0.0436	
Smoking Status																								
Current	6.0	(3.3–8.6)	1.16	17.3	(13.3–21.3)	1.4	(1.0–2.0)	37.1	(31.7–42.6)	1.58	(1.2–2.08)	25.8	(21.0–30.6)	1.4	(1.0–1.9)	49.7	(44.0–55.4)	2.34	(1.0–5.4)	40.6	(35.1–46.0)	1.72	(1.3–2.3)	
Former	2.6	(1.1–4.0)	0.712	10.2	(6.0–14.5)	1.0	(0.6–1.8)	28.7	(21.1–36.3)	1.22	(0.8–1.85)	20.8	(13.5–28.1)	1.2	(0.7–2.0)	43.3	(34.8–51.8)	1.98	(0.8–4.7)	37.7	(28.9–46.6)	1.91	(1.3–2.9)	
Never	5.3	(3.9–6.7)	Ref	12.7	(10.8–14.7)	Ref	--	30.4	(27.6–33.2)	Ref	--	21.2	(18.6–23.9)	Ref	--	23.3	(20.7–25.9)	Ref	--	29.0	(26.2–31.8)	Ref	--	
		p=0.1650			p=0.0310				p=0.0650									p=0.0001					p=0.0001	
Product Use^c																								
Yes	4.3	(1.0–7.5)	0.827	10.0	(4.9–15.2)	0.6	(0.3–1.1)	27.1	(15.0–39.2)	0.68	(0.4–1.31)	22.4	20.2	0.7	(0.4–1.3)	43.6	(35.9–51.3)	0.77	(0.5–1.1)	38.5	(30.5–46.5)	0.85	(0.6–1.2)	
No	5.3	(4.0–6.5)	Ref	13.8	(12.1–15.6)	Ref	--	32.0	(29.6–34.4)	Ref	--	17.0	8.4	25.5	Ref	--	49.1	(43.5–54.7)	Ref	--	32.1	(29.6–34.7)	Ref	--
		p=0.6158			p=0.2229				p=0.4526									p=0.2591					p=0.4082	
Total	5.2	(4.0–6.3)		13.6	(12.0–15.3)			31.8	(29.4–34.2)			22.3	(20.1–24.5)			31.8	(29.4–34.3)			32.7	(30.2–35.1)			

^a excluding snus

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^qNon-Hispanic

^c Adjusted for ever (e-cigarettes) or current (hookah, smokeless tobacco/snus, menthol cigarettes, and cigars) use of the product being modeled

^d Prevalence P-values are for Rao-Scott Chi-Square test of covariate by binomial risk perception; AOR P-Values are Wald Chi-Square Type 3 Analysis of Effects