

# Youth Curiosity About Cigarettes, Smokeless Tobacco, and Cigars

## Prevalence and Associations with Advertising

David B. Portnoy, PhD, MPH, Charles C. Wu, MPH, Cindy Tworek, PhD, MPH, Jiping Chen, MD, PhD, MPH, Nicolette Borek, PhD

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**Background:** Curiosity about cigarettes is a reliable predictor of susceptibility to smoking and established use among youth. Related research has been limited to cigarettes, and lacks national-level estimates. Factors associated with curiosity about tobacco products, such as advertising, have been postulated but rarely tested.

**Purpose:** To describe the prevalence of curiosity about cigarettes, smokeless tobacco, and cigars among youth and explore the association between curiosity and self-reported tobacco advertising exposure.

**Methods:** Data from the 2012 National Youth Tobacco Survey, a nationally representative survey of 24,658 students, were used. In 2013, estimates weighted to the national youth school population were calculated for curiosity about cigarettes, smokeless tobacco, and cigars among never users of any tobacco product. Associations between tobacco advertising and curiosity were explored using multivariable regressions.

**Results:** Curiosity about cigarettes (28.8%); cigars (19.5%); and smokeless tobacco (9.7%) was found, and many youth were curious about more than one product. Exposure to point-of-sale advertising (e.g., OR=1.35, 95% CI=1.19, 1.54 for cigarette curiosity); tobacco company communications (e.g., OR=1.70, 95% CI=1.38, 2.09 for cigarette curiosity); and tobacco products, as well as viewing tobacco use in TV/movies (e.g., OR=1.37, 95% CI=1.20, 1.58 for cigarette curiosity) were associated with curiosity about each examined tobacco product.

**Conclusions:** Despite decreasing use of tobacco products, youth remain curious about them. Curiosity is associated with various forms of tobacco advertising. These findings suggest the importance of measuring curiosity as an early warning signal for potential future tobacco use and evaluating continued efforts to limit exposure to tobacco marketing among youth.

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### Introduction

The most effective way to mitigate tobacco use among youth is to prevent initiation. Nearly all adult daily smokers start before age 18 years;

younger initiation is correlated with becoming an established cigarette or cigar smoker<sup>1–3</sup> and smokeless tobacco (SLT) user.<sup>1–5</sup> Past month tobacco use data show that 14% of high school students smoke cigarettes, 13% smoke cigars, and 6% use SLT.<sup>6</sup>

In addition to SES, norms, peer influence, access to tobacco, and many other factors, media and advertising play a strong role in youth initiation.<sup>1,7,8</sup> These factors may lead to tobacco initiation through increasing curiosity, leading to susceptibility, which in turn may lead to experimentation and established use.<sup>9–13</sup> Susceptibility signals likelihood of tobacco experimentation and

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From the Office of Science, Center for Tobacco Products (Portnoy, Tworek, Chen, Borek), Food and Drug Administration, Rockville; and Office of Extramural Research (Wu), NIH, Bethesda, Maryland

Address correspondence to: David B. Portnoy, PhD, MPH, Office of Science, Center for Tobacco Products, Food and Drug Administration, 9200 Corporate Blvd, CORP 300H, Rockville MD 20850. E-mail: david.portnoy@fda.hhs.gov.

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established use through developing beliefs about future smoking.<sup>11</sup> Curiosity indicates interest, even in the absence of intentions to use it. Curiosity can lead to attention to behavior-relevant stimuli, such as advertising, as well as impulsive behavior.<sup>9,14</sup> Thus, curiosity may serve as an early warning for youth who may become susceptible and later progress to experimentation and established use.

Curiosity has been associated with smoking experimentation and subsequent progression to established smoking, even after accounting for susceptibility.<sup>9</sup> In a national cohort study, adolescents who were curious about cigarettes had nearly three times the odds of increased susceptibility or smoking experimentation during 6 years of follow-up, compared to those who were not curious (J Nodora, University of California, San Diego, unpublished observations, 2014). Similarly, results from a California cohort found that youth curious about cigarettes were nearly two and a half times more likely to become established smokers as adults (D Strong, University of California, San Diego, unpublished observations, 2014).

Exposure to advertising is thought to be a key determinant of curiosity. A causal relationship exists among tobacco advertising and experimentation, uptake, and progression in young people.<sup>1,15–19</sup> Whereas pro-tobacco advertising may increase curiosity, warnings about risks and harms (a form of anti-tobacco advertising) may reduce curiosity each time the package or advertisement is viewed by communicating risks.<sup>20,21</sup>

To date, only curiosity about cigarettes has been explored, limiting understanding of curiosity about other products. In addition, whether exposure to specific forms of advertising are associated with curiosity, and whether those associations are consistent across tobacco products, has not been examined. Given that nearly one third to one half of youth report poly-tobacco use, exploring curiosity about tobacco products other than cigarettes and determining factors that are associated with curiosity are critical.<sup>1</sup> Finally, although curiosity has been examined in large cohorts, nationally representative estimates of its prevalence have not been published.

This study examines curiosity about the three most widely used tobacco products among youth, cigarettes, SLT, and cigars,<sup>22</sup> to (1) describe the prevalence of curiosity about cigarettes, SLT, and cigars among youth who reported never having used any tobacco product and (2) examine associations between exposure to tobacco advertising and curiosity about cigarettes, SLT, and cigars.

## Methods

Data were drawn from the 2012 National Youth Tobacco Survey (NYTS), which uses a stratified three-stage cluster sample design to produce cross-sectional, nationally representative estimates of U.S. middle and high school students. The sampling frame consists of middle and high schools in the 50 states and District of Columbia. Students self-administer a paper questionnaire in the classroom focused on tobacco use and key tobacco-related measures. The CDC

**Table 1.** Prevalence of curiosity about cigarettes among never tobacco users

Group	Highly curious	Moderately curious	Not curious	n
<b>OVERALL</b>	13.4 (12.6, 14.2)	15.4 (14.7, 16.2)	71.2 (70.0, 72.3)	15,461
<b>Sex</b>				
Female	14.2 (13.2, 15.3)	14.3 (13.2, 15.3)	71.5 (70.0, 73.0)	8,236
Male	12.5 (11.5, 13.6)	16.7 (15.8, 17.8)	70.8 (69.4, 72.1)	7,221
<b>Race/ethnicity</b>				
White, non-Hispanic	11.5 (10.6, 12.6)	16.3 (15.2, 17.4)	72.2 (70.6, 73.8)	7,777
Black, non-Hispanic	15.0 (13.2, 17.0)	12.0 (10.3, 13.9)	73.0 (70.2, 75.7)	1,804
Hispanic	16.4 (14.9, 18.1)	16.0 (14.3, 17.8)	67.6 (65.3, 69.8)	3,298
Other	16.3 (14.3, 18.6)	14.4 (12.6, 16.3)	69.3 (65.8, 72.6)	2,103
<b>School level</b>				
Middle school	12.5 (11.7, 13.4)	15.6 (14.5, 16.7)	71.9 (70.5, 73.3)	8,916
High school	14.4 (13.0, 15.9)	15.3 (14.2, 16.5)	70.3 (68.3, 72.2)	6,517

Note: Values are row % (95% CI). The analytic sample includes only never tobacco users.

**Table 2.** Prevalence of curiosity about cigars among never tobacco users

Group	Highly curious	Moderately curious	Not curious	n
<b>OVERALL</b>	9.6 (8.8, 10.4)	9.9 (9.2, 10.7)	80.5 (79.5, 81.5)	15,480
<b>Sex</b>				
Female	7.8 (7.0, 8.7)	8.4 (7.6, 9.3)	83.8 (82.7, 84.8)	8,249
Male	11.5 (10.4, 12.7)	11.6 (10.4, 12.8)	77.0 (75.4, 78.4)	7,227
<b>Race/ethnicity</b>				
White, non-Hispanic	7.6 (6.9, 8.4)	10.0 (9.0, 11.0)	82.4 (81.2, 83.6)	7,777
Black, non-Hispanic	14.8 (12.9, 16.8)	7.5 (6.2, 9.0)	77.7 (75.4, 79.8)	1,808
Hispanic	11.9 (10.4, 13.5)	11.0 (9.5, 12.8)	77.1 (75.1, 79.0)	3,308
Other	9.7 (8.3, 11.5)	9.9 (8.4, 11.7)	80.3 (78.2, 82.3)	2,104
<b>School level</b>				
Middle school	8.2 (7.1, 9.5)	9.1 (8.2, 10.1)	82.6 (81.5, 83.7)	8,935
High school	11.1 (10.0, 12.3)	10.8 (9.9, 11.8)	78.1 (76.4, 79.7)	6,517

Note: Values are row % (95% CI). The analytic sample includes only never tobacco users.

Human Research Protection Office approved the protocol. More information about the NYTS protocol and survey is available elsewhere.<sup>23</sup>

Of the 284 schools selected for participation, 228 (80.3%) participated in 2012, and 24,658 (91.7%) surveys were completed by students in these schools (73.6% overall response rate). Excluding students who had ever used tobacco yielded analytic samples of 15,461, 15,480, and 15,484, for cigarettes, cigars, and SLT, respectively.

## Measures

Tobacco use was measured for cigarettes, cigars, SLT or snus, pipe, roll-your-own cigarettes, bidis, kreteks, hookah, dissolvable tobacco products, electronic cigarettes, and other tobacco products using items such as *Have you ever tried (cigarette smoking/smoking cigars)...even one or two puffs?* and *Have you ever used chewing tobacco, snuff, or dip... even just a small amount?* Those that responded no to all items were classified as never users.

**Table 3.** Prevalence of curiosity about smokeless tobacco among never tobacco users

Group	Highly curious	Moderately curious	Not curious	n
<b>OVERALL</b>	4.1 (3.5, 4.8)	5.7 (5.1, 6.2)	90.3 (89.4, 91.1)	15,484
<b>Sex</b>				
Female	2.8 (2.2, 3.6)	4.3 (3.7, 5.0)	92.9 (91.9, 93.7)	8,250
Male	5.4 (4.7, 6.3)	7.1 (6.3, 8.0)	87.4 (86.3, 88.5)	7,230
<b>Race/ethnicity</b>				
White, non-Hispanic	3.8 (3.2, 4.6)	6.0 (5.3, 6.7)	90.2 (89.2, 91.1)	7,779
Black, non-Hispanic	4.7 (3.3, 6.6)	2.9 (2.0, 4.1)	92.4 (90.7, 93.8)	1,809
Hispanic	4.3 (3.5, 5.3)	6.0 (5.1, 7.0)	89.7 (88.2, 91.1)	3,310
Other	4.2 (2.9, 6.0)	6.2 (4.7, 8.1)	89.6 (87.1, 91.7)	2,103
<b>School level</b>				
Middle school	4.7 (3.8, 5.9)	6.0 (5.2, 7.0)	89.2 (87.8, 90.6)	8,933
High school	3.3 (2.7, 4.0)	5.2 (4.6, 6.0)	91.4 (90.5, 92.3)	6,523

Note: Values are row % (95% CI). The analytic sample includes only never tobacco users.

**Table 4.** Factors associated with curiosity about cigarettes among never tobacco users, OR (95% CI)

Factor	Highly curious	Moderately curious
<b>Sex</b>		
Female	1.08 (0.95, 1.23)	0.84 (0.75, 0.95)
Male	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
<b>Race/ethnicity</b>		
White, non-Hispanic	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Black, non-Hispanic	1.18 (0.95, 1.46)	0.70 (0.56, 0.88)
Hispanic	1.51 (1.30, 1.76)	1.05 (0.88, 1.25)
Others	1.41 (1.10, 1.80)	0.93 (0.76, 1.16)
<b>School type</b>		
Middle school	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High school	1.18 (1.02, 1.37)	1.00 (0.85, 1.16)
<b>Tobacco ad exposure—Internet</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	1.18 (0.96, 1.45)	1.06 (0.85, 1.32)
<b>Tobacco ad exposure—newspaper/magazine</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	1.14 (0.95, 1.37)	1.09 (0.87, 1.37)
<b>Tobacco ad exposure—point-of-sale</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	1.35 (1.19, 1.54)	1.14 (1.01, 1.29)
<b>Tobacco ad exposure—billboard</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	0.91 (0.79, 1.05)	1.03 (0.87, 1.22)
<b>Exposure to tobacco —TV/movies</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	1.37 (1.20, 1.58)	1.09 (0.95, 1.25)
<b>Exposure to tobacco company communications</b>		
Yes	1.70 (1.38, 2.09)	1.44 (1.16, 1.78)
No	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
<b>Warning label exposure—cigarette</b>		
High	1.08 (0.83, 1.41)	1.00 (0.75, 1.33)
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Did not see the product	0.61 (0.50, 0.75)	0.65 (0.54, 0.79)
<b>Warning label exposure—SLT</b>		

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Curiosity was measured with the items *Have you ever been curious about (smoking a cigarette /smoking a cigar, cigarillo, or little cigar/using chewing tobacco, snuff or dip)?* Response options were definitely yes, probably yes, probably not, and definitely not. Owing to smaller sample sizes and previous work showing few differential effects between definitely yes and probably yes, these response options were combined and are referred to as “highly curious.” Previous research has found that those responding probably not are at increased risk of smoking compared to those reporting definitely not.<sup>9,11</sup> Thus, a response of probably not still indicates some curiosity, which we refer to as “moderately curious.” Those who responded definitely not were categorized as “not curious.”

Exposure to internet, newspaper/magazine, and point-of-sale advertising was measured as follows: *When you (are using the Internet/read newspapers or magazines/go to a convenience store, supermarket, or gas station) how often do you see any ads or promotions for cigarettes or other tobacco products?* Billboard advertising was measured as follows: *During the past 30 days, how often did you see any ads or promotions for cigarettes or other tobacco products that were outdoors on a billboard or could be seen from outside a store?*

To evaluate indirect advertising, frequency of viewing tobacco use in TV or movies was measured as follows: *When you watch TV or go to the movies, how often do you see actors and actresses using cigarettes or other tobacco products?* Response options to all items were *never, rarely, sometimes, most of the time, always*, and an option to indicate that the question did not apply (e.g., does not read newspapers). For parsimony and because of a lack of variability in the responses, we classified the exposure responses as “high exposure” (*always, most of the time*) and “not high” (the remaining response options).

Additionally, a dichotomous variable, “exposure to tobacco company communication” indicated past 30-day exposure to coupons and/or other information from a tobacco company. To control for known factors related

**Table 4.** Factors associated with curiosity about cigarettes among never tobacco users, OR (95% CI) (continued)

Factor	Highly curious	Moderately curious
High	0.78 (0.52, 1.16)	0.84 (0.57, 1.23)
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Did not see the product	0.80 (0.62, 1.04)	1.06 (0.84, 1.35)
<b>Receptivity to advertising</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	1.77 (1.42, 2.22)	1.52 (1.17, 1.97)

Note: The reference group for both the “highly curious” and “moderately curious” groups is the “not curious” group. The analytic sample includes only never tobacco users. SLT, smokeless tobacco

to curiosity and advertising, receptivity to pro-tobacco advertising was measured using two validated items that assessed past year purchase or receipt of items with a tobacco brand name or logo on it, and the likelihood of ever using/wearing such an item.<sup>17</sup>

To explore whether anti-tobacco advertising might lessen curiosity, exposure to health warnings on cigarette packs and SLT containers during the past 30 days was included in the analysis coded as “high exposure” (*always, most of the time*); “not high exposure” (*never, rarely, sometimes*); and “did not see the product” (*did not see a cigarette pack/smokeless tobacco product during the past 30 days*). This coding also facilitated analysis on exposure to the products, regardless of exposure to the warnings.

## Data Analysis

As curiosity is thought to be a psychological precursor to susceptibility and product use, the analytic sample only included students who had never used any tobacco product. Analyses were conducted using SAS-callable SUDAAN, version 11 (RTI International, Research Triangle Park NC). Final weights were applied to reflect initial selection probabilities, non-response adjustment, weight trimming, and post-stratification to national student population estimates. Prevalence estimates were weighted to represent the U.S. middle and high school population.

Individual multivariable regressions were performed to examine associations with curiosity about each of the three products. All variables were entered into the model simultaneously; adjusted ORs are presented. For cigarette and cigar curiosity, generalized logit models in which “highly curious” and “moderately curious” were individually compared to the reference group “not curious” were fit.<sup>a</sup>

Thus, the analyses focused on comparing “highly curious” to “not curious” respondents, consistent with how curiosity has been analyzed in previous research.<sup>9–11</sup> Analyses comparing “moderately curious” to “not curious” respondents were then examined separately. For SLT curiosity, because of the small number of respondents reporting any level of curiosity about SLT, binary logit models

<sup>a</sup>We attempted to fit the ordinal curiosity outcome using a cumulative logit (proportional odds) model. However, the model failed the proportional odds assumption (Score test,  $p < 0.001$ ).

were fit with response levels *definitely yes, probably yes, and probably not* as “curious” and *definitely not* as “not curious.”

Cross-product curiosity was assessed using descriptive cross-tabs and percentages of responses to each level of the curiosity item about one product compared to responses on the curiosity item about another product.

## Results

Among tobacco-naïve youth, 13.4%, 9.6%, and 4.1% reported high curiosity about cigarettes (Table 1); cigars (Table 2); and SLT (Table 3), respectively, and

an additional 15.4%, 9.9%, and 5.7% reported moderate curiosity. Males were more curious about cigars and SLT, but exhibited similar levels of curiosity to females about cigarettes. Some differences by race/ethnicity were also observed.

Regression results are presented in Tables 4–6. Regression results presented below focus first on the comparison between highly curious and not curious respondents, and then on differences between this regression analysis and one comparing moderately curious to not curious.

For associations with demographic characteristics, females were significantly less likely to be curious about SLT (OR=0.49, 95% CI=0.43, 0.56) and cigars (OR=0.59, 95% CI=0.51, 0.68) than males.

Non-Hispanic blacks and Hispanics had higher odds of being highly curious about cigars than non-Hispanic whites, but non-Hispanic blacks were less likely to be curious about SLT than non-Hispanic whites (OR=0.68, 95% CI=0.53, 0.87). High school students were more likely to be curious than middle school students about cigarettes (OR=1.18, 95% CI=1.02, 1.37) and cigars (OR=1.45, 95% CI=1.20, 1.76), but significantly less likely to be curious about SLT (OR=0.78, 95% CI=0.63, 0.96).

There were significant positive associations between high curiosity (using not curious as the reference group) for all three products and exposure to point-of-sale tobacco advertising (OR<sub>cigarettes</sub>=1.35, OR<sub>cigars</sub>=1.54, OR<sub>SLT</sub>=1.33); viewing tobacco use in TV/movies (OR<sub>cigarettes</sub>=1.37, OR<sub>cigars</sub>=1.31, OR<sub>SLT</sub>=1.20); exposure to tobacco company communications (OR<sub>cigarettes</sub>=1.70, OR<sub>cigars</sub>=1.50, OR<sub>SLT</sub>=1.38); and receptivity to advertising (OR<sub>cigarettes</sub>=1.77, OR<sub>cigars</sub>=2.82, OR<sub>SLT</sub>=1.97). For exposure to advertising in newspapers/magazines, the only significant association with curiosity was for

**Table 5.** Factors associated with curiosity about cigars among never tobacco users, OR (95% CI)

Factor	Highly curious	Moderately curious
<b>Sex</b>		
Female	0.59 (0.51, 0.68)	0.65 (0.55, 0.77)
Male	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
<b>Race/ethnicity</b>		
White, non-Hispanic	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Black, non-Hispanic	2.04 (1.66, 2.50)	0.79 (0.60, 1.04)
Hispanic	1.73 (1.44, 2.08)	1.20 (0.98, 1.48)
Others	1.32 (1.09, 1.61)	1.04 (0.85, 1.26)
<b>School type</b>		
Middle school	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High school	1.45 (1.20, 1.76)	1.27 (1.07, 1.50)
<b>Tobacco ad exposure—Internet</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	0.98 (0.77, 1.26)	1.33 (1.01, 1.75)
<b>Tobacco ad exposure—newspapers/magazine</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	1.27 (0.99, 1.63)	0.99 (0.75, 1.30)
<b>Tobacco ad exposure—point-of-sale</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	1.54 (1.31, 1.80)	1.17 (0.97, 1.40)
<b>Tobacco ad exposure—billboard</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	1.02 (0.85, 1.21)	1.05 (0.83, 1.31)
<b>Exposure to tobacco—TV/movies</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	1.31 (1.11, 1.54)	1.01 (0.83, 1.23)
<b>Exposure to tobacco company communications</b>		
Yes	1.50 (1.12, 2.01)	1.26 (0.96, 1.65)
No	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
<b>Warning label exposure—cigarette</b>		
High	1.25 (0.99, 1.58)	0.98 (0.71, 1.35)
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Did not see the product	0.72 (0.61, 0.85)	0.72 (0.55, 0.95)
<b>Warning label exposure—SLT</b>		

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SLT ( $OR_{SLT}=1.33$ ). Exposure to advertising on billboards was not associated with curiosity about any of the three products.

There were significant positive associations between high curiosity for all three products and exposure to cigarette packs in the past 30 days. Those that reported not seeing a pack in the past 30 days had lower odds of being curious than those that reported seeing a pack. Exposure to SLT containers was associated with being curious about SLT, but not cigarettes or cigars. Exposure to cigarette or SLT warning labels was not significantly associated with the odds of being curious about any of the three products.

Comparison of moderately curious and not curious respondents for curiosity about all three products generally revealed similar associations to the analyses presented above for highly curious versus not curious; however, there were a few differences. For cigarette curiosity, female respondents were significantly less likely than male respondents to be moderately curious about cigarettes. There were no associations with school type or viewing tobacco use in TV/movies. All other associations were similar to the comparison between highly curious and not curious groups.

Comparison of moderately curious and not curious respondents for curiosity about cigars found that associations with race/ethnicity were not significant and only exposure to Internet advertising and receptivity to advertising were significant. Significant associations with exposure to cigarettes and receptivity

**Table 5.** Factors associated with curiosity about cigars among never tobacco users, OR (95% CI) (continued)

Factor	Highly curious	Moderately curious
High	1.10 (0.74, 1.63)	1.04 (0.64, 1.69)
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Did not see the product	0.80 (0.60, 1.06)	0.86 (0.62, 1.20)
<b>Receptivity to advertising</b>		
Not high	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
High	2.82 (1.98, 4.00)	1.93 (1.40, 2.65)

Note: The reference group for both the “highly curious” and “moderately curious” groups is the “not curious” group. The analytic sample includes only never tobacco users.

to advertising remained in the comparison between highly curious and not curious groups.

We identified a strong association between curiosity about one product and curiosity about other products. For example, among youth who reported being highly curious about cigarettes, 59% also reported being either highly or moderately curious about cigars (Figure 1A). Among youth who reported being highly curious about SLT, 69% also reported curiosity about cigars (Figure 1C); however, the overlap in curiosity between SLT and cigarettes was fairly low (Figure 1B).

## Discussion

In this analysis, the prevalence of curiosity about cigarettes, cigars, and SLT among a nationally representative sample of middle and high school students is described. Weighting these findings to the national level, millions of youth who had never used any tobacco product were curious about them. The finding that 30% of youth were curious about cigarettes represents a significant public health concern, as cigarettes are the most widely used tobacco product among youth.

Curiosity about cigars was almost one and a half times the reported estimates of cigar use by youth, perhaps indicating a future increase in prevalence, as those who are curious may eventually become established users. Differences in curiosity by sex and race/ethnicity as well as the general upward trend in curiosity among older students are consistent with previously published research on tobacco initiation.

This study is the first to examine cross-product curiosity, which was substantial, and suggests that youth may be curious about tobacco products in general, although overlap of curiosity between SLT and cigarettes was fairly low. Experimentation with a specific product

may be determined by other factors, such as availability and immediate peer group influences. Understanding how curiosity about one product extends to other products, what predicts curiosity about multiple products, and how curiosity about multiple products is associated with future experimentation and established use will help shape future surveillance efforts, youth education campaigns, interventions, and policies aimed at preventing initiation.

The consistent association between exposure to advertising and curiosity about these three products supports the hypothesis in the literature that exposure to advertising is associated with curiosity. Exposure to point-of-sale advertising was associated with increased curiosity, which corroborates previous research showing that such exposure is associated with youth beliefs, susceptibility, and tobacco product use.<sup>24</sup> Similarly, exposure to tobacco company communications was associated with increased curiosity about all three products. Finally, exposure to tobacco use in TV or movies, a less direct form of advertising that reflects social norms about tobacco use, was also associated with being curious.<sup>1,19</sup>

From a public health perspective, these findings are concerning because of the causal relationship between advertising and experimentation, uptake, and progression in young people, as well as previous findings of the association between curiosity and future experimentation and use.<sup>1,8,9,16,18,19</sup> This evidence supports the assertion that curiosity plays an important role in the trajectory from advertising exposure to tobacco use behavior.

Greater exposure to warning labels was not associated with the odds of being curious, which may reflect that current warnings are not attended to or are not effective at reducing curiosity.<sup>25</sup> However, exposure to cigarette packs in the past 30 days was associated with curiosity about cigarettes, cigars, and SLT, and exposure to SLT in the past 30 days was associated with increased curiosity about SLT. Youth who report curiosity may already be around peers or family members who use tobacco products.

Reducing exposure to tobacco products while also strengthening warnings on them could serve to reduce curiosity for youth and keep those who are not curious from becoming so. In addition to warnings appearing on tobacco products, warnings also appear on advertisements. Therefore, strengthened warnings may reduce

**Table 6.** Factors associated with curiosity about smokeless tobacco among never tobacco users, OR (95% CI)

	SLT curiosity
<b>Sex</b>	
Female	0.49 (0.43, 0.56)
Male	1.00 (1.00, 1.00)
<b>Race/ethnicity</b>	
White, non-Hispanic	1.00 (1.00, 1.00)
Black, non-Hispanic	0.68 (0.53, 0.87)
Hispanic	1.01 (0.84, 1.22)
Others	1.05 (0.82, 1.35)
<b>School type</b>	
Middle school	1.00 (1.00, 1.00)
High school	0.78 (0.63, 0.96)
<b>Tobacco ad exposure—Internet</b>	
Not high	1.00 (1.00, 1.00)
High	1.23 (0.96, 1.58)
<b>Tobacco ad exposure—newspaper/magazine</b>	
Not high	1.00 (1.00, 1.00)
High	1.33 (1.04, 1.69)
<b>Tobacco ad exposure—point-of-sale</b>	
Not high	1.00 (1.00, 1.00)
High	1.33 (1.13, 1.58)
<b>Tobacco ad exposure—billboard</b>	
Not high	1.00 (1.00, 1.00)
High	1.00 (0.83, 1.21)
<b>Exposure to tobacco—TV/movies</b>	
Not high	1.00 (1.00, 1.00)
High	1.20 (1.03, 1.41)
<b>Exposure to tobacco company communications</b>	
Yes	1.38 (1.12, 1.71)
No	1.00 (1.00, 1.00)
<b>Warning label exposure—cigarette</b>	
High	0.82 (0.59, 1.13)
Not high	1.00 (1.00, 1.00)
Did not see the product	0.62 (0.50, 0.76)
<b>Warning label exposure—SLT</b>	
High	0.80 (0.55, 1.18)

(continued)

**Table 6.** (continued)

	SLT curiosity
Not high	1.00 (1.00, 1.00)
Did not see the product	0.54 (0.42, 0.69)
<b>Receptivity to advertising</b>	
Not high	1.00 (1.00, 1.00)
High	1.97 (1.52, 2.56)

Note: The reference group is the not curious group. The analytic sample includes only never tobacco users.  
SLT, smokeless tobacco

curiosity through countering effects of advertising on curiosity.

This study also confirms the association between curiosity and variables previously found to be important predictors of tobacco initiation, such as exposure to tobacco products in movies, point-of-sale advertising, and receptivity to advertising.<sup>8,11,17</sup> These findings have implications for emerging products, especially those with strong advertising campaigns. For example, the use of cigars is increasing among youth and associations between cigar curiosity and various exposures to advertising were found in this analysis. This supports previous findings on the association between the number of cigar-focused newspaper and magazine articles and cigar use.<sup>26</sup>

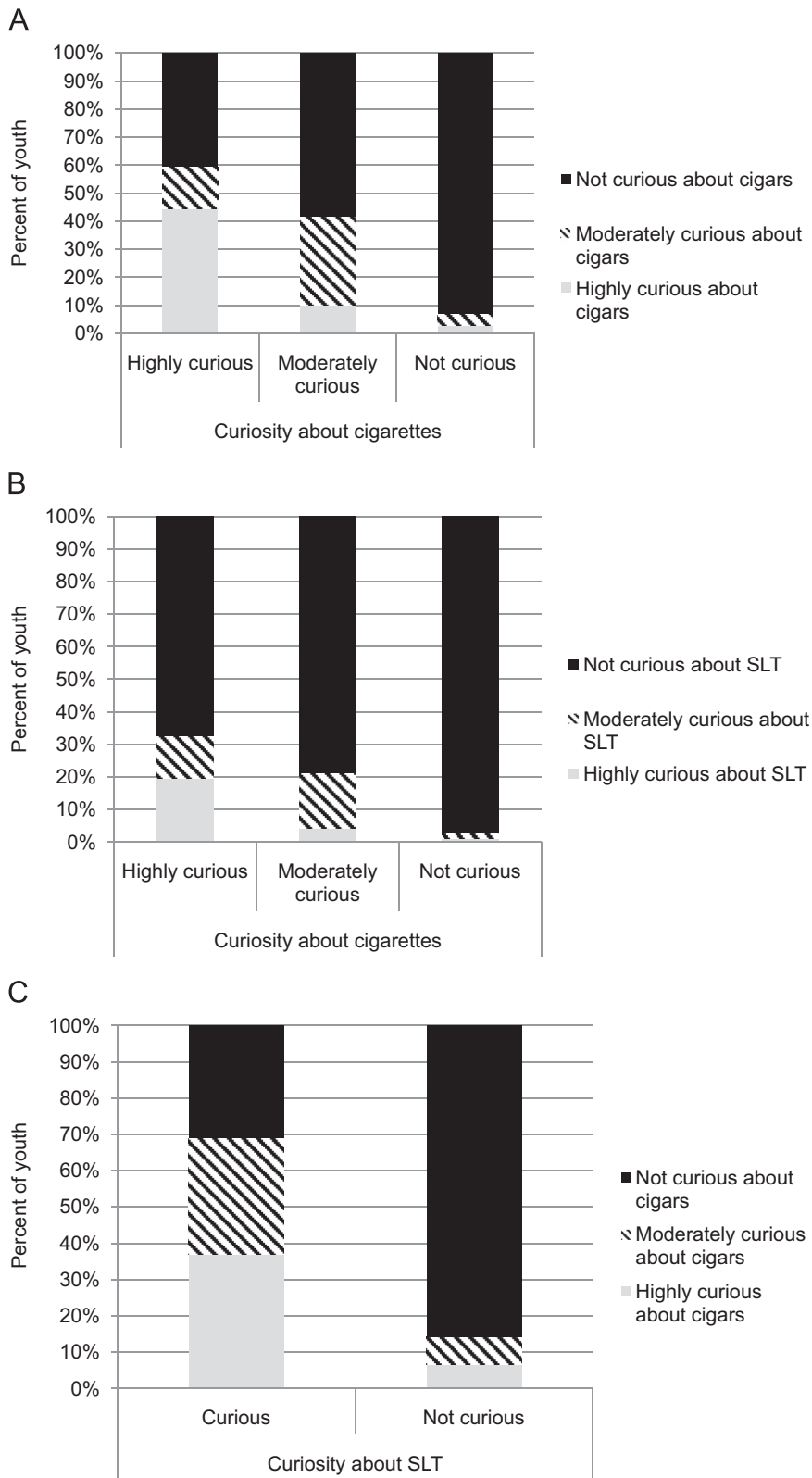
Future research is needed to study the implications of marketing and advertising exposure on cigar initiation and progression to established use, and specifically how advertising for different types of cigar products (e.g., cigarillos and little cigars) is associated with curiosity, experimentation, and future product use, along with additional research on curiosity about cigarettes and other products.

## Limitations

Although the data are nationally representative, they are cross-sectional, limiting causal inference and the ability to fully explore the association between exposure to advertising, increased curiosity, and tobacco use. This important work could be explored in the ongoing Population Assessment of Tobacco and Health (PATH) study, which measures, among other important variables, reported exposure to advertising, curiosity, and tobacco use among a large cohort of youth, young adults, and adults.

Additionally, exposure to products other than cigarettes and SLT and peer use of these and other tobacco products, which could serve to increase curiosity, were





**Figure 1.** (A) Cross-product curiosity about cigarettes and cigars. (B) Cross-product curiosity about cigarettes and SLT. (C) Cross-product curiosity about cigars and SLT.

Note: The analytic sample includes only never tobacco users. SLT, smokeless tobacco.

not assessed. There may be other important factors associated with curiosity unaccounted for in this analysis, which focused on the association between advertising and curiosity.

Potential limitations in recall of advertising were addressed by dichotomizing measures of exposure to focus on the differences between high versus limited exposure, and less so on subtle differences among varying amounts of exposure. Youth are able to name specific tobacco messages or advertisements, suggesting that recall of exposure to advertisements may not be a major concern.<sup>17</sup> Copious research also suggests that people selectively attend to information that is consistent with their current beliefs and behavior.<sup>14,27–29</sup> Thus, those who were curious may have been more attentive to advertising for these products.

Finally, this analysis did not include susceptibility, which has been established as a strong and reliable predictor of experimentation and future established use, as well as other factors that might be associated with curiosity. Efforts are underway to attempt to better integrate curiosity and susceptibility; however, the purpose of this study was to examine associations between advertising and curiosity, independent of susceptibility.

## Conclusions

This paper provides the first prevalence estimates of curiosity about cigarettes, cigars, and SLT among tobacco-naïve youth. Exposure to various forms of advertising and tobacco product use in the media was associated with being curious about these products. These findings suggest areas for policy intervention, such as restricting tobacco product advertising, as well as the importance of measuring curiosity as an early warning signal for potential susceptibility to future tobacco use.

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