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Smokers' Early E-cigarette Experiences, Reasons for Use, and Use Intentions

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Abstract

Objectives—This study examined the context of smokers' first e-cigarette experiences, reasons for trying e-cigarettes, not continuing their use, and future use intentions.

Methods—We surveyed a nationally representative sample of 519 current cigarette smokers in the United States (classified as never, current, or former e-cigarette users/tryers) in April 2014 about their e-cigarette experiences and use intentions.

Results—Among ever e-cigarette users/tryers, 43% purchased an e-cigarette on their own as their first method of trial. These respondents were more likely to have used e-cigarettes more times than those who first tried e-cigarettes from a friend. Positive perceptions about first experiences were significantly higher among current (34.5%) compared to former e-cigarette users/tryers (17.9%). Few (8.7%) current e-cigarette users/tryers had a negative first experience. Susceptibility to future e-cigarette use was significantly associated with e-cigarette use status, intention to quit smoking and satisfaction with first e-cigarette experience. Among those interested in e-cigarettes, 26.3% were more interested in trying an e-cigarette made by a major tobacco company and 31.8% in trying an e-cigarette that looked "similar" versus different (13.8%) than a real cigarette.

Conclusions—The context and perceptions of e-cigarette trial experiences, product quality, style and manufacturer may influence e-cigarette trial and use.

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Human Subjects Statement

This study was approved as exempt by the Rutgers Biomedical Health Sciences IRB.

Conflict of Interest Statement

All authors of this article declare they have no conflicts of interest.

Keywords

e-cigarettes; perceptions; use intentions; susceptibility

INTRODUCTION

Electronic cigarettes (or “e-cigarettes”) are battery-operated devices intended to simulate the experience of smoking and have the potential to improve public health if smokers can successfully use them to quit tobacco cigarettes.^{1, 2} A major concern, however, is that e-cigarettes may be used as complements to cigarettes rather than as complete substitutions and that such dual use may demotivate smokers from quitting smoking completely.^{2,3}

Although several studies have documented the growth in e-cigarette awareness and trial,^{4–7} relatively few population-level studies have explored the context and experience of early e-cigarette use. This is important given that such early experiences may be associated with and predict future e-cigarette use. One study found that having a more favorable initial experience with e-cigarettes explained 19% of variance in progressing to regular e-cigarette use.⁸

Similarly, little population-level work has been conducted on individuals’ reasons for initiating and either continuing with e-cigarettes or not, despite the fact that most who try e-cigarettes do not go on to become current or “established” users.^{9,10} This is significant because if smokers only try e-cigarettes once or twice for reasons such as their novelty, then they are unlikely to lead to large scale reduction in cigarette use and public health benefits.⁸ A 2013 national survey with adult ever e-cigarette users found that 65% of ever users discontinued e-cigarette use.⁹ This “discontinuation” was significantly higher among those who tried e-cigarettes for “non-goal” oriented reasons (eg, out of curiosity or because offered by friend/family member) versus more motivated reasons (like to quit smoking or reduce harm). Research on individuals’ *future* intentions to use e-cigarettes is also limited, despite the fact that most people remain *potential* users. Two previous population studies found that between 22–52% of smokers who had never tried e-cigarettes were either interested in using them or considered themselves likely to try e-cigarettes in the future.^{11,12}

This paper aims to build on the limited but important research on early e-cigarette experiences (including method and perception of first trial), reasons for trying e-cigarettes, and not continuing their use. We also explore future use intentions in multiple ways – i.e., interest in e-cigarettes for particular reasons, in various e-cigarette types and likelihood of future use.

METHODS

We analyzed results of an online survey of adult current smokers recruited from a commercially available nationally representative research panel, ie, *KnowledgePanel* from GFK. *KnowledgePanel* members are recruited through probability-based sampling of addresses from the US Postal Service’s Delivery Sequence File, and samples for individual surveys are drawn from the panel using a probability proportional to size sampling approach

and weighted to produce nationally representative estimates. Details about GFK's recruitment and sample methodology are available online.¹³ GFK's *KnowledgePanel* has been used for numerous studies about e-cigarettes to date including those on risk perceptions and knowledge,^{7,14–16} information exposure,^{17–19} and policy perceptions.^{20,21} And while several studies have also used it to describe trends in e-cigarette awareness and use,^{7,10,12,22,23} research using this data source on early e-cigarette experiences, reasons for discontinuation and future use intentions have been limited^{9,12} (cites) and was the focus of this study.

To be eligible for the current survey, participants needed be adult current smokers defined as having ever smoked 100 cigarettes and now smoking "some days" or "everyday". GFK invited 1,042 participants from their panel believed to be smokers from previous screenings to participate. Of these, 609 (58.4%) completed the smoker eligibility questions and 519 were reconfirmed as being current smokers and completed the survey in April 2014. We compared weighted demographics of our sample (sex, race, age, education, census region) with current smokers from the 2013 National Health Interview Survey and found no concerning discrepancies.

We classified those smokers who had also used e-cigarettes in the past 30 days as "current e-cigarette users/tryers". While most studies refer to respondents meeting this cut-off definition as current "users", we recognize that this group may include people who have just begun experimenting with e-cigarettes and those who may have progressed to more established regular "use" who may be quite different (eg, more likely to use vaporizers vs. cigalikes e-cigarette styles, have a regular e-cigarette brand/style).^{10,24} Similarly, we classified those who had ever tried e-cigarettes but not used them in the past 30 days as "former e-cigarette users/tryers".

All smokers who had ever tried e-cigarettes were asked about the context of their first e-cigarette use ("Which of the following situations best describes how you FIRST tried e-cigarettes?"), their perception of this first experience ("disappointing or unpleasant", "enjoyable", or "neutral" – neither enjoyable nor unpleasant), and their reasons for trying e-cigarettes. Former users/tryers were also asked to indicate the main reasons they did not continue to use e-cigarettes. All smokers were then asked to indicate how interested they were (on a scale of 1–4 from "not at all" to "very" interested) in using e-cigarettes – for the first time or again – in the future for five reasons (see Table 3), presented in randomized order. Ratings on these items were then summed to create an overall e-cigarette interest score (possible range of 4–20). Susceptibility to future e-cigarette use was measured by asking all smokers two questions: 1) "Do you think that you will smoke an e-cigarette in the next year?" and 2) "If one of your best friends were to offer you an e-cigarette, would you smoke it?" ("definitely not", "probably not", "probably yes" and "definitely yes"). Respondents who answered "probably" or "definitely" yes to either question were then coded as being "susceptible" to future e-cigarette experimentation or continued use in a composite measure.

Additionally, all smokers were informed that "recently, the same tobacco companies that make Marlboro and Camel cigarettes have begun designing and selling their own e-

cigarettes” and asked if they would be more or less interested in trying e-cigarettes (or using them again) if they were made by a major tobacco company. Participants were also asked if they would be “more interested in trying or using an e-cigarette that looks similar to a real cigarette,” one that looks “different” than a real cigarette, or if it made no difference. Participants were shown an image of NJOY’s ciga-like style e-cigarettes (with the white and beige coloring of a typical cigarette) as an example of looking “similar to a real cigarette”. They were shown an image of Blu brand e-cigarettes (black colored ciga-likes with blue colored tip) and of a larger vaporizer pen style e-cigarette as examples of looking “different than a real cigarette” (images available from authors upon request). Participants who provided an answer other than “no difference” were asked to briefly explain their answers in an open-ended question.

Weighted prevalence estimates are presented and bivariate associations were tested using the Rao-Scott Chi-Square test, where p-values less than 0.05 were considered statistically significant. All statistical analyses were performed using SAS (Version 9.4) survey procedures, which account for complex sample design.

RESULTS

Most smokers (80.3%) were daily smokers, 57.6% were lighter smokers (ie, half a pack or less per day), and 52% had been smoking for at least 20 years. Approximately 39% had tried to quit smoking at least once in the past year and 44.3% had plans to quit smoking within the next 30 days or six months. Other demographic characteristics are presented in Table 1.

Over half (56.7%) of smokers had ever used/tried e-cigarettes and 18.9% were “current users/tryers”. Among current e-cigarette users/tryers, 63.8% reported having used e-cigarettes at least 10 times in total (30.1% had used them more than 50 times) (data not in table). Additionally, 37.8% of smokers were “former e-cigarette users/tryers”. Of these former users/tryers, 35% had only used e-cigarettes one or two times, 62.7% had used e-cigarettes less than 10 times in total, and only 6.8% had used them more than 50 times (data not in table). Also, 46.1% had last used e-cigarettes at least six months ago. Lastly, 43.3% of smokers had never tried e-cigarettes.

Early Experiences, Reasons for Trying, and Reasons for Not Continuing with E-cigarettes

Among those who had ever used/tried an e-cigarette, 50.3% tried an e-cigarette for the first time from their friend or someone they knew who was using one, while 43% purchased an e-cigarette on their own (see Table 2). These methods of trial were significantly associated with number of times having used e-cigarettes. Trying from a friend was highest (66.8%) among ever users/tryers who had only used e-cigarettes once or twice before, and buying from a store was higher among those who had used e-cigarettes a greater number of times. Current e-cigarette users/tryers had a higher prevalence of having purchased e-cigarettes as their form of first use (51%) versus former users/tryers (37.9%), as did those who were heavier (i.e., daily, >10 cigarettes per day) and longer-term smokers (20+ years), though these relationships were not statistically significant. Few (2–3%) had tried an e-cigarette for the first time at a mall/retail environment or promotional event (data not in table).

Approximately 23% of ever e-cigarette users/tryers found their first experience with e-cigarettes to be enjoyable. Satisfaction with first experience was significantly associated with sex, education level, and e-cigarette use status and experience – males (30.3%), those with more education (29%) and current e-cigarette users/tryers (34.5%) had a higher prevalence of finding their first experience to be enjoyable relative to females (16.2%), those with less education (18%) and former e-cigarette users/tryers (17.9%) (see Table 2).

Approximately one-third of those who had only used e-cigarettes once or twice found their first experience to be disappointing compared to 8.4% who found these single experiences satisfying. In contrast, 65.4% of those who had used e-cigarettes more than 50 times found their first experience to be satisfying while only 1.5% of those who had used e-cigarettes this many times had a negative first experience. Only 8.7% of current e-cigarette users/tryers found their first e-cigarette disappointing compared to 24.4% of former users/tryers.

Most indicated trying e-cigarettes because they believed it was less harmful than regular cigarettes (77.2%), out of curiosity (76.5%), and as a way to cut down on smoking (72.7%) (see Table 3). A similar percentage indicated trying e-cigarettes to support cigarette smoking cessation (64.9%) and to use in places where they can't smoke (66.7%). Current e-cigarette users/tryers had a significantly higher prevalence of citing cutting down on smoking, saving money and consideration for others as reasons for trying e-cigarettes relative to former users/tryers. Curiosity was the main reason for trying e-cigarettes among former users/tryers (77.1%).

Two-thirds (66.6% [59.7–73.5]) of ever e-cigarette users/tryers were no longer using e-cigarettes (i.e., were former users/tryers). Their most frequent reasons for not continuing to use e-cigarettes were because e-cigarettes did not satisfy their cravings (42.8%) or give the feel of smoking that they enjoyed (43%) (see Table 3). Respondents also cited being unsatisfied with their cost (25.1%), help in smoking cessation (23.8%) and taste (19.4%) as reasons for not continuing with e-cigarettes, and 20.4% report that they were “just not interested”. Few did not continue using e-cigarettes because of concerns about their risks (6.8%), or finding them to be too complicated or impractical (2.3%).

Future E-cigarette Use Intentions

Future interest in using e-cigarettes was significantly associated with e-cigarette status, both for specific reasons and overall (see Table 4). Continued interest in e-cigarettes among current users/tryers was high, with the most prevalently cited reason being reduction of health risks (94.4%) and the least common reason being for use as a cigarette cessation aid (84%). While the majority of former e-cigarette users/tryers were interested in using e-cigarettes in the future for various reasons (55–63%), only 27–35% of never users shared that interest. Future overall interest in e-cigarette use was also significantly associated with age (higher among younger adults), number of years smoked (lowest among those smoking 20 or more years), having tried to quit in the past year, intentions to quit smoking in the future, and asking health professionals about e-cigarettes. Among ever e-cigarette users/tryers, it was also significantly associated with their first impression of e-cigarettes (highest among those with enjoyable first experiences).

Overall susceptibility to using an e-cigarette in the future was similarly associated with e-cigarette status (see Table 4). Notably, while only 18.6% of never e-cigarette users/tryers said they would likely smoke an e-cigarette in the next year, 44.9% said they would probably do so if offered an e-cigarette by a friend ($p < .0001$). Susceptibility was also significantly associated with intention to quit smoking and, among ever users/tryers, having an enjoyable first experience with e-cigarettes.

Finally, 26.3% (20.7–31.9) of smokers who expressed any interest in e-cigarette use said they would be more interested in using e-cigarettes made by a major tobacco company and 9% (5.5–12.4) indicated they would be less interested in such e-cigarettes (64.8% [58.7–70.8] had no preference). Reasons cited for being “more” interested in such e-cigarettes included perceptions that tobacco companies are “established” and “experienced” and therefore might create e-cigarettes that provide better flavor, taste, quality and satisfaction (e.g., “*that is their expertise...manufacturing cigs. I would expect a quality product*”). Some also described tobacco companies as being “trusted” and “reliable”. Conversely, reasons cited for being less interested in tobacco-industry made e-cigarettes included perceptions that tobacco companies are untrustworthy, that they create products that kill people, and that they might create e-cigarettes that are more harmful or more addictive (e.g., “*They don't care what poisons are in regular cigarettes so who knows what they would put in it*”). Some also mentioned not wanting to continue financially supporting the tobacco industry.

Among those who expressed any interest in e-cigarette use, 31.8% (26.1–37.6) said they would be more interested in trying an e-cigarette that looked “similar” to a real cigarette, 13.8% (9.1–18.4) were more interested in trying one that looked “different”, and most (54.4% [48.0–60.7]) had no preference. Reasons given for wanting a similar looking product included beliefs that it might feel like a more satisfying, authentic substitute (e.g., “*would feel more like actually smoking*”) and a desire not to draw attention to it/themselves using it (e.g., “*no one would stare*”). Reasons for preferring a “different” looking e-cigarettes included not wanting to be confused with being a real smoker for stigma or practical reasons (e.g., “*so that people do not mistake you smoking a real cigarette in places where they are not allowed*”), beliefs that such products would be better to use for quitting smoking (“*Trying to quit. Mental separation of the two*”) or an inclination to try “new”, “different” things.

DISCUSSION

This study builds on existing knowledge of smokers' early e-cigarette experiences and future use intentions. We found that buying an e-cigarette as a first method of trial was almost as high as trying from a friend/acquaintance. Although we initially perceived this to be a surprising finding, it is consistent with a recent survey in New Zealand which found that more people indicated that their first time trying an e-cigarette was one that they personally owned (53%) rather than a friend's (31%).²⁵ These findings are likely a function of the more recent availability and affordability of e-cigarettes in retail stores^{26–28} and are also consistent with recent research finding that the retail environment has become a more frequent source for hearing about and/or seeing e-cigarettes.^{5,19} This is also important given that this method of first trial was significantly associated with more frequent and current e-

cigarette use/trial. While e-cigarette trial by purchase may reflect a greater existing motivation to try e-cigarettes (which in turn may predict continued use), the point of sale environment might also work to stimulate impulse purchases among some curious smokers who *then* become motivated to continue using it.

Regardless of first trial method, our results also suggest that smokers' *perceptions* of their first experience are associated with continued e-cigarette use. Consistent with Kralikova et al,⁸ we found that those who had tried e-cigarettes more times and used them currently were more likely to have had a favorable first experience with e-cigarettes. However, only 23% of ever users actually indicated having a positive first experience, suggesting room for product improvement. It should also be noted that while most current e-cigarette users/tryers had "neutral" first experiences rather than "positive" ones, very few described having negative experiences. Having a negative first experience was more common among those who only tried e-cigarettes a limited number of times and who no longer used e-cigarettes. Negative first experiences with e-cigarettes may inhibit smokers from wanting to try e-cigarettes again and slow the rate of e-cigarette adoption, at least to some extent. E-cigarettes are inherently different than cigarette products and may require a bit of a "learning curve" to use and enjoy. However, e-cigarette styles and quality also vary tremendously, and the products initially used may also impact e-cigarette impressions. The likelihood of having positive or at least "neutral" first impressions (and thus potentially subsequent e-cigarette use) may increase with time as the products evolve and their technology improves. Given that negative first experiences were significantly more prevalent among females than males and among those with lower education levels, research on the reasons behind these different first experiences may also be instructive in understanding uptake of this new product.

We also found that the majority of former e-cigarette users/tryers had only used e-cigarettes a handful of times, and mostly represented e-cigarette experimenters who seemed interested in and susceptible to trying e-cigarettes again in the future. Given that this large group will be important to the ultimate adoption rate of e-cigarettes (and its potential public health impact), additional research should investigate potential influencing factors and processes which may lead former users/tryers back to e-cigarettes. Use of the term "discontinuation" with respect to stopping e-cigarette use should also perhaps be reserved for those who have reached some threshold of previous established use.

About one-third of those who had used e-cigarettes in the past 30 days (typically classified as "current users" in e-cigarette literature)^{10,24} had only used e-cigarettes less than ten times and thus might also represent "experimenters". However, around 90% of these smokers considered themselves still interested in and likely to use e-cigarettes in the future. This may increase our confidence that although the "past 30 day use" measure captures people who are still just experimenting, the majority of these may indeed be people likely to go on to become more regular established users.

In contrast, e-cigarette interest and perceived likelihood of future use was significantly lower among smokers who were never e-cigarette users and also lower than that found in previous 2012 surveys of smokers.^{11,12} While these differences in e-cigarette interest may be attributed to different samples and question wording, they might also reflect a slowing down

in e-cigarette interest occurring with time, given that the initial novelty factor of e-cigarettes may be wearing off while increased attention is being paid to their potential risks and regulation needs.²⁹ Indeed, a recent study showed that while most people continue to believe e-cigarettes are less harmful than cigarettes, the prevalence of these perceptions has declined.²¹

Interestingly, almost three times as many smokers indicated that they would prefer an e-cigarette made by a major tobacco company than not. It is not clear to what extent smokers know that e-cigarette brands such as MarkTen and Vuse are owned by cigarette parent companies Altria and Reynolds American. Indeed, their branding represents a different strategy than previously used by both companies for their smokeless tobacco products (ie, Marlboro and Camel Snus) which have been overtly tied in promotion to the flagship cigarette brands. More research into this topic may be informative. Finally, almost twice as many smokers indicated that they would prefer to try an e-cigarette that looked “similar” to a real cigarette than one that looked “different”. This represents a challenge for the e-cigarette industry in that those more similar-looking “cigalike” styles are also limited in their ability to deliver the nicotine “punch”, vapor clouding and satisfaction of higher level larger “vaporizer”, “tanks” and “mods” (“VTM”) models that look “different” and appear to be preferred by established users^{10,31,32} However, as the popularity of VTM styles continues to grow and these products become more familiar to the public, smokers may feel less ambivalent about trying and using these more advanced devices.

This study has several limitations including a relatively small sample size and a cross-sectional design that limits our ability to draw definitive conclusions about the influence of first trial method and impression on continued e-cigarette use. In addition, we did not measure what type of e-cigarette product/style participants tried on their first use, which is likely an important factor in the satisfaction perception of that experience. Also, our sample was limited to adult current smokers, so e-cigarette interest levels and reasons for future use may not be representative of former smokers, nonsmokers, or youth.

IMPLICATIONS FOR TOBACCO REGULATION

This paper adds to nascent e-cigarette literature on e-cigarette experiences, use reasons and future interest and suggests areas for future research and several regulatory implications. Multiple factors including e-cigarette product availability and diversity, mode and context of trial, and product and marketing perceptions are important to understanding e-cigarette initiation, continued use or rejection, and future use, and thus continued surveillance of these is important. Our findings suggest that many smokers are now trying e-cigarettes by purchasing them directly themselves and thus regulation of the e-cigarette retail/sales environment may impact e-cigarette trial and use. Regulations that impact the manufacturing and quality of e-cigarette devices may also influence e-cigarette use, as our findings suggest a positive association between initial e-cigarette experience (pleasant/unpleasant) and current e-cigarette use. Our results also suggest that smokers may have different perceptions about e-cigarettes based on whether they are made by a major tobacco company or not. More research into understanding the potential importance of e-cigarette brand and manufacturer type on e-cigarette trial and use may be of interest, particularly given that a

growing section of the e-cigarette market, that of the larger and stronger VTMs appear to be promoted more in terms of their flavoring options and functional benefits (eg, battery life, nicotine delivery) rather than traditional branding messages. E-cigarette branding and manufacturer type may also change in importance if the large e-cigarette market begins to consolidate under impending FDA regulation.

Finally, regulating e-cigarettes requires a good understanding of the target market (ie, its current and potential users), which in turn requires good measures for defining “use”. Given the relative infancy of this area, additional measurement research into appropriate standards for classifying different types of e-cigarette use (eg, experimentation, current, established use) would also be helpful.

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Table 1

E-cigarette Status, Demographic and Cigarette Smoking Characteristics (N = 519)

	Overall		E-cigarette Status			
	% ^a	(95% CI) ^b	Never User		Former User	
			%	(95% CI)	%	(95% CI)
Age Group						
18–29	21.6	(16.3–26.8)	33.8	(19.7–48.0)	42.6	(28.4–56.8) 23.6 (11.5–35.7) *
30–44	28.8	(23.9–33.8)	35.3	(25.5–45.2)	42.6	(32.3–53.0) 22.0 (13.0–31.1)
45–59	31.6	(26.9–36.3)	48.0	(39.5–56.5)	37.1	(28.9–45.2) 14.9 (9.0–20.8)
60+	18.0	(14.5–21.6)	58.5	(48.8–68.3)	25.9	(17.8–34.1) 15.5 (9.0–22.1)
Sex						
Male	51.0	(45.6–56.4)	49.0	(41.9–56.2)	34.5	(27.7–41.4) 16.4 (11.5–21.4)
Female	49.0	(43.6–54.4)	37.3	(29.3–45.2)	41.1	(33.1–49.2) 21.6 (14.5–28.7)
Race/Ethnicity						
White, non-Hispanic	66.1	(60.7–71.6)	36.5	(30.6–42.4)	42.4	(36.2–48.6) 21.1 (15.8–26.4) §
Black, non-Hispanic	14.7	(10.7–18.8)	70.5	(56.8–84.2)	22.0	(9.6–34.5) 7.5 (0.0–15.0)
Hispanic	12.7	(8.3–17.2)	53.2	(33.4–72.9)	32.4	(13.5–51.3) 14.4 (0.9–27.9)
Other, non-Hispanic	6.4	(4.1–8.7)	36.2	(18.8–53.5)	34.1	(17.2–51.1) 29.7 (10.9–48.5)
Education						
High school diploma or less	59.9	(54.7–65.1)	47.2	(39.9–54.4)	35.2	(28.3–42.1) 17.6 (12.1–23.2)
Some college or more	40.1	(34.9–45.3)	37.7	(29.9–45.6)	41.5	(33.4–49.5) 20.8 (13.9–27.7)
Cigarette Smoking Status						
Daily	80.3	(75.7–84.9)	44.8	(38.9–50.7)	39.1	(33.4–44.8) 16.1 (11.8–20.3) *
Some days	19.7	(15.1–24.3)	36.9	(23.8–50.0)	32.1	(19.3–44.9) 31.0 (18.0–44.0)
No. of Years Smoked						
5 years or less	19.5	(14.6–24.4)	39.7	(24.9–54.5)	42.7	(28.1–57.2) 17.6 (7.4–27.9)
6–19 years	28.5	(23.4–33.5)	40.7	(30.2–51.2)	36.6	(26.2–46.9) 22.7 (13.4–32.1)
20 years or more	52.0	(46.5–57.5)	45.7	(39.1–52.4)	37.0	(30.6–43.5) 17.2 (11.9–22.5)
Cigarettes per Day						
10 or less	57.6	(52.3–62.8)	43.6	(36.0–51.2)	35.8	(28.4–43.2) 20.6 (14.5–26.7)

	E-cigarette Status					
	Overall			Never User		
	% ^a	(95% CI) ^b	%	(95% CI)	%	(95% CI)
More than 10	42.4	(37.2–47.7)	42.1	(34.5–49.6)	41.0	(33.6–48.3)
Past-year Cigarette Quit Attempt						
Yes	39.0	(33.6–44.3)	31.6	(23.3–39.9)	45.0	(35.8–54.1)
No	61.0	(55.7–66.4)	50.6	(43.8–57.3)	33.3	(27.1–39.4)
Intention to Quit Cigarettes						
Yes	44.3	(38.8–49.7)	34.2	(26.2–42.2)	39.5	(31.2–47.7)
No	55.7	(50.3–61.2)	50.7	(43.5–57.9)	37.4	(30.5–44.2)
TOTAL	100.0		43.3	(37.9–48.7)	37.8	(32.5–43.0)

^a Weighted percentages

^b Confidence Intervals (variances estimated using Taylor Series Linearization)

* p < 0.05,

§ p < 0.01,

† p < 0.001, Rao-Scott Chi Square test

Table 2
Circumstances and Impressions Surrounding First E-Cigarette Experiences among Ever E-cigarette Users (N = 292)

	How first tried E-cigarette			First Experience with E-cigarette		
	Friend or Known Person		Bought it on Own	Disappointing or Unpleasant		Enjoyable
	% ^a	(95% CI) ^b	% (95% CI)	% (95% CI)	% (95% CI)	Neutral (95% CI)
Age Group						
18–29	58.1	(40.9–75.2)	39.0 (21.9–56.1)	20.3 (5.0–35.6)	29.4 (14.1–44.8)	50.3 (33.0–67.5)
30–44	42.9	(30.1–55.6)	48.7 (35.5–62.0)	20.0 (9.5–30.5)	19.4 (8.9–30.0)	60.6 (47.8–73.4)
45–59	56.5	(45.1–67.9)	34.7 (23.7–45.7)	17.5 (8.9–26.1)	21.6 (12.4–30.7)	60.9 (49.8–72.0)
60+	40.8	(27.3–54.4)	54.0 (40.3–67.6)	22.7 (11.0–34.3)	20.5 (9.7–31.3)	56.9 (43.3–70.4)
Sex						
Male	48.9	(39.1–58.7)	43.7 (34.1–53.4)	12.2 (6.3–18.1)	30.3 (20.7–39.8)	57.5 (47.7–67.4) [§]
Female	51.4	(41.0–61.9)	42.5 (32.0–53.0)	26.4 (16.8–35.9)	16.2 (9.2–23.2)	57.4 (47.2–67.7)
Race/Ethnicity						
White, non-Hispanic	46.0	(38.1–53.9) [§]	47.5 (39.5–55.5) [*]	20.7 (14.1–27.2)	19.6 (13.3–25.8)	59.8 (51.9–67.6)
Black, non-Hispanic	46.4	(20.0–72.9)	53.6 (27.1–80.0)	18.4 (0.0–39.2)	27.6 (5.4–49.8)	54.0 (27.8–80.2)
Hispanic	53.1	(24.4–81.7)	31.1 (3.0–59.2)	20.7 (0.0–49.6)	28.9 (2.3–55.5)	50.4 (20.2–80.6)
Other, non-Hispanic	94.1	(87.8–100.0)	4.0 (0.0–8.9)	10.3 (0.0–25.0)	43.6 (18.6–68.5)	46.1 (22.4–69.8)
Education						
High school diploma or less	51.2	(41.3–61.0)	43.7 (33.8–53.5)	25.1 (15.9–34.2)	18.0 (11.2–24.7)	57.0 (47.2–66.7) [*]
Some college or more	49.1	(38.5–59.7)	42.2 (31.7–52.8)	12.8 (6.7–18.9)	29.0 (18.8–39.3)	58.1 (47.6–68.6)
Cigarette Smoking Status						
Daily	47.0	(39.2–54.9)	45.1 (37.2–53.0)	19.3 (13.0–25.6)	23.4 (16.6–30.1)	57.4 (49.6–65.2)
Some days	61.7	(45.1–78.3)	35.8 (19.4–52.2)	21.3 (6.0–36.5)	20.9 (7.3–34.4)	57.9 (40.8–74.9)
No. of Years Smoked Cigarettes						
5 years or less	53.0	(35.2–70.8)	37.5 (20.4–54.6)	23.8 (7.8–39.8)	36.8 (19.4–54.2)	39.4 (22.5–56.4)
6–19 years	55.7	(41.6–69.9)	36.4 (22.3–50.5)	16.9 (5.8–28.0)	16.9 (6.8–27.1)	66.2 (52.8–79.5)
20 years or more	46.2	(37.0–55.4)	48.9 (39.6–58.2)	19.1 (11.9–26.2)	20.4 (13.6–27.2)	60.6 (51.9–69.2)
Cigarettes per Day						
10 or less	55.1	(45.0–65.2)	39.4 (29.4–49.3)	20.6 (11.6–29.5)	27.6 (18.4–36.7)	51.9 (41.7–62.1)

	How first tried E-cigarette				First Experience with E-cigarette			
	Friend or Known Person		Bought it on Own		Disappointing or Unpleasant		Enjoyable	
	% ^a	(95% CI) ^b	%	(95% CI)	%	(95% CI)	%	(95% CI)
More than 10	43.9	(34.0–53.8)	47.9	(37.7–58.0)	18.6	(11.4–25.8)	16.6	(9.8–23.4)
Past-year Cigarette Quit Attempt								
Yes	48.1	(37.0–59.2)	43.7	(32.7–54.7)	25.1	(14.8–35.3)	25.3	(15.4–35.3)
No	52.1	(42.7–61.6)	42.5	(32.9–52.0)	14.9	(8.8–20.9)	20.5	(13.5–27.6)
Intention to Quit Cigarettes								
Yes	51.2	(40.9–61.4)	42.4	(32.2–52.5)	22.1	(13.4–30.8)	22.5	(14.0–31.0)
No	49.8	(39.6–60.0)	42.9	(32.7–53.1)	17.4	(9.3–25.6)	22.7	(14.1–31.3)
No. of Times used E-cigarette								
1 or 2 times	66.8	(55.0–78.6) [§]	27.2	(15.9–38.5) [*]	33.7	(22.0–45.4)	8.4	(2.8–14.0)
2 to 9 times	58.5	(44.2–72.8)	39.6	(25.4–53.8)	18.5	(5.9–31.1)	8.2	(1.1–15.3)
10 to 20 times	31.4	(17.2–45.7)	57.4	(41.4–73.3)	20.4	(5.8–35.0)	27.5	(12.9–42.1)
21 to 50 times	39.9	(18.3–61.5)	56.2	(34.5–78.0)	1.7	(0.0–5.0)	29.2	(8.2–50.3)
More than 50 times	42.2	(23.6–60.9)	49.8	(31.0–68.7)	1.5	(0.0–4.3)	65.4	(47.6–83.3)
How first tried E-cigarette								
Friend/known person					17.3	(9.5–25.0)	25.2	(16.6–33.8)
Bought it on own					21.0	(11.2–30.8)	17.7	(9.4–26.1)
E-cigarette Status								
Former user	53.7	(45.0–62.4)	37.9	(29.3–46.4)	24.4	(16.5–32.3)	17.9	(10.9–24.8)
Current user	45.2	(32.6–57.8)	51.0	(38.3–63.7)	8.7	(2.0–15.3)	34.5	(22.8–46.3)
TOTAL – All Ever E-cigarette Users	50.3	(43.0–57.5)	43.0	(35.8–50.3)	19.7	(13.8–25.7)	22.8	(16.8–28.8)

^a Weighted percentages^b Confidence Intervals (variances estimated using Taylor Series Linearization)^{*} $p < 0.05$,[§] $p < 0.01$,[†] $p < 0.001$, Rao-Scott Chi Square test

Table 3
Reasons for Trying and Discontinuing E-cigarette use, among Ever E-cigarette Users (N = 292)

	E-Cigarette Status					
	Overall			Current		Former
	% ^a	(95% CI) ^b	%	(95% CI)	%	(95% CI)
<u>Reasons for Trying E-cigarettes</u>						
Curiosity/to try something new	76.5	(70.7–82.3)	76.0	(66.5–85.4)	77.1	(69.9–84.4)
It seems less harmful than regular cigarettes	77.2	(71.4–83.1)	86.3	(76.1–96.4)	72.1	(64.7–79.6)
As way to cut down on number of cigarettes I smoke	72.7	(66.0–79.4)	88.3	(79.0–97.7)	64.1	(55.4–72.8) [§]
As a way to quit smoking cigarettes completely	64.9	(57.8–72.0)	73.9	(61.3–86.4)	59.4	(50.7–68.2)
To use in places where I can't smoke	66.7	(59.9–73.4)	73.1	(62.1–84.1)	63.5	(55.0–72.1)
To save money spent on regular cigarettes	58.5	(51.4–65.6)	76.3	(65.6–86.9)	49.4	(40.4–58.4) [†]
To avoid disturbing others around me with smoke	58.7	(51.4–65.9)	69.3	(57.0–81.6)	52.3	(43.3–61.3) [*]
Someone recommended it to me	61.1	(53.8–68.3)	65.1	(52.3–78.0)	60.5	(51.7–69.3)
Other	9.5	(5.0–14.1)	13.3	(4.0–22.6)	6.6	(2.0–11.2)
<u>Reasons for Discontinuing E-cigarettes</u>						
Cost/too expensive	25.1	(17.4–32.8)			25.1	(17.4–32.8)
Didn't like taste	19.4	(12.0–26.8)			19.4	(12.0–26.8)
Doesn't satisfy cravings as well as regular cigs	42.8	(34.1–51.4)			42.8	(34.1–51.4)
Impractical/too complicated	2.3	(0.1–4.5)			2.3	(0.1–4.5)
Concerns about risks	6.8	(1.5–12.2)			6.8	(1.5–12.2)
Embarrassing	0.4	(0.0–1.3)			0.4	(0.0–1.3)
Doesn't give feel of smoking cigs that I like	43.0	(34.2–51.8)			43.0	(34.2–51.8)
Didn't help quit/cut down	23.8	(16.0–31.5)			23.8	(16.0–31.5)
Just not interested	20.4	(13.8–27.0)			20.4	(13.8–27.0)
Other	16.3	(9.3–23.3)			16.3	(9.3–23.3)

^aWeighted percentages

^bConfidence Intervals (variances estimated using Taylor Series Linearization)

* p < 0.05.

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[§] $p < 0.01$,
[†] $p < 0.001$, Rao-Scott Chi Square test

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Table 4

E-cigarette Future Interest and Susceptibility, among Current Cigarette Smokers (N = 519)

	Reasons for Future Interest (Somewhat or Very Interested)										Susceptibility (Probably or Definitely Yes)							
	To use when can't smoke cigarettes		To reduce health risks		To cut down on regular cigarettes		To quit regular cigarettes completely		To save money		Composite Interest Score ^c		Will use E-cigarette in next year		Would accept E-cigarette from best friend		Overall Susceptibility ^d	
	% ^a	(95% CI) ^b	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(SE)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Age Group																		
18–29	57.7	(43.1–72.3)	62.7	(48.3–77.0) [§]	57.8	(43.2–72.5)	60.3	(45.9–74.7) [*]	57.5	(42.9–72.2)	13.6	(0.8) [§]	53.7	(38.8–68.6)	59.5	(45.1–73.9)	67.4	(53.5–81.4)
30–44	56.5	(46.3–66.7)	63.5	(53.7–73.4)	58.3	(48.0–68.6)	52.7	(42.3–63.1)	50.6	(40.2–60.9)	13.0	(0.6)	51.7	(41.2–62.1)	68.1	(58.7–77.5)	72.4	(63.5–81.3)
45–59	48.1	(39.5–56.6)	54.9	(46.4–63.4)	56.7	(48.2–65.2)	54.0	(45.6–62.5)	53.3	(44.7–61.8)	12.6	(0.5)	37.8	(29.7–45.9)	56.4	(47.9–64.8)	62.4	(54.1–70.7)
60+	37.1	(27.3–46.8)	37.5	(27.6–47.4)	38.3	(28.3–48.4)	35.5	(25.9–45.2)	35.5	(25.7–45.3)	10.3	(0.6)	38.6	(28.8–48.4)	49.1	(38.6–59.6)	52.8	(42.3–63.4)
Sex																		
Male	45.7	(38.6–52.8)	51.1	(43.9–58.3)	48.2	(41.0–55.3) [*]	47.5	(40.4–54.7)	45.7	(38.6–52.8)	12.0	(0.4)	39.8	(32.9–46.8) [*]	56.3	(49.2–63.4)	60.9	(53.9–68.0)
Female	55.7	(47.5–63.9)	61.2	(53.1–69.3)	60.5	(52.3–68.7)	56.0	(47.8–64.2)	55.1	(46.8–63.4)	13.1	(0.5)	50.9	(42.7–59.2)	62.1	(54.1–70.1)	68.5	(60.8–76.1)
Race/Ethnicity																		
White, non-Hispanic	54.3	(48.0–60.5)	58.3	(52.1–64.5)	58.7	(52.5–64.9)	56.1	(49.9–62.3)	53.6	(47.3–59.8)	13.0	(0.4)	50.0	(43.7–56.3)	62.5	(56.5–68.5)	68.8	(63.2–74.5)
Black, non-Hispanic	37.2	(22.3–52.0)	46.5	(31.1–61.8)	46.5	(31.1–61.9)	36.5	(22.0–51.0)	42.1	(27.0–57.1)	11.4	(0.8)	28.3	(14.6–42.1)	49.2	(33.7–64.8)	51.4	(35.9–66.9)
Hispanic	43.2	(23.6–62.7)	54.3	(34.8–73.7)	39.6	(20.6–58.5)	46.0	(26.3–65.6)	40.9	(21.8–59.9)	11.6	(1.0)	38.2	(19.4–57.0)	47.2	(27.8–66.5)	54.0	(34.7–73.4)
Other, non-Hispanic	56.7	(38.6–74.7)	57.0	(39.1–75.0)	51.1	(32.4–69.8)	49.9	(31.4–68.4)	51.8	(33.4–70.2)	12.4	(1.1)	49.9	(31.4–68.4)	70.6	(55.0–86.2)	72.3	(56.9–87.6)
Education																		
High school diploma or less	47.7	(40.5–55.0)	52.8	(45.5–60.2)	51.8	(44.5–59.2)	48.3	(41.1–55.6)	48.6	(41.3–55.9)	12.2	(0.4)	43.2	(36.0–50.4)	54.8	(47.5–62.1) [*]	62.0	(54.8–69.1)
Some college or more	54.8	(46.7–62.8)	60.5	(52.8–68.3)	57.4	(49.3–65.6)	56.5	(48.5–64.5)	52.6	(44.4–60.7)	13.1	(0.5)	48.5	(40.3–56.7)	65.7	(58.1–73.2)	68.7	(61.3–76.0)
Cigarette Smoking Status																		
Daily	48.9	(42.9–54.8)	54.1	(48.2–60.0)	54.1	(48.2–60.1)	49.9	(44.0–55.8)	49.8	(43.8–55.7)	12.3	(0.4)	45.4	(39.5–51.4)	58.4	(52.6–64.3)	65.1	(59.5–70.8)
Some Days	57.6	(44.3–70.9)	63.6	(50.9–76.3)	54.1	(40.5–67.6)	58.6	(45.5–71.8)	52.2	(38.7–65.7)	13.4	(0.6)	44.9	(31.5–58.3)	62.0	(49.0–75.0)	62.9	(49.9–75.8)
No. of Years Smoked																		
5 years or less	57.8	(43.2–72.5)	61.0	(46.6–75.4)	56.0	(41.2–70.7)	57.6	(43.1–72.1)	56.8	(42.1–71.5)	13.2	(0.8) [*]	42.1	(27.8–56.4)	54.9	(40.4–69.5)	59.4	(44.9–74.0)
6–19 years	55.5	(44.9–66.1)	63.7	(53.4–74.0)	62.5	(52.1–72.9)	59.9	(49.3–70.4)	53.9	(43.3–64.6)	13.7	(0.6)	53.7	(43.1–64.4)	63.9	(53.6–74.3)	69.4	(59.8–79.0)
20 years or more	45.3	(38.6–52.1)	50.4	(43.6–57.2)	48.2	(41.5–55.0)	45.1	(38.4–51.8)	46.2	(39.5–53.0)	11.7	(0.4)	42.2	(35.5–48.9)	57.8	(51.1–64.4)	63.6	(57.0–70.1)

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	Reasons for Future Interest (Somewhat or Very Interested)						Susceptibility (Probably or Definitely Yes)											
	To use when can't smoke cigarettes	To reduce health risks	To cut down on regular cigarettes	To quit regular cigarettes completely	To save money	Composite Interest Score ^c	Will use E-cigarette in next year	Would accept E-cigarette from best friend	Overall Susceptibility ^d									
% ^a	(95% CI) ^b	%	(95% CI)	%	(95% CI)	Mean	(SE)	%	(95% CI)	%	(95% CI)							
Cigarettes per Day																		
10 or less	48.0	(40.4–55.6)	54.5	(46.9–62.1)	51.7	(44.1–59.4)	50.4	(42.8–58.0)	48.7	(41.1–56.3)	12.4	(0.4)	44.3	(36.8–51.9)	59.2	(51.6–66.8)	64.0	(56.6–71.4)
More than 10	54.4	(46.7–62.0)	58.4	(50.8–65.9)	57.3	(49.6–64.9)	53.2	(45.6–60.9)	52.6	(44.9–60.3)	12.8	(0.5)	47.4	(39.6–55.1)	59.1	(51.6–66.6)	65.7	(58.5–72.9)
Past-year Cigarette Quit Attempt																		
Yes	58.1	(49.1–67.2) [*]	64.6	(55.6–73.7) [*]	61.9	(52.7–71.1) [*]	62.0	(52.9–71.1) [§]	59.0	(49.8–68.2) [*]	13.6	(0.6) [*]	52.7	(43.6–61.8) [*]	62.2	(53.3–71.1)	67.5	(59.0–75.9)
No	45.7	(39.0–52.5)	50.7	(43.9–57.5)	49.1	(42.3–55.9)	45.0	(38.2–51.7)	44.9	(38.2–51.6)	11.9	(0.4)	40.7	(34.0–47.5)	57.1	(50.4–63.9)	62.8	(56.2–69.4)
Intention to Quit Cigarettes																		
Yes	54.3	(45.8–62.7)	71.1	(63.5–78.7) [‡]	67.7	(59.6–75.7) [‡]	70.5	(63.0–78.1) [‡]	64.4	(56.3–72.5) [‡]	14.3	(0.5) [‡]	53.0	(44.7–61.4) [§]	66.1	(58.2–74.1) [*]	71.4	(63.9–78.9) [*]
No	47.0	(39.8–54.2)	43.9	(36.8–51.0)	44.5	(37.4–51.7)	37.4	(30.6–44.3)	40.1	(33.1–47.0)	11.3	(0.4)	38.6	(31.6–45.7)	53.4	(46.1–60.6)	59.2	(52.1–66.4)
First E-cigarette Impression ^e																		
Disappointing/unpleasant	38.3	(20.9–55.7) [‡]	45.0	(27.9–62.0) [‡]	44.6	(27.6–61.6) [‡]	45.7	(28.5–62.9) [§]	38.1	(21.7–54.5) [‡]	10.8	(0.9) [‡]	35.8	(19.1–52.6) [‡]	34.3	(18.9–49.7) [‡]	50.6	(33.3–67.9) [‡]
Enjoyable	85.3	(75.2–95.4)	88.4	(78.0–98.8)	90.7	(80.7–100.0)	84.9	(74.0–95.7)	82.2	(69.5–94.9)	16.8	(0.6)	84.9	(73.3–96.4)	87.0	(75.9–98.0)	93.2	(83.6–100.0)
Neutral	69.9	(61.3–78.4)	73.6	(65.6–81.7)	69.9	(61.4–78.4)	66.7	(58.1–75.3)	68.0	(59.4–76.6)	14.9	(0.5)	65.8	(57.0–74.5)	73.2	(65.1–81.3)	79.2	(71.6–86.7)
E-cigarette status																		
Current user	90.6	(83.9–97.4) [‡]	94.4	(90.1–98.8) [‡]	87.7	(78.1–97.2) [‡]	84.0	(74.3–93.6) [‡]	87.2	(77.8–96.5) [‡]	17.4	(0.5) [‡]	90.8	(84.5–97.2) [‡]	87.4	(80.0–94.9) [‡]	94.0	(88.5–99.6) [‡]
Former user	58.7	(50.1–67.4)	63.1	(54.3–71.8)	62.0	(53.2–70.7)	59.1	(50.3–67.9)	55.7	(46.8–64.6)	13.4	(0.5)	53.5	(44.7–62.4)	62.2	(53.5–70.9)	70.8	(62.7–79.0)
Never user	27.1	(19.9–34.4)	34.8	(26.6–43.0)	34.3	(26.3–42.3)	32.5	(24.6–40.4)	31.1	(23.3–38.8)	9.9	(0.4)	18.6	(12.5–24.8)	44.9	(36.6–53.3)	47.4	(39.1–55.8)
Asked health professional about e-cigarettes																		
Yes	72.8	(55.9–89.8) [*]	78.5	(62.6–94.4) [*]	77.4	(61.4–93.4) [*]	73.1	(56.2–90.0) [*]	74.9	(58.6–91.2) [§]	15.7	(1.0) [§]	65.8	(47.9–83.8) [*]	65.3	(47.1–83.5)	69.9	(52.4–87.5)
No	49.3	(43.6–55.0)	54.7	(49.1–60.4)	52.6	(46.9–58.4)	50.5	(44.8–56.2)	48.8	(43.1–54.5)	12.4	(0.3)	43.6	(38.0–49.3)	58.9	(53.3–64.5)	64.4	(58.9–69.9)
Aware e-cigarettes unregulated																		
Aware	59.4	(50.6–68.2) [*]	59.6	(50.7–68.4)	54.9	(45.7–64.1)	52.6	(43.5–61.6)	50.0	(40.8–59.2)	13.0	(0.5)	50.3	(41.2–59.4)	63.5	(54.9–72.1)	69.3	(61.0–77.6)
Unaware	46.1	(39.3–52.9)	54.8	(47.9–61.6)	54.6	(47.7–61.4)	52.0	(45.1–58.9)	51.2	(44.3–58.1)	12.4	(0.4)	43.1	(36.2–49.9)	57.6	(50.7–64.4)	63.1	(56.4–69.7)
TOTAL – All current smokers	50.6	(45.2–56.1)	56.0	(50.6–61.4)	54.1	(48.6–59.6)	51.7	(46.2–57.1)	50.2	(44.8–55.7)	12.5	(0.3)	45.3	(39.9–50.8)	59.9	(53.8–64.5)	64.7	(59.5–69.9)

^aWeighted percentages

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^bConfidence Intervals (variances estimated using Taylor Series Linearization)

^cPossible range of 4–20

^d“Probably Yes” or “Definitely Yes” to either susceptibility question

^eAmong ever e-cigarette users only (n=292)

^{*}p < 0.05,

[§]p < 0.01,

[‡]p < 0.001,

[‡]p < 0.0001, Rao-Scott Chi Square test (independence of proportions) or t-test/ANOVA (independence of means)