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Who are the smokers who never plan to quit and what do they think about the risks of using tobacco products?

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Abstract

Introduction: Smoking cigarettes is the most harmful way to use tobacco. Smokers who do not plan to quit present a particular challenge in reducing the morbidity and mortality from tobacco use. Switching to a lower harm product might encourage them to end their use of combusted cigarettes. This study aimed to better understand smokers who do not intend to quit (including their demographic and worldviews as indicators of their social, cultural, and political dispositions) and their perceived risks of cigarettes and possible lower-risk products such as e-cigarettes.

Methods: Participants were 2,572 current smokers. Data were pooled from 2015 and 2016 cross-sectional surveys of national probability samples of U.S. adults and analyzed with multivariable logistic regressions.

Results: Smokers who never plan to quit comprise 14.3% of current U.S. smokers and are more likely to be older (24.2% among 65+ years old vs. 9.8% among 18-24) and less likely to have ever used e-cigarettes. A one-unit increase in hierarchical worldview (measured on a 1-6 scale) was associated with a 20% increase in the odds of never planning to quit. Those who denied that cigarettes cause disease or death (aORs between 1.6 and 2.0) or were uncertain (aORs: 2.5-2.7) were more likely to never plan to quit compared to those who agreed. They did not view risks of e-cigarettes substantially different compared to smokers who plan to quit.

Conclusion: One in seven U.S. smokers never plans to quit and might benefit from interventions which reflect their hierarchical worldviews and increase their risk perceptions of combustible cigarettes.

1. Introduction

Currently, the information on the prevalence, characteristics, and perceptions of smokers who never plan to quit is lacking. There has been a moderate amount of research on “hardcore” smokers, defined as smokers with low willingness to quit, heavy cigarette consumption, and high nicotine dependence (West & Jarvis, 2018). However, these studies

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are plagued by several issues and cannot be used to fully describe smokers who never plan to quit. First, these studies used inconsistent definitions of “hardcore” smokers and various terminology, such as “inveterate” (Rodu & Godshall, 2006), “confirmed” (McKeganey & Dickson, 2017), “hardened,” “immotive,” and “persistent” smokers (Darville & Hahn, 2014), making it difficult to compare estimates across studies (Darville & Hahn, 2014). Second, as West and Jarvis (2018) recently argued, past studies on “hardcore” smokers have typically conflated unwillingness to quit with high levels of nicotine addiction to create a concept of “hardcore” smokers. Yet, research has shown that different factors influence motivation to quit and quitting ability (Vangeli, Stapleton, Smit, Borland, & West, 2011). An example illustrating the difference between the two groups is a presence of a mental health condition. Smoking rates are disproportionately high among adults with mental health conditions (Centers for Disease Control and Prevention, 2013; Chou et al., 2016; Schroeder & Morris, 2010), who tend to smoke more heavily and have more difficulty quitting than those without mental health conditions (Forman–Hoffman, Hedden, Glasheen, Davies, & Colpe, 2016; Williams, Steinberg, Griffiths, & Cooperman, 2013). However, smokers with mental health conditions are just as motivated to quit as the general population (Prochaska, 2011; Schroeder & Morris, 2010).

Electronic cigarettes (e-cigarettes) are handheld battery-powered devices that create aerosols from liquid solution that usually contains propylene glycol, vegetable glycerin, nicotine, and flavors. E-cigarettes are not risk-free: they contain carcinogens (Goniewicz et al., 2014) and can have a negative impact on the cardiovascular system (Bhatnagar, 2016; Schweitzer, Wills, & Behner, 2017). However, they deliver lower levels of carcinogens and harmful chemicals than combusted cigarettes (Goniewicz et al., 2014; Shahab et al., 2017). It has been argued that e-cigarettes could play a role in reducing the overall harm of tobacco use if the smokers unwilling to quit smoking switched to them completely (Centers for Disease Control and Prevention, 2018; Fiore, Schroeder, & Baker, 2014; Gottlieb & Zeller, 2017). Increased knowledge of the risk of using less harmful products, such as e-cigarettes, which deliver nicotine in a way that satisfies smokers’ dependence, could be a means to encourage smokers not willing to quit to end use of combusted cigarettes. In order to help evaluate this potential, it is necessary to understand who these smokers are and how they perceive cigarettes and e-cigarettes.

In this paper, we focus on smokers who never plan to quit (defined as those who answered “never plan to quit” in response to the question about their quitting intentions). Smokers who never plan to quit might require different interventions to motivate them to quit (or to switch to less harmful products) than those who are willing, but struggling to quit. The goals of this paper are to estimate the prevalence of smokers who never plan to quit in the U.S. population, and to compare them to smokers who do plan to quit on their demographic characteristics, mental health conditions, and their perceptions, particularly perceptions of the risk of cigarettes and e-cigarettes and cultural worldviews. To develop effective interventions for the smokers who never plan to quit, such as health education campaigns motivating them to give quitting a try or modified risk statements and messages about e-cigarettes encouraging them to switch to e-cigarettes, it is essential to understand these smokers’ perceptions of cigarettes and e-cigarettes, particularly risk perceptions and cultural worldviews. However, to the best of our knowledge, risk perceptions of smokers who never

plan to quit have not been characterized before on a national scale, although they play an important role in decision-making about tobacco use (Grevenstein, Nagy, & Kroeninger-Jungaberle, 2015; Rosenstock, 1974; Song et al., 2009; Weinstein, 1988).

Another characteristic that might distinguish smokers who never plan to quit is their worldviews (Kagee & Dixon, 2000). Worldviews can be described as “orienting dispositions” or interpretive lenses comprising social, cultural, and political attitudes through which individuals understand their world (Buss & Craik, 1983; Hirsch & Baxter, 2011; Kahan, Jenkins-Smith, & Braman, 2011). Kahan, Jenkins-Smith, & Braman (2011) defined two worldview dimensions: (1) *hierarchy-egalitarianism*, which deals with people’s “attitudes toward social orderings that connect authority to stratified social roles based on highly conspicuous and largely fixed characteristics such as gender, race, and class” (p. 151) and (2) *individualism-communitarianism*, which reflects “attitudes toward social orderings that expect individuals to secure their own well-being without assistance or interference from society versus those that assign society the obligation to secure collective welfare and the power to override competing individual interests” (p. 151). Worldviews can help understand the motivations and reasoning of smokers and can begin to guide the development of interventions since they have been found to be associated with health promoting behaviors (Kagee & Dixon, 2000). Previous studies have reported relationship between worldviews and risk perception (Buss & Craik, 1983; Hirsch & Baxter, 2011). A recent study found that worldviews were associated with risk perceptions of e-cigarettes, such as people with individualist (compared to communitarian) worldviews perceived e-cigarettes as less risky, were more likely to be uncertain about their risks, and were more likely to have ever used e-cigarettes (Weaver et al., 2017). Furthermore, worldviews are associated with trust in the sources of information on health effects of e-cigarettes (Weaver et al., 2017). Trust is significant because it also predicts risk perception (Cvetkovich, Siegrist, Murray, & Tragesser, 2002; Siegrist, Gutscher, & Earle, 2005; Slovic, Flynn, & Layman, 1991). While efforts have been made to understand and target anti-tobacco interventions to the cultural worldviews of some ethnic groups (Daley et al., 2006; Smith et al., 2014), no known study has examined the worldviews of smokers who are unwilling to quit smoking. Given that worldviews are associated with risk perceptions, and risk perceptions play significant role in tobacco use initiation and cessation (Grevenstein et al., 2015; Rosenstock, 1974; Song et al., 2009; Weinstein, 1988), we assessed whether the worldviews of smokers who are unwilling to quit smoking differ from those with intentions to quit smoking.

Understanding the risk perceptions and worldviews of the smokers who never plan to quit will inform the development of interventions including public education and authorization of modified risk claims to encourage these unmotivated smokers to switch completely to e-cigarettes or other reduced harm products. Thus, we compared smokers who never plan to quit (vs. smokers who plan to quit in the future) on demographic variables, mental health conditions, use of e-cigarettes, risk perceptions, and cultural worldviews.

2. Methods

2.1 Data sample

We used data from the 2015 (August–September 2015) and 2016 (September–October 2016) Tobacco Products and Risk Perceptions Survey conducted by the Georgia State University Tobacco Center of Regulatory Science (TCORS). These were annual cross-sectional surveys, administered to probability samples drawn from GfK’s KnowledgePanel, a probability-based web panel designed to be representative of non-institutionalized USA adults. KnowledgePanel only includes adults selected via address-based sampling, and participants lacking internet access are provided a computer to facilitate participation. Additional details on these surveys have been published previously (Majeed, Dube, Sterling, Whitney, & Eriksen, 2014; Weaver et al., 2016). A total of 6,051 and 6,014 respondents completed the 2015 and 2016 surveys, respectively, for the final-stage completion rates of 76.0% and 75.9%, respectively. For this study, we used data from 1,284 (2015) and 1,288 (2016) participants who were current smokers, defined as those who had smoked at least 100 cigarettes in their lifetime and were currently smoking every day or some days, for a total sample of 2,572. Data from the two surveys were pooled to improve the statistical power and increase the precision of the estimates. We used an iterative proportional fitting (raking) procedure to adjust for sources of sampling and non-sampling error (such as panel recruitment non-response and panel attrition) to compute a study-specific post-stratification weight. Demographic and geographic distributions from the most recent Current Population Survey (CPS) for each year served as benchmarks for adjustment, and included sex, age, race/ethnicity, education, household income, census region, metropolitan area, and internet access. This study was approved by the Georgia State University Institutional Review Board.

2.2. Measures

2.2.1 Willingness to quit—All current smokers (those who indicated having smoked at least 100 cigarettes in their lifetime and currently smoke cigarettes every day or some days) were asked about their plans to quit cigarette smoking. Response options included: next 7 days, next month, next 6 months, next year, someday but not within the next year, and never plan to quit. Participants who responded “never plan to quit” were defined as *smokers who never plan to quit*. All others were categorized as *smokers who plan to quit*.

2.2.2 Demographic characteristics—We assessed sex, age, race/ethnicity, education, household annual income, and US census region (see Table 1 for these variables’ operationalizations).

2.2.3 Mental health conditions—Participants were asked if they had ever been “diagnosed by a doctor or other qualified medical professional” with a variety of medical conditions: anxiety disorder, bipolar disorder, depression, mood disorder, schizoaffective disorder, schizophrenia, and other mental conditions. Participants who indicated that they had been diagnosed with any of the above were classified as having a mental health condition.

2.2.4 Use of e-cigarettes—Participants reported their ever and past 30-day use of e-cigarettes (yes/no).

2.2.5 Cultural worldviews—Cultural worldviews were measured with a validated short-form scale (Kahan et al., 2011) consisting of two 6-item subscales assessing two bipolar dimensions: hierarchy-egalitarianism (e.g., “our society would be better off if the distribution of wealth was more equal,” Cronbach’s $\alpha=.90$) and individualism-communitarianism (e.g., “sometimes government needs to make laws that keep people from hurting themselves,” Cronbach’s $\alpha=.89$). Responses were on a 6-point Likert scale (*Strongly Disagree* to *Strongly Agree*). Higher scores indicated greater agreement with ideas of hierarchy and individualism, respectively.

2.2.6 Risk perceptions—In the 2015 survey, to measure perceived risk of cigarettes and e-cigarettes, participants were asked: “Imagine that you just began [smoking cigarettes / using electronic vapor products] every day. What do you think your chances are of having each of the following happen to you if you continue to [smoke cigarettes / use electronic vapor products] every day?” with respect to the following conditions: lung cancer, lung disease other than lung cancer (such as COPD and emphysema), heart disease, becoming addicted, and premature death. Each question had a Likert-type scale of response options ranging from 0 (“No chance”) to 6 (“Very good chance”), and a separate “I don’t know” category. In 2016, the same root question prompt was used: “Imagine that you just began [smoking cigarettes / using electronic vapor products] every day.” However, the subsequent prompt was changed to reflect a shift in the response options: “For each of the following, please indicate whether you think this can happen to you if you continue to [smoke cigarettes / use electronic vapor products] every day.” Response options were “Yes”, “No” and “I don’t know”. To harmonize the data from the two surveys, we compared the marginal response rates for each available response category for each item across the two survey years and also compared the response rates for each year stratified by age, race, gender, and ever-use of e-cigarettes. Based on the assumption that if the 2015 participants had been given the same 3-category response options as the 2016 participants, the marginal and conditional response distributions would be similar, accounting for sampling variability across the two years, we equated 2015 responses in categories 0 (“No chance”), 1, or 2 to the 2016 “No” responses and equated 2015 response categories 3-6 (“Very good chance”) to the 2016 “Yes” responses. The “I don’t know” responses from both years were considered equivalent.

2.3 Statistical Analyses

Data were analyzed using Stata 13.0 (StataCorp, College Station, TX). To account for the complex study design and survey non-response, all analyses were weighted using post-stratification weights. We present the overall and by participant characteristics, the proportions of current smokers and smokers who never plan to quit. To examine the characteristics of smokers who never plan to quit, we ran separate multivariable logistic regression analyses to examine the relationship of demographic variables, past year quitting, mental health conditions, use of e-cigarettes, daily smoking, worldviews, and perceptions of harm of e-cigarettes and of cigarettes. The binary variable “never plan to quit” (1 = never plan to quit, 0 = plan to quit) was the dependent variable in all the models. Covariates in all

models were demographic characteristics and year of survey. Models for worldviews and risk perceptions included an additional covariate, ever use of e-cigarettes. For worldviews, both dimensions of worldviews were included in the same model as independent variables. For all the models, adjusted odds ratios (aOR) and 95% CI were estimated. Significance level was set at $p < 0.05$.

3. Results

Participants' characteristics for the overall sample and prevalence of smokers who never plan to quit among various demographic groups are presented in Table 1. Overall, 14.3% (95% CI: 12.4-16.4) of current smokers in this study never plan to quit. Younger smokers were less likely to never plan to quit compared to older (65+) smokers, but the differences by sex, race/ethnicity, geographical region, or presence of a mental health condition were not significant (Table 1). Although there were more smokers who never plan to quit in lower education and lower income groups, the differences were not significant. Smoker who ever used e-cigarettes were less likely to have no plans to quit compared to smokers who ever used e-cigarettes.

In terms of worldviews, a 1-unit increase in the hierarchy-egalitarianism score was associated with a 20% increase in the odds of never planning to quit smoking (aOR=1.2, 95% CI=1.0–1.4). Individualism-communitarianism was not significantly associated with never planning to quit (aOR=1.1, 95% CI=0.9-1.3).

Perceived risk of cigarette and e-cigarettes are presented in Table 2, separately for smokers who never plan to quit and smokers who plan to quit. Table 3 presents the results of logistic regression models describing association of perceived risk of cigarettes and e-cigarettes with never planning to quit. Those who denied that cigarettes cause lung cancer, lung disease, heart disease, addiction, or death (aORs: 1.6-2.0) or selected "I don't know" in response to those questions (aORs: 2.5-2.7) were more likely to never plan to quit compared to those who agreed (Tables 2-3). For the perceptions of risk of e-cigarettes, differences were in the same direction as for perceptions of risk of cigarettes, with smokers who never plan to quit being more likely to deny or report that they don't know risks of e-cigarettes compared to smokers who plan to quit; however, only the results for denying lung disease were significant (Table 3).

4. Discussion

Although the rates of tobacco cigarette smoking have declined in the United States and some Western European Countries, a considerable number of people continue to smoke (United States Department of Health and Human Services, 2014; Wipfli & Samet, 2016). Nearly 38 million adults still smoked in the United States in 2016 (Jamal et al., 2018). There is universal agreement that quitting is the most effective and immediate way to reduce the risk of disease and premature death from tobacco use. Yet some smokers do not plan to quit. In this study, pooling data from 2015 and 2016 cross-sectional nationally representative surveys of U.S. smokers, we found that 14.3% of U.S. smokers (translating to about 5 million people) are smokers who never plan to quit.

As the age of smokers increased, so did the odds of being a smoker who never plans to quit, with the highest proportion in the 65 years and older group, where almost a quarter reported never planning to quit. This is consistent with other studies that found older smokers to have lower intention to quit smoking (Owusu, Quinn, Wang, Aibangbee, & Mamudu, 2017; Yong, Borland, & Siahpush, 2005) and to be less likely to have seriously tried to quit smoking (Messer, Trinidad, Al-Delaimy, & Pierce, 2008). It has been reported that older smokers have low perceived self-efficacy and low perceived benefit of smoking cessation, and worry less about harm from smoking (Yong et al., 2005). A qualitative study with older smokers also found that older smokers believed any damage from smoking would have already occurred so there was no point in quitting (Kerr, Watson, Tolson, Lough, & Brown, 2006). Taken together, these results highlight the need to specifically target older smokers with messages increasing their motivation to quit and emphasizing that quitting at any age is beneficial (Thun et al., 2013).

Importantly, the presence of a mental health condition was not associated with quit intentions. This is consistent with research suggesting that while smokers with mental health conditions experience greater nicotine dependence, they are not necessarily unmotivated to quit (Prochaska, 2011; Schroeder & Morris, 2010). In fact, greater psychiatric symptoms have been associated with higher motivation to quit (Anzai, Young-Wolff, & Prochaska, 2015). In our study, the vast majority (84%) of smokers with mental health conditions indicated that they do plan to quit smoking. There is still much work to be done in order to dispel the myth that smokers with mental illness do not want to quit (Prochaska, 2011), and to provide appropriate cessation services to this population. Unfortunately, in a recent survey of patients and psychiatrists in community mental health centers, providers perceived their patients' lack of interest as a primary barrier to quitting despite the fact that most smokers wanted to reduce or quit smoking (Chen et al., 2017). Furthermore, 60% of psychiatrists indicated very often/always providing advice for quitting smoking and only 29% indicated very often/always setting up follow-up plans to continue discussing smoking cessation (Chen et al., 2017).

To our knowledge, this was the first study to evaluate perceptions of e-cigarette harm among smokers who never plan to quit in a nationally representative sample. When asked whether daily e-cigarette use is likely to cause various health problems, compared to smokers who plan to quit, smokers who never plan to quit were more likely to deny that e-cigarettes cause lung disease, but the differences for all other risk perceptions were not significant. Thus, for many health conditions, smokers who plan to quit and those who never plan to quit don't have a substantially different understanding of the risk of e-cigarettes. In contrast, there were consistent significant differences in terms of perceptions of harms of combustible cigarettes. Smokers who never plan to quit were more likely to deny that cigarettes cause lung cancer, lung disease, heart disease, addiction, and premature death, and more likely to answer "I don't know" to these questions compared to smokers with quitting intentions. This finding indicates the importance of more effectively communicating to smokers who never plan to quit about the harms of combustible cigarettes and benefits of quitting.

A study of "confirmed" smokers (defined as those in contact with a smokers' rights organization) in Scotland (McKeganey & Dickson, 2017) found that most (77%) saw

themselves continuing to smoke for the foreseeable future, which is similar to how we defined smokers who never want to quit in our study. In providing the reasons why they did and did not use e-cigarettes, very few of these Scottish smokers brought up the harm of smoking or comparative harms of e-cigarettes and combustible cigarettes as the reasons for using e-cigarettes. This lack of focus on harms of cigarettes may be due to these smokers not feeling that smoking is harmful enough to substitute with less enjoyable (Kong, Morean, Cavallo, Camenga, & Krishnan-Sarin, 2014; Pechacek, Nayak, Gregory, Weaver, & Eriksen, 2016), but possibly less dangerous e-cigarette use.

Recent campaigns emphasizing negative health effects of smoking, such as CDC's Tips From Former Smokers (Centers for Disease Control and Prevention, 2016), have been successful in increasing smoking harm perceptions and quit attempts (Huang et al., 2015; McAfee, Davis, Alexander, Pechacek, & Bunnell, 2013). Studies evaluating effects of these campaigns need to examine whether there were differential effects on older smokers and smokers who never plan to quit, and whether there are optimal strategies of reaching these populations with hard-hitting messages that communicate about smoking harms.

We found that smokers who never plan to quit tended to have more hierarchical worldviews. Individuals with hierarchical worldviews believe that responsibilities and privileges are assigned differentially in the society based on fixed social structure of class, gender, ethnicity, and so on. They tend to be power, wealth, and status-oriented, and tend to value authority, trust large companies, mistrust government, and ascribe lower risks to various issues from nuclear power to climate change (Hornsey & Fielding, 2017; Peters & Slovic, 1996). Likely, smokers who never plan to quit view their smoking as an established part of their social milieu. Furthermore, because they perceive smoking as less risky (compared to smokers who plan to quit), which could be partially due to their greater trust in tobacco companies (Weaver et al., 2017), they are less motivated to quit smoking.

Limitations of this study include use of an online panel, which, although designed to be representative of the U.S. population, might not be generalizable to the overall population of the U.S. smokers. All measures were self-reported; however, self-report of behavior in surveys has been a reliable measure (Caraballo, Giovino, & Pechacek, 2004). Participants indicated whether they had ever been diagnosed with a variety of mental health conditions, and future research is needed to examine prevalence of smokers who never plan to quit among people with current psychiatric conditions as diagnosed by a clinician. In addition, because subsample sizes for several of the specific conditions were small, analyses only considered whether or not participants indicated any mental health condition. Larger studies might examine whether smokers with particular diagnoses are more or less likely to never plan to quit. Since these were cross-sectional surveys, all data are correlational and thus casual inference is limited.

While we examined various perceptions of risks of cigarettes and e-cigarettes, future research should evaluate other reasons that might be keeping these smokers never planning to quit cigarettes, such as perceived benefits of smoking and various perceptions of satisfaction, social norms, and perceptions of technological and chemical characteristics of different tobacco products. Some studies have begun to examine these issues qualitatively

(McKeganey & Dickson, 2017; Popova et al., 2017); the next step would be to evaluate these perceptions in nationally representative samples of smokers.

In conclusion, smokers who never plan to quit comprise only about 14% of the U.S. population of smokers. Smokers who do not plan to quit are older and have a more hierarchical world view. The presence of a mental health condition was not associated with quit intentions. It has been argued that e-cigarettes can have a population-level benefit if these smokers switched to them completely (Centers for Disease Control and Prevention, 2018; Fiore et al., 2014; Gottlieb & Zeller, 2017). We found that smokers who never plan to quit largely did not differ in their perceptions of harm of e-cigarettes from smokers who have quitting intentions. The only significant difference we found indicated that they were already more likely to have lower perceptions of harms of e-cigarettes compared to those who plan to quit. Instead, it was perceptions of harm of combustible cigarettes that differentiated smokers who never plan to quit from smokers with quitting intentions. Therefore, the greatest impact for this group might not be in communicating to them the reduced risks of e-cigarettes, but continuing to communicate harms of combustible cigarettes to increase their perceptions of harm of smoking and benefits of quitting. Moreover, these messages might be tailored to their hierarchical worldviews by being delivered by someone they perceive as an authority or an expert and emphasizing how social norms they value are incompatible with smoking.

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Table 1

– Prevalence and factors associated with being a smoker who never plans to quit

Participant characteristics	Overall sample (Current smokers) n (weighted %)	Prevalence of smokers who never plan to quit, weighted %	aOR (95% CI)
Sex			
Men	1,336 (48.6)	15.6	1.4 (1.0 – 2.0)
Women (ref)	1,235 (51.4)	13.1	1.00
Age (years)			
18-24	91 (6.1)	9.8	0.3 [*] (0.1 - 0.8)
25-34	495 (26.3)	10.7	0.4 ^{**} (0.2 - 0.6)
35-44	383 (18.5)	14.6	0.5 [*] (0.3 - 0.9)
45-54	535 (19.7)	12.5	0.4 ^{**} (0.2 - 0.7)
55-64	631 (19.4)	17.2	0.7 (0.4 - 1.1)
65 + (ref)	436 (10.1)	24.2	1.00
Race/Ethnicity			
White, Non-Hispanic (ref)	1,884 (59.0)	14.6	1.00
Black, Non-Hispanic	271 (17.2)	12.6	0.7 (0.4 - 1.2)
Other, Non-Hispanic	149 (7.6)	19.2	1.4 (0.7 - 2.8)
Hispanic	267 (16.2)	12.7	0.8 (0.5 - 1.5)
Education			
Less than high school	249 (22.0)	19.6	1.6 (0.8 - 3.0)
High school	935 (35.9)	14.1	1.1 (0.7 - 1.9)
Some college	887 (28.1)	11.2	0.9 (0.5 - 1.4)
Bachelor's degree or higher (ref)	500 (14.0)	12.9	1.00
Annual Income			
<\$15,000	545 (22.5)	18.2	1.6 (0.8 - 3.2)
\$15,000-\$24,999	293 (7.9)	16.4	1.5 (0.7 - 3.1)
\$25,000-\$39,999	498 (17.7)	15.7	1.3 (0.7 - 2.6)
\$40,000-\$59,999	417 (14.7)	12.4	1.0 (0.6 - 2.0)
\$60,000-\$84,999	382 (15.1)	11.5	1.0 (0.5 - 1.8)
\$85,000-\$99,999	134 (5.3)	10.9	0.9 (0.3 - 1.9)
\$100,000 + (ref)	302 (16.9)	11.9	1.00
Region			
Northeast (ref)	475 (16.2)	11.8	1.00
Midwest	739 (23.7)	15.8	1.3 (0.8 - 2.2)
South	840 (38.8)	14.2	1.2 (0.7 – 2.0)
West	517 (21.3)	14.6	1.3 (0.8 - 2.2)
Mental Health Condition			
Yes	768 (30.2)	15.9	1.2 (0.8 – 1.8)
No	1775 (69.8)	13.8	1.00
Past year quitting			

Participant characteristics	Overall sample (Current smokers) n (weighted %)	Prevalence of smokers who never plan to quit, weighted %	aOR (95% CI)
Yes	988 (40.0)	5.1	0.2 ** (0.1 – 0.3)
No	1575 (60.0)	20.3	1.00
Daily smoking			
Yes	1,931 (70.0)	15.6	1.2 (0.8 – 1.8)
No	641 (30.0)	11.2	1.00
Ever use of e-cigarettes			
Yes	1,486 (55.4)	10.9	0.6 ** (0.4 – 0.9)
No	1,081 (44.6)	18.2	1.00
Past 30-day use of e-cigarettes			
Yes	484 (18.9)	8.6	0.6 (0.3 – 1.0)
No	2,081 (81.1)	15.5	1.00
Total sample	2,558 (100.0)	14.3	

*
 $p < .05$,

**
 $p < .01$

aORs, adjusted Odds Ratios were from separate multivariable logistic regression models that controlled for demographic characteristics and year of survey.

Table 2

– Perceptions of harm of cigarettes and e-cigarettes among current smokers by willingness to quit

	Cigarettes						E-cigarettes					
	Plan to Quit (%)			Never Plan to Quit (%)			Plan to Quit (%)			Never Plan to Quit (%)		
Perceptions *	No	Yes	Don't know	No	Yes	Don't know	No	Yes	Don't know	No	Yes	Don't know
Lung cancer	14.4	73.6	12.0	22.1	55.4	23.3	22.2	39.2	38.6	26.3	33.4	40.5
Lung disease	13.7	75.1	11.2	19.6	57.9	22.6	21.0	41.6	37.4	26.1	33.9	40.0
Heart disease	15.0	72.4	12.7	22.3	53.5	24.0	22.7	39.7	37.6	24.7	31.5	43.8
Become addicted	14.7	77.2	8.1	19.4	62.7	17.9	16.6	53.4	30.0	20.8	44.7	34.5
Premature death	17.9	68.0	14.1	25.6	47.7	26.7	22.4	37.8	39.9	23.9	34.5	41.5

* Perceptions were assessed using the question “Imagine that you just began smoking cigarettes/e-cigarettes every day. For each of the following, please indicate whether you think this can happen to you if you continue smoking cigarettes/e-cigarettes every day”

Table 3

– Association of perceptions of harm of e-cigarettes and cigarettes with never planning to quit

Perceptions	Cigarettes		E-cigarettes	
	Never Plan to Quit aOR (95% CI)		Never Plan to Quit aOR (95% CI)	
	No	“I don’t know”	No	“I don’t know”
Lung cancer	2.0 (1.3-3.1) **	2.5 (1.6-3.8) **	1.5 (0.9-2.5)	1.2 (0.8-1.8)
Lung disease	1.8 (1.2-2.9) **	2.6 (1.7-4.0) **	1.6 (1.0-2.6) *	1.3 (0.9-1.9)
Heart disease	2.0 (1.3-3.1) **	2.6 (1.7-4.0) **	1.5 (0.9-2.5)	1.5 (1.0-2.2)
Become addicted	1.6 (1.0-2.6) *	2.7 (1.7-4.3) **	1.6 (1.0-2.6)	1.3 (0.9-2.0)
Premature death	2.0(1.4-3.1) **	2.7(1.8-4.1) **	1.3 (0.8-2.0)	1.1 (0.8-1.7)

aOR: Adjusted odds ratio, computed using separate logistic regression models. Demographic characteristics, ever use of e-cigarettes, and year of survey were covariates. Those who responded *Yes* were considered as the referent group for the independent variables (risk perceptions)

*
 $p < .05$

**
 $p < .01$