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Adolescent Males' Awareness of and Willingness to Try Electronic Cigarettes

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Abstract

Purpose—Electronic cigarettes (e-cigarettes) are a new type of device that delivers vaporized nicotine without the tobacco combustion of regular cigarettes. We sought to understand awareness of and willingness to try e-cigarettes among adolescent males, a group that is at risk for smoking initiation and may use e-cigarettes as a "gateway" to smoking.

Methods—A national sample of 11–19-year-old males (n =228) completed an online survey in November 2011. We recruited participants through their parents, who were members of a panel of U.S. households constructed using random-digit dialing and addressed-based sampling.

Results—Only two participants (< 1%) had previously tried e-cigarettes. Among those who had not tried e-cigarettes, most (67%) had heard of them. Awareness was higher among older and non-Hispanic adolescents. Nearly 1 in 5 (18%) participants were willing to try either a plain or flavored e-cigarette, but willingness to try plain versus flavored varieties did not differ. Smokers were more willing to try any e-cigarette than nonsmokers (74% vs. 13%; OR 10.25, 95% CI 2.88, 36.46). Nonsmokers who had more negative beliefs about the typical smoker were less willing to try e-cigarettes (OR .58, 95% CI .43, .79).

Conclusions—Most adolescent males were aware of e-cigarettes, and a substantial minority were willing to try them. Given that even experimentation with e-cigarettes could lead to nicotine dependence and subsequent use of other tobacco products, regulatory and behavioral interventions are needed to prevent "gateway" use by adolescent nonsmokers. Campaigns promoting negative images of smokers or FDA bans on sales to youth may help deter use.

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Conflicts of interest: None.

Keywords

Electronic cigarette; Adolescents; Males; Nicotine; Smoking; Awareness

Electronic cigarettes (e-cigarettes) are battery-operated devices that are typically made to look and perform like regular cigarettes. They contain an inhalation-activated mechanism that heats liquid from a cartridge composed of humectants and nicotine, although non-nicotine e-cigarettes are also available. Users, sometimes called “vapers,” inhale the resulting vapor. Safety data on e-cigarettes are sparse and inconsistent [1, 2], giving rise to considerable concern about the lack of quality control in manufacturing [3]. The U.S. Food and Drug Administration (FDA) is working to regulate e-cigarettes as tobacco products [4], but regulations are not yet in place.

While fewer than 3% of American adults had used e-cigarettes as of 2010 [5], public interest is skyrocketing [6], and the popular media (e.g., New York Times; Parade Magazine) has covered them extensively [7, 8]. Existing research suggests that smokers are more likely than nonsmokers to try e-cigarettes [5]. The most frequently cited reason for use among “vapers” is to help them quit smoking or reduce use of traditional cigarettes [9–11]. Given the unknown long-term consequences of e-cigarette use and the lack of comprehensive data on product safety or utility as a cessation aid, the public health and tobacco control communities are both strongly divided about whether e-cigarettes are dangerous or a promising harm reduction strategy for adult smokers [12–15].

Tobacco control advocates and researchers are also concerned that e-cigarettes could act as “gateway” devices, getting novice users, particularly young people, addicted to nicotine and encouraging future tobacco use [15]. Given that most tobacco use begins during adolescence and males are more likely than females to use tobacco products [16], we sought to understand how male adolescents respond to e-cigarettes. Because earlier beliefs about a “typical smoker” are related to future use of cigarettes by adolescents [17], we also wished to explore how social images of smokers might influence willingness to try a cigarette-like product. No published studies we are aware of have examined U.S. adolescent males’ views about e-cigarettes. We surveyed a national sample of males ages 11–19 to explore their awareness of e-cigarettes and their willingness to try them.

Methods

Participants

Parents and their adolescent sons participated in an online, two-wave survey on adolescent health described in detail by Reiter et al [18]. In brief, a survey company constructed a national panel of U.S. households by using probability sampling, a combination of list-assisted, random-digit dialing and address-based sampling to reach cell phone-only households [19]. The survey company then randomly sampled panel members who were parents with sons ages 11–17 years. In August and September 2010, parents and sons completed the online Wave 1 survey. We re-contacted these parents and sons in November 2011 to participate in the present survey (i.e., Wave 2). Four parents indicated that their sons were 11 years old at Wave 2, suggesting that the son’s age documented in the panel profile or Wave 2 survey was off by a year. In exchange for participation, parents received 1,000 points (worth about $1) that they could later redeem for small cash payments. Households without Internet access received laptops and free Internet access. Sons received 10,000 points (worth about $10) for completing the Wave 2 survey. The Institutional Review Board at the University of North Carolina approved the study.

The survey company sent e-mail invitations to participate in the study to 421 parents who participated in the Wave 1 survey. Three reminder e-mails were sent to parents between Waves 1 and 2 to maximize participation at Wave 2. Only the Wave 2 survey included items about e-cigarettes. Of the 327 parents (78%) who completed the Wave 2 surveys, 228 (70%) had adolescent sons who also completed surveys. There were no differences between the 70% of sons who completed Wave 2 surveys and the 30% who did not in terms of: son's race or ethnicity; parent's age, gender, marital status, or smoking status; or the household's income, urbanicity, or region. Sons who completed the Wave 2 survey were less likely to have parents who attended at least some college than sons who did not complete the Wave 2 survey (56% vs. 69%, $p = .04$).

Measures

Sons' Wave 2 surveys assessed awareness of e-cigarettes by asking "Have you ever heard of electronic cigarettes, often called e-cigarettes?" (0 = no, 1 = yes). All sons then viewed a brief informational statement about e-cigarettes: "E-cigarettes look like regular cigarettes but they are different. They create a mist that you breathe in like smoke, but they are not made of tobacco." We then asked "Have you ever seen someone using an e-cigarette?" (0 = no, 1 = yes) and "Have you ever used an e-cigarette?" (0 = no, 1 = yes).

Because e-cigarettes are available in a variety of flavors (plain as well as candy- or fruit-flavored), we assessed willingness to use an e-cigarette with two items: "If one of your best friends were to offer you an e-cigarette, would you try it?" and "If one of your best friends were to offer you a flavored e-cigarette (chocolate, mint, apple, etc.), would you try it?" Responses of "definitely not" or "probably not" were coded as 0, and responses of "definitely yes" or "probably yes" were coded as 1. For some analyses, we grouped responses of willingness to try plain and flavored e-cigarettes to create a variable for willingness to try any kind of e-cigarette (0 = no, 1 = yes), such that '1' included respondents who were willing to try plain but not flavored e-cigarettes, flavored but not plain e-cigarettes, or both kinds of e-cigarettes.

We classified adolescent participants as nonsmokers (coded as 0) if they responded "never, I am not a smoker" to the question "How often do you smoke now?" We classified all other responses ("less than once a month," "at least once a month," "at least once a week," and "at least once a day") as indicating smokers (coded as 1). The item "Do you think you will smoke a cigarette in the next year?" assessed participants' susceptibility to cigarette use. We coded responses of "definitely not" or "probably not" as 0 and responses of "definitely yes" or "probably yes" as 1.

As described by the prototype/willingness model, adolescents' willingness to engage in risky behaviors like smoking is influenced by their self-comparisons to a social image (or prototype) of the kind of person who engages in that behavior [20]. Thus, prior to asking participants about their awareness and use of e-cigarettes, we evaluated their smoker prototypes [21, 22]. We instructed them to "Consider a typical person your age who smokes. How would you describe this person using the following characteristics?" For each of a set of eight adjectives, displayed in a random order, participants responded on a 5-point scale from "not at all" (coded as 1) to "very much" (5). We created a mean score (range 1–5) for the four items that assessed positive smoker prototypes (stylish, tough, cool, and independent; alpha = .79), and a mean score for the four items that assessed negative smoker prototypes (unattractive, immature, inconsiderate, and trashy; alpha = .85).

Demographic characteristics included sons' age, ethnicity (Hispanic/Latino or not Hispanic/Latino), and race (white or nonwhite), as well as parents' marital status, education, and smoking habits. We classified parents as having "never or rarely smoked" (smoked less than

100 cigarettes in their lifetimes), being "former smokers" (smoked more than 100 cigarettes in their lifetimes but not current smokers), or being "current smokers" (smoke cigarettes some days or every day). We also collected data on household characteristics: income, urbanicity (as described by the Census Bureau definition of metropolitan statistical areas, http://factfinder.census.gov/home/en/epss/glossary_r.html), and region of residence (Northeast, Midwest, South, and West). All demographic characteristics (except son's age and son's smoking status) used data collected at Wave 1. The complete parent and son surveys are available online at http://www.unc.edu/wntbrewer/hpv.htm

Data analyses

Among sons without past use of e-cigarettes, we examined bivariate correlates of awareness of and willingness to try any kind of e-cigarette (plain, flavored, or both) using logistic regression. All correlates identified as statistically significant ($p < .05$) in bivariate analyses were included in a multivariate model. For willingness to try e-cigarettes, we repeated the multivariate analysis restricted to nonsmokers. We analyzed data with SPSS version 17.0 (SPSS Inc., Chicago, IL). Statistical tests were two-tailed with a critical alpha of .05.

Results

Participants

Adolescents' mean age was 15.1 years (Table 1). Most were nonsmokers (91%), white (80%), and lived in urban areas (84%). About half of parents reported a household income of less than $60,000 (48%). Most parents had never or rarely smoked (43%) or were former smokers (41%).

Use of e-cigarettes

Only 2 of 228 adolescents (< 1%) had previously tried an e-cigarette. Both of these participants also smoked regular cigarettes. We excluded these two adolescents from subsequent analyses.

Awareness of e-cigarettes

The majority of adolescents (67%) had heard of e-cigarettes (Table 2). In bivariate analyses, older adolescents were more likely to be aware of e-cigarettes (Table 2). About three out of four participants ages 14–16 and 17–19 were aware (72% and 76%, respectively) compared to half (52%) of those 11–13 years old. Hispanic/Latino males were less likely to be aware of e-cigarettes than those of other ethnicities (50% vs. 71%), and white males were more likely to be aware of e-cigarettes than were other races (71% vs. 53%). Sons of parents with greater than high school education were less likely to be aware of e-cigarettes (61% vs. 76%), as were sons living in urban versus rural areas (64% vs. 83%). Neither parents' nor sons' smoking status was correlated with having heard of e-cigarettes.

In the multivariate model of sons' awareness, only age and Hispanic ethnicity remained statistically significant. Participants ages 14–16 were more likely to have heard of e-cigarettes (OR 2.12, 95% CI 1.06, 4.26) compared to participants ages 11–13, as were participants ages 17–19 (OR 2.61, 95% CI 1.21, 5.64). Hispanic participants were less likely to be aware of e-cigarettes (OR .44, 95% CI .21, .95).

Willingness to try e-cigarettes

A substantial minority of adolescent boys (18%) were willing to try an e-cigarette if it was offered by one of their best friends: 13% were willing to try a plain e-cigarette, and an additional 5% were willing to try flavored e-cigarettes or both kinds. The same proportion of

respondents were willing to try plain e-cigarettes or to try flavored e-cigarettes (p =.15). In bivariate analyses, adolescent males ages 17–19 were more willing to try an e-cigarette compared to their 11–13- year-old counterparts (29% vs. 11%) (Table 3). The small number of adolescent males who smoked were much more willing to try e-cigarettes (74% vs. 13%) than the remaining respondents. However, sons of parents who were current smokers were less willing compared to sons of parents who had never or rarely smoked (5% vs. 22%). Sons living in households with annual incomes of $60,000 or more were also less likely to be willing to try an e-cigarette (13% vs. 24%). Participants willing to try e-cigarettes had less negative beliefs about the typical smoker (mean negative prototype 2.65 vs. 3.35). Prior awareness of e-cigarettes was not associated with willingness to use them (p = .38).

Only sons' smoking status remained statistically significant in the multivariate model (OR 10.25, 95% CI 2.88, 36.46). However, when we excluded sons who smoked (n =19) from the model, only endorsement of negative smoker prototypes was statistically significant. That is, willingness to try e-cigarettes was associated with less negative beliefs about the typical smoker (mean negative prototype 2.83 vs. mean 3.39, OR .58, 95% CI .43, .79). When negative beliefs were dichotomized using a median split, the association held. More adolescents below or at the median of negative beliefs were willing to try an e-cigarette compared to adolescents above the median (24% vs.12%, p =.02).

Discussion

Although few adolescent males in our national sample had tried e-cigarettes, around two-thirds were aware of them. This figure is much higher than expected, given that only 32% of adults in a national sample were aware of e-cigarettes as of 2010 [5]. The high rate of awareness in our sample may reflect the increasing popularity of and media attention given to the product [5, 7, 8] or to the rise in e-cigarette promotion in the past 2 years [6, 16]. For example, e-cigarettes are advertised extensively online, and disposable e-cigarettes are now sold in many convenience stores and gas stations. Our findings may also reflect higher awareness among adolescents than adults.

Within our sample, older adolescents were more likely to be aware of e-cigarettes than younger adolescents, while Hispanic adolescents were less likely to be aware compared to their non-Hispanic counterparts. This pattern could reflect greater awareness of or exposure to all nicotine and tobacco products. Cigarette smoking rates increase with age throughout adolescence, and Hispanic young adults are less likely to smoke than white young adults [16].

Consistent with findings on adolescent males' susceptibility to regular cigarettes, nearly 1 in 5 adolescent males in our study were willing to try either a plain or flavored e-cigarette if one of their best friends offered it; willingness to try plain versus flavored varieties did not differ. This preliminary finding suggests that, at present, candy or fruit flavors do not increase the attractiveness of e-cigarettes to adolescents. However, before their ban by the FDA in 2009 [23], flavored non-electronic cigarettes were particularly popular among youth smokers compared to adult smokers, in part due to youth-targeted advertising [24]. Future marketing of flavored e-cigarettes toward young people could increase the appeal of the product relative to unflavored e-cigarettes.

Being a smoker was the strongest predictor of willingness to try an e-cigarette. Even after controlling for other statistically significant correlates, the odds of a smoker being willing to try an e-cigarette were 10 times the odds of a nonsmoker. This pattern is consistent with survey data showing that most adult e-cigarette users are or were smokers [5]. Because adolescent smokers exhibit more sensation seeking than nonsmokers [25], smokers may be

more willing to try new, potentially risky behaviors, such as e-cigarette use, than their nonsmoking counterparts. Alternatively, both smoking and nonsmoking adolescents might view e-cigarettes as similar, or even equivalent, to regular cigarettes. Thus, if they have already used one product, they are willing to try the other. Similar to adult smokers, young smokers may also be attracted to e-cigarettes because they view them as a tool to quit smoking, an option for using nicotine in places where smoking is banned, or a less unpleasant version of regular cigarettes [9, 26].

When we removed smokers from analyses, the only predictor of willingness to try an e-cigarette in multivariate analyses was smoker prototype. Specifically, having more negative beliefs about the typical smoker was associated with lower willingness. According to the prototype/willingness model, risky behavior, particularly among adolescents, is driven by a combination of reasoned cognitions and social reactions [20]. One assumption of the model is that adolescents associate risk behaviors with specific social images (also called prototypes) of a person who engages in that behavior. Comparing themselves to that social image influences their willingness and behavior. Thus, associating oneself with positive images of smokers should predict future smoking behavior, as has been found in longitudinal studies [17]. Our findings are consistent with the prototype/ willingness model. Believing that smokers were unattractive, immature, inconsiderate, or trashy was associated with reduced interest in trying e-cigarettes, possibly because respondents viewed e-cigarettes as similar–or even the same–as regular cigarettes. Thus, they were less willing to try a product that they associated with these negative prototypes. In line with the prototype/ willingness model and given that teenagers are already influenced by images of smoking in the media [27], our findings suggest that presenting negative portrayals of smokers could potentially discourage nonsmokers from trying e-cigarettes.

Although willingness to use e-cigarettes among nonsmokers was lower than among smokers, even minimal interest among this population is concerning, given that most adolescent males are nonsmokers [16]. Furthermore, nicotine dependence can start to occur within weeks of occasional tobacco use [28], so even brief experimentation with nicotinecontaining e-cigarettes could bolster adolescents' interest in using other tobacco products.

Because this study was cross-sectional, we were not able to assess whether attitudes about smokers influenced willingness to try e-cigarettes or vice versa. Moreover, we could not address whether participants' attitudes and behaviors changed over time. Another limitation is that we asked participants about their willingness to try "an e-cigarette" and "a flavored e-cigarette" without specifying that the former question referred to regular, unflavored e-cigarettes. We also did not ask e-cigarette users about the duration or frequency of their use or whether they began using e-cigarettes prior to initiating smoking regular cigarettes. However, the small number of respondents ($n = 2$) in this group and our study's cross-sectional design would prevent us from examining the "gateway" hypothesis in any case. Participants self-reported their smoking and e-cigarette use, but adolescents' self-reported use of regular cigarettes is largely consistent with the results of serum cotinine testing [29]. Although we examined predictors of self-reported intention, rather than behavior, this choice is appropriate for studying early adoption of new behaviors [30]. The study benefited from the use of a national sample, which increases our confidence that the findings may generalize to other U.S. adolescent males.

Should additional studies replicate our findings of high level of awareness and moderate willingness to try e-cigarettes among adolescent males, the FDA should evaluate devoting regulatory resources toward preventing youth from initiating use. Specifically, we believe that the FDA should consider implementing a ban on the sale of e-cigarettes to minors and

monitoring advertisements, particularly those for flavored e-cigarettes, to ensure that they do not target youth. As e-cigarette research continues, it will be important to track the number of youth who initiate e-cigarette use as a precursor to smoking.

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IMPLICATIONS AND CONTRIBUTION

Electronic cigarettes may be a "gateway" to future smoking. In this national sample, most adolescent males had heard of electronic cigarettes, and a substantial minority were willing to try them. Regulatory bodies and health professionals who work with adolescents should monitor use of this increasingly popular nicotine-delivery device.

Table 1

Demographic characteristics (n = 228)

	n (%)
Adolescent males	
Age, mean (SD)	15.1 (2.1)
Race	
White	182 (80)
Non-white	46 (20)
Ethnicity	
Hispanic/Latino	38 (17)
Non-Hispanic/Latino	190 (83)
Smoking status	
Nonsmoker	207 (91)
Smoker	21 (9)
Positive smoker prototype, mean (SD)[a]	1.7 (.8)
Negative smoker prototype, mean (SD)[b]	3.2 (1.1)
Will smoke in the next year	
No	208 (91)
Yes	20 (9)
Tried an e-cigarette	
No	226 (99)
Yes	2 (1)
Parent	
Age	
< 45 years	140 (61)
≥ 45 years	88 (39)
Gender	
Female	119 (52)
Male	109 (48)
Marital status	
Married/living with partner	181 (79)
Other	47 (21)
Education	
High school or less	100 (44)
Some college or more	128 (56)
Smoking status	
Never or rarely smoked	97 (43)
Former smoker	94 (41)
Current smoker	37 (16)
Households	
Annual income	
< $60,000	110 (48)

	n (%)
≥ $60,000	118 (52)
Urbanicity	
Rural	37 (16)
Urban	191 (84)
Region of residence	
Northeast	41 (18)
Midwest	60 (26)
South	86 (38)
West	41 (18)

[a] Mean rating of the typical smoker on these characteristics: stylish, tough, cool, and independent. Range: not at all (coded as 1) –very much (5).

[b] Mean rating of the typical smoker on these characteristics: unattractive, immature, inconsiderate, and trashy. Range: not at all (coded as 1)–very much (5).

Table 2

Correlates of awareness of e-cigarettes (n = 226)

	Number aware of e-cigarettes/total number in category (%)		Bivariate		Multivariate	
	n	(%)	OR	(95% CI)	OR	(95% CI)
Overall	152/226	(67)				
Adolescent males' characteristics						
Age						
11–13 years (Ref)	33/64	(52)	1	-	1	-
14–16 years	66/92	(72)	2.34	(1.22, 4.65) *	2.12	(1.06, 4.26) *
17–19 years	53/70	(76)	2.93	(1.41, 6.10) **	2.61	(1.21, 5.64) *
Hispanic/Latino						
No (Ref)	133/188	(71)	1	-	1	-
Yes	19/38	(50)	.41	(.20, .84) *	.44	(.21, .95) *
Race						
Non-white (Ref)	24/45	(53)	1	-	1	-
White	128/181	(71)	2.11	(1.08, 4.12) *	1.87	(.92, 3.78)
Smoking status						
Nonsmoker (Ref)	137/207	(66)	1	-		
Smoker	15/19	(79)	1.92	(.61, 5.99)		
Positive smoker prototype[a]			.78	(.55, 1.09)		
Negative smoker prototype[b]			.79	(.62, 1.02)		
Parents' characteristics						
Age						
< 45 years (Ref)	89/138	(64)	1	-		
≥45 years	63/88	(72)	1.39	(.78, 2.48)		
Gender						
Female (Ref)	78/118	(66)	1	-		
Male	74/108	(69)	1.12	(.64, 1.95)		
Marital status						
Other (Ref)	30/47	(64)	1	-		

	Number aware of e-cigarettes/total number in category (%)		Bivariate		Multivariate	
	n	(%)	OR	(95% CI)	OR	(95% CI)
Married	122/179	(68)	1.21	(.62, 2.38)		
Education						
High school or less (Ref)	75/99	(76)	1	-	1	-
Some college or more	77/127	(61)	.49	(.28, .88) *	.59	(.31, 1.10)
Smoking status						
Never or rarely smoked (Ref)	61/97	(63)	1	-		
Former smoker	63/92	(68)	1.28	(.70, 2.34)		
Current smoker	28/37	(76)	1.84	(.78, 4.32)		
Household characteristics						
Annual income						
< $60,000 (Ref)	71/109	(65)	1	-		
≥ $60,000	81/117	(69)	1.20	(.69, 2.10)		
Urbanicity						
Rural (Ref)	30/36	(83)	1	-	1	-
Urban	122/190	(64)	.36	(.14, .91) *	.54	(.20, 1.43)
Region						
Northeast (Ref)	32/41	(78)	1	-		
Midwest	41/60	(68)	.61	(.24, 1.52)		
South	55/84	(65)	.53	(.22, 1.27)		
West	24/41	(59)	.40	(.15, 1.04)		

Note. Analyses excluded two adolescents who had previously used e-cigarettes. Multivariate model contains all correlates statistically significant ($p < .05$) in bivariate models.

CI - confidence interval; OR = odds ratio; Ref = reference category.

* p < .05.

** p < .01.

[a] Mean rating of the typical smoker on these characteristics: stylish, tough, cool, and independent. Range: not at all (coded as 1) – *very much* (5).

[b] Mean rating of the typical smoker on these characteristics: unattractive, immature, inconsiderate, and trashy. Range: not at all (coded as 1) – *very much* (5).

Table 3

Correlates of willingness to try an e-cigarette (plain or flavored) (n = 226)

	Number willing to try an e-cigarette/total number in category (%)		Bivariate		Multivariate	
	n	(%)	OR	(95% CI)	OR	(95% CI)
Overall	41/226	(18)				
Adolescent males' characteristics						
Age						
11–13 years (Ref)	7/64	(11)	1	-	1	-
14–16 years	14/92	(15)	1.46	(.55, 3.85)	1.16	(.42, 3.16)
17–19 years	20/70	(29)	3.26	(1.27, 8.35) *	1.46	(.49, 4.32)
Hispanic/Latino						
No (Ref)	34/188	(18)	1	-		
Yes	7/38	(18)	1.02	(.42, 2.52)		
Race						
Non-white (Ref)	8/45	(18)	1	-		
White	33/181	(18)	1.03	(.44, 2.42)		
Smoking status						
Nonsmoker (Ref)	27/207	(13)	1	-	1	-
Smoker	14/19	(74)	18.67	(6.22, 55.98) ***	10.25	(2.88, 36.46) ***
Positive smoker prototype[a]			1.18	(.79, 1.77)		
Negative smoker prototype[b]			.58	(.43, .79) **	.74	(.52, 1.05)
Awareness of e-cigarettes						
Not aware (Ref)	11/74	(15)	1	-		
Aware	30/152	(20)	1.41	(.66, 3)		
Parents' characteristics						
Age						
< 45 years (Ref)	26/138	(19)	1	-		
≥ 45 years	15/88	(17)	.89	(.44, 1.78)		
Gender						
Female (Ref)	23/118	(19)	1	-		

	Number willing to try an e-cigarette/total number in category (%)		Bivariate		Multivariate	
	n	(%)	OR	(95% CI)	OR	(95% CI)
Male	18/108	(17)	.83	(.42, 1.63)		
Marital status						
Other (Ref)	12/47	(26)	1	-		
Married	29/179	(16)	.56	(.26, 1.21)		
Education						
High school or less (Ref)	20/99	(20)	1	-		
Some college or more	21/127	(17)	.78	(.40, 1.54)		
Smoking status						
Never or rarely smoked (Ref)	21/97	(22)	1	-	1	-
Former smoker	18/92	(20)	.88	(.43, 1.78)	.85	(.38, 1.89)
Current smoker	2/37	(5)	.21	(.05, .93)*	.28	(.06, 1.38)
Household characteristics						
Annual income						
< $60,000 (Ref)	26/109	(24)	1	-	1	-
≥ $60,000	15/117	(13)	.47	(.23, .94)*	.72	(.33, 1.60)
Urbanicity						
Rural (Ref)	6/36	(17)	1	-		
Urban	35/190	(18)	1.13	(.44, 2.92)		
Region						
Northeast (Ref)	6/41	(15)	1	-		
Midwest	12/60	(20)	1.46	(.50, 4.26)		
South	17/84	(20)	1.48	(.54, 4.09)		
West	6/41	(15)	1	(.29, 3.40)		

Note. Analyses excluded two adolescents who had previously used e-cigarettes. Multivariate model contains all correlates significant ($p < .05$) in bivariate models.

CI = confidence interval; OR = odds ratio; Ref = reference category.

* p < .05.

** p < .01.

*** p < .001.

[a] Mean rating of the typical smoker on these characteristics: stylish, tough, cool, and independent. Range: not at all (coded as 1) –very much (5).

[b] Mean rating of the typical smoker on these characteristics: unattractive, immature, inconsiderate, and trashy. Range: not at all (coded as 1) –very much (5).