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Direct-to-Consumer Tobacco Marketing and Its Association with Tobacco Use Among Adolescents and Young Adults

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Abstract

Objective—We assess exposure to direct-to-consumer tobacco marketing and its association with ever having tried smoking, smoking within past 30 days ('current'), and smoking 100 cigarettes in lifetime ('established') among adolescents and young adults.

Methods—We surveyed a U.S. telephone sample of 3,342 15–23 year olds and 2,541 respondents subsequently completed a web-based survey. Among respondents completing both the telephone and web-based surveys (N=2,541 [75%]), we assessed their exposure to direct-to-consumer tobacco marketing (receiving direct mail from tobacco companies and seeing tobacco company websites) and their associations with ever having tried smoking, current smoking, and established smoking.

Results—Overall, 12% of 15–17 year olds and 26% of 18–23 year olds were exposed to direct-to-consumer tobacco marketing. Racial/ethnic minority non-smoking respondents were more likely to see tobacco websites than non-smoking Whites. Respondents exposed to either form of direct-to-consumer tobacco marketing were more likely to currently smoke (adjusted odds ratio[AOR]: 2.2; 95% CI 1.3–3.8), while those exposed to both forms of marketing experienced even higher odds of currently smoking (AOR: 2.7; 95% CI 1.1–6.6). We observed similar relationships for ever having tried smoking and established smoking.

Conclusions—Direct-to-consumer tobacco marketing reaches adolescent and young adult non-smokers and is associated with smoking behavior.

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1. INTRODUCTION

Conclusive evidence spanning decades shows that advertising and promotion activities funded by the tobacco industry cause the onset and continuation of smoking among adolescents and young adults [1]. The 1998 Master Settlement Agreement (MSA) between 46 states and the largest tobacco manufacturers established restrictions on tobacco company marketing and advertising that would be seen by youth (e.g., billboards, transit ads, cartoon characters, major sport events) and prohibited the distribution of tobacco brand merchandise. As MSA restrictions did not encompass price discounting at the point-of-sale or direct-to-consumer marketing practices, tobacco industry marketing efforts have shifted focus to these areas [2]. In 2010, for example, the tobacco industry spent \$236 million in cigarette coupons (regularly distributed via postal mail and email), \$35 million in smokeless tobacco coupons, and \$22 million in internet marketing [3,4]. Internet marketing may be more cost-effective to the tobacco industry than traditional advertising and provides greater reach to young smokers via social media. Passage of the Family Smoking Prevention and Tobacco Control Act granted the FDA authority to regulate marketing of tobacco products, including via the mail and internet [5] – marketing modalities to which adolescents and young adults may be especially vulnerable [6,7].

Compared to established adult smokers, adolescents and young adults may be particularly sensitive to price discounting for tobacco products [8–10] and, therefore, more receptive to the direct-to-consumer marketing that offers these discounts. In addition to price discounting, some adolescents may also actively seek direct-to-consumer marketing because of their strong need for novel experiences and risky behaviors. Of course, direct-to-consumer tobacco marketing may not be originally intended for adolescent and young adults. Nonetheless, these vulnerable populations may be exposed to such marketing because their parents, older siblings, and older friends that smoke. We do not know the extent to which adolescents and young adults, especially non-users of tobacco, are exposed to direct-to-consumer tobacco marketing. We also do not know whether exposure to direct-to-consumer marketing is associated with tobacco use over and above well-established correlates of smoking including sensation seeking, friends smoking, and parental smoking.

In this paper, we seek to fill important evidence gaps in our knowledge of adolescent and young adult exposure to direct-to-consumer tobacco marketing by addressing the following three research objectives. First, we assess the level of exposure to direct-to-consumer tobacco marketing via the mail and the internet among adolescents and young adults. Second, we determine the characteristics of non-smoking adolescents and young adults associated with increased exposure to direct-to-consumer tobacco marketing. Finally, we assess whether the level of exposure to direct-to-consumer tobacco marketing is associated with smoking behavior among adolescents and young adults.

2. METHODS

Recruitment

We recruited participants through a three-stage sample selection process. In stage 1, we identified a list-assisted sample of 578,542 landline phone numbers and 145,260 cell phone

numbers from all states in the US. In Stage 2, interviewers called each number and successfully completed screener interviews with 60,189 households and identified the 6,466 households with age-eligible adolescents and young adults. In Stage 3, interviewers obtained permission and consent from participants 18 years and older and parental permission and adolescent assent from participants under age 18. In total, we recruited 3,342 15–23 year olds between Fall 2010 and Spring 2011. Finally, 2,541 of the 3,342 participants that completed the phone-based survey subsequently completed the web-based survey. Participants received \$10 for completion of the telephone survey and an additional \$10 or \$25 for completion of the web-based survey, depending on how quickly they completed it. The weighted screener response rate using the American Association for Public Opinion Research response rate 3 equaled 20% for the cell phone sample and 37% for the landline sample [11]. The weighted completion rate for the web-based survey equaled 75%. Compared to the 801 respondents only completing the phone-based survey, the 2,541 respondents completing both the phone- and web-based surveys were more likely to be adolescents, female, non-Hispanic White, and a current cigarette smoker (Supplementary Table 1). The Dartmouth Committee for the Protection of Human Subjects approved the study.

Compared to the 2011 US Current Population Survey (CPS), the unweighted survey sample was broadly similar with respect to gender, region of the country, and household income, but had fewer young adults and fewer minorities, especially non-Hispanic Blacks and Hispanics (8% and 12% of the survey compared with 14% and 20% in the CPS, respectively). To improve generalizability, data were weighted to compensate for survey undercoverage based on the CPS for the U.S. population within the 15–23 year old age range. Specifically, we weighted the survey data according to respondents' region, race/ethnicity, age group (0–17 years old and 18–24 years old), parental education, household income, and whether respondents' parents owned or rented their home.

Outcomes

Our assessment of smoking was based on respondents' self-report of the recency and intensity of their smoking behavior. First, we assessed whether respondents had ever tried smoking ("Have you ever tried smoking a cigarette, even just a puff?"). Second, we considered a respondent to be a current smoker if he or she smoked cigarettes 1 day in past 30 days ("During the past 30 days, on how many days did you smoke cigarettes?"). Third, we considered a respondent to be an established smoker if he or she smoked 100 cigarettes in their lifetime ("How many cigarettes have you smoked in your life?") without respect to their current smoking status.

Marketing Exposures

We assessed two modes of exposure to direct-to-consumer tobacco marketing. First, in the telephone portion of the survey, we ascertained if respondents had ever been exposed to direct mail from tobacco companies or tobacco retailers ("Have you ever received anything in the mail for tobacco products? For example, discounts on snus or cigarettes, coupons for free packs, or other tobacco-related merchandise?"). Direct tobacco mail may have been sent to the respondent directly or to the respondents' parents, older siblings, or older friends. Our

survey measure on exposure to direct tobacco mail did not determine the recipient listed on the mail.

Second, in the internet portion of the survey, respondents were asked image-based cued-recall questions that showed the current homepage for American Spirit, Camel, Kool, Marlboro, and Newport websites after their respective age-verification pages (e.g., “This is the website for Marlboro. Have you ever seen it?”). We focused on these five brands because Marlboro, Newport, Camel, and Kool represent nearly 90% of the brands usually smoked among current adolescent smokers and 60% among current adult smokers [12,13]. Additionally, American Spirit is among the fastest growing brands in the US [14]. The homepage of each tobacco company was the first page shown on their website *after* the age-verification process was completed. This cued-response approach to ascertaining advertising exposure has been successful in prior studies of alcohol marketing [15–17].

Covariates

We also collected demographic characteristics of respondents including their age, sex, race and ethnicity (non-Hispanic White [henceforth referred to as ‘Whites’], non-Hispanic Black [henceforth referred to as ‘Blacks’], Hispanic, and other). We categorized respondents’ age into two groups: 15–17 years old (‘adolescents’) and 18–23 years old (‘young adults’). We also categorized respondents’ geographic location by region of the country (Midwest, Northeast, South, and West) and urbanicity (urban core, sub-urban, large rural town, and small town/isolated rural) [18]. We assessed the socioeconomic status of adolescent respondents through two measures: annual household income (<\$50,000, \$50,000–\$100,000, and >\$100,000) and parental education (high school graduate or less, some college, and college graduate).

We created a composite measure of sensation seeking based on respondents’ answers to 6 personal behavior topics (e.g., “I like to do dangerous things” and “I like new and exciting experiences, even if I have to break the rules”, Cronbach’s $\alpha=0.72$) [19]. For ease of interpretation, we categorized the sensation seeking score into quartiles. Additionally, we assessed whether any of the respondents’ friends smoked and the smoking status of their parents (never, former, or current smoker). We categorized parental smoking status to be the more recent of the two parents’ smoking status (e.g., parental smoking status was ‘current’ if the respondent’s mother never smoked and respondent’s father currently smokes).

Statistical Analyses

First, we modeled the likelihood of exposure to direct tobacco mail among never smokers as a function of age, sex, race/ethnicity, region, urbanicity, sensation seeking, friends smoking, parental smoking, and whether the respondent had previously seen tobacco websites. We also modeled the likelihood of having seen tobacco websites as a function of the same covariates and whether the respondent was exposed to direct tobacco mail. Second, we modeled the likelihood of having ever tried smoking as a function of age, sex, race/ethnicity, region, urbanicity, sensation seeking, friends smoking, parental smoking, and the level of exposure to direct-to-consumer tobacco marketing (no exposure, either direct mail or tobacco websites, and both direct mail and tobacco websites). We conducted the same

analysis for the two other smoking outcomes of interest: smoking in the past 30 days and established smoking among ever smokers. For all multivariate analyses, we incorporated the survey weights. We also considered two-way interactions between [1] age group and the level of exposure to direct-to-consumer tobacco marketing and [2] sensation seeking and the level of exposure. The main effects model for having ever tried smoking yielded a better model fit assessed by a lower Akaike information criteria (AIC) value (AIC = 545), compared to the two-way interaction model (AIC = 555). Similarly, the main effects models for smoking in the past 30 days and established smoking among ever smokers (AIC = 316 and 284, respectively) yielded the same or better model fits, compared to the two-way interaction models (AIC = 323 and 284, respectively). Stata version 12.0 and R (R Project for Statistical Computing) version 2.9.2 were used for all statistical analyses.

3. RESULTS

Our study identified stratified associations between direct-to-consumer tobacco marketing and youth smoking behavior. Overall, 12% of 15–17 year olds and 26% of 18–23 year olds were exposed to either form of direct-to-consumer tobacco marketing (Table 1). Specifically, 6% of 15–17 year olds and 17% of 18–23 year olds were exposed to direct tobacco mail; the prevalence of online exposure to tobacco marketing was similar with 6% of 15–17 year olds and 15% of 18–23 year olds having seen at least one tobacco website (Table 2).

Among adolescents, 10% of Blacks and 15% of Hispanics saw tobacco company websites compared to 4% of Whites. We observed the same differences by race/ethnicity among young adults: 24% of Blacks and 16% of Hispanics saw tobacco company websites compared to 13% of Whites (Table 2). Given the racial/ethnic differences in exposure to tobacco websites, we next assessed patterns by specific tobacco brands (Figure 1). Newport was the most commonly seen tobacco website for Blacks: 9% of adolescents and 20% of young adults. Marlboro was the most commonly seen tobacco website for Hispanics: 9% of adolescents and 12% of young adults. Marlboro was also the most commonly seen tobacco website for Whites, although the level was lower than for Hispanics.

Exposure to direct-to-consumer tobacco marketing was associated with a number of factors among non-smoking adolescents and young adults (Table 3). Non-smoking young adults were more likely to be exposed to direct tobacco mail compared to non-smoking adolescents (adjusted odds ratio [AOR]=2.2, 95% CI 1.2–4.1). Non-smoking respondents in the 4th and highest sensation seeking quartile were also more likely to be exposed to direct tobacco mail, compared with the lowest sensation seeking quartile (AOR=2.7, 95% CI 1.1–6.2, respectively). Finally, non-smoking Blacks and Hispanics were more likely to see tobacco company websites, compared with Non-smoking Whites (AOR=8.7, 95% CI 3.4–22.0 and AOR=10.7, 95% CI 4.1–27.9, respectively).

As a subset analysis, we separately considered only adolescents and included as covariates household income and parental education as measures of socioeconomic status (Supplemental Table 2). Non-smoking Hispanic adolescents were more likely to see tobacco company websites than non-smoking White adolescents (AOR=9.3, 95% CI 2.6–32.8),

although non-smoking Black adolescents were not more likely (AOR=3.6, 95% CI 0.6–22.9).

We also observed associations between smoking behavior and exposure to direct-to-consumer tobacco marketing that persisted after accounting for key socio-demographic, behavioral, and peer and parental smoking characteristics (Table 4). Respondents exposed to either form of direct-to-consumer tobacco marketing were more likely to have ever tried smoking (AOR=1.5, 95% CI 1–2.3), smoked in the past 30 days (AOR=2.2, 95% CI 1.3–3.8), and have smoked 100 cigarettes in their lifetime (AOR=2.2, 95% CI 1.3–3.8), compared to those not exposed to either marketing medium. The associations increased for respondents exposed to both mediums. Respondents exposed to both forms of marketing were even more likely to have tried smoking (AOR=5.4, 95% CI 1.7–17.9), smoked in the past 30 days (AOR=2.7, 95% CI 1.1–6.6), and smoked 100 cigarettes in their lifetime (AOR=8.2, 95% CI 4–16.9). There were no statistically significant two-way interactions between the level of exposure to direct-to-consumer tobacco marketing and the demographic, peer and parental smoking covariates.

4. DISCUSSION

Our study provides some of the first evidence to suggest that that direct-to-consumer tobacco marketing reaches adolescents and young adult non-smokers. We found that 12% of all adolescents and 15% of non-smoking young adults were either exposed to direct tobacco mail or saw tobacco company websites. Non-smoking adolescents whose parents smoked were more likely to be exposed to direct tobacco mail and non-smoking racial and ethnic minorities were more likely than non-smoking Whites to have seen tobacco company websites. Finally, greater exposure to direct-to-consumer tobacco marketing was associated with higher odds of ever having tried smoking, smoking within the past 30 days, and established smoking.

The MSA placed marketing restrictions on the tobacco industry (e.g., restrictions on sponsorship of sports and cultural events, free samples and promotional giveaways, and advertising on television and radio). Tobacco companies have responded by focusing advertising and promotional funding on price discounting at the point of sale and through direct-to-consumer marketing [20,21]. These marketing efforts serve to offset price increases through coupons and other promotions and promote brand loyalty [22]. Importantly, these discounts and promotions may be more salient to adolescent and young adult smokers, who are vulnerable to tobacco marketing and even more price-sensitive than adult smokers [1,23,24].

Direct-to-consumer tobacco marketing may also affect vulnerable non-users of tobacco. Behaviorally, we found that the never-smoking respondents with higher sensation-seeking scores were also more likely to be exposed to direct-to-consumer tobacco marketing. High sensation seeking adolescents may actively seek tobacco marketing because they exhibit a strong need for novel experiences and engage in risky behavior. The proportion of non-smoking adolescents in our sample that reported they had misrepresented their age to get into a website increased from 24% for adolescents in the lowest sensation seeking quartile to

50% for adolescents in the highest quartile. Regardless of the original recipient of the marketing, high sensation seeking adolescents and young adults may also be especially vulnerable to exposure to tobacco marketing. The marketing serves a stimulus with high arousal potential that appeals to high sensation seekers [14].

Exposure to tobacco websites may occur through different pathways than exposure to direct tobacco mail. Racial and ethnic minorities may be more likely to see tobacco websites because their overall daily computer use time is higher (notably video websites such as YouTube), experience higher exposure to social cues for tobacco use, and often live in communities with higher densities of tobacco retail outlets [25–28]. Young adults, especially those at least 21 years old, may be more likely to be exposed to direct tobacco mail than adolescents because of their greater frequency visiting bars. Young adults may sign up directly on tobacco mailing lists at bars or their addresses may be added to tobacco mailing lists when they have their driver's licenses swiped.

Even direct-mail tobacco marketing originally meant for adults may ultimately affect children living in the household. In a 2004 study of New Jersey adults, smokers who reported quitting during the previous 12 months were over twice as likely to receive direct mail than never or former smokers [22]. The study concluded that by removing their names from tobacco mailing lists, smokers who intend to quit could eliminate a trigger to smoke that occurs within the home. Our results raise a related issue; children of parents who smoke are more likely to be exposed to direct-mail marketing materials than children living in non-smoking households. Smokers who remove their names from industry mailing lists may reduce their children's exposure to tobacco marketing and, thereby, may reduce the likelihood their children begin smoking.

Our study has some potential limitations, which may affect its internal and external validity. First, we rely on self-reported exposure to direct-to-consumer marketing and smoking behavior, both of which may be subject to recall bias. Moreover, we assess exposure to tobacco websites through a web-based survey with visual cues and screenshots of the tobacco websites. In contrast, we assess exposure to direct tobacco mail through a phone-based survey without specific examples. Thus, we may conservatively estimate exposure to direct-to-consumer tobacco marketing if respondents were less likely to recall receiving direct tobacco mail. We may also conservatively estimate exposure to direct-to-consumer tobacco marketing among young adults if older respondents failed to recall exposure that occurred years ago during their adolescence. We do not assess when the exposure occurred and, therefore, cannot speculate if recent exposure is associated with recent smoking, even on a cross-sectional basis. We also do not determine how often respondents revisited tobacco websites, their level of engagement and participation, and the reasons for these visits, which could include peer pressure, curiosity, or interest in marketing promotions and coupons. Second, although the survey question asked the respondent whether he or she had “ever received anything in the mail for tobacco products”, we do not know if the direct-mail tobacco marketing was originally sent to a parent or other adult in the respondent's household or to the respondent directly. Third, we do not know how adolescent respondents bypassed the age verification used by tobacco companies to see tobacco homepages, which required the social security number or driver license number of a legally aged adult.

Adolescents may have used the login information of their parents, older siblings, or older friends; they may also have created fake identities to bypass age verification [29]. Finally, the estimation of survey weights may introduce measurement uncertainty; we conducted all multivariate analyses without survey weights and reached identical substantive conclusions.

Direct-to-consumer tobacco marketing and smoking behavior may reciprocally affect each other. Exposure to tobacco marketing could enhance an adolescent or young adult's curiosity about tobacco and prompt tobacco use. Tobacco use could then motivate adolescents and young adults to explore tobacco websites and obtain more information about a product, which could further enhance their expectations about it. A similar reciprocal process has been observed between alcohol marketing and drinking among adolescents [30]. Our cross-sectional data suggests both processes occur, although we cannot distinguish their relative importance.

The website images queried in this study could not have been seen without passing the age verification procedure (set at 21 years of age by the tobacco companies we studied). We found 6% of 15–18 year olds and 12% of 19–20 year olds had seen at least 1 tobacco website, despite being younger than the minimum age set by the tobacco industry. We are not able to ascertain how these respondents gained access to the tobacco websites. Respondents could have seen the website alongside an adult user. More motivated respondents may have registered under the name of an adult family member or surreptitiously gained access through an existing user name. Future studies could assess adolescents' attempts to visit tobacco websites as a potential determinant of subsequent smoking behavior.

Future studies could also monitor changes in exposure to direct-to-consumer tobacco marketing in adolescents and non-tobacco users over time. Additionally, more research is needed to examine why minority youth are disproportionally exposed to new tobacco marketing modalities, whether this trend continues to occur over time, and what particular marketing efforts to target minority youth may be employed.

In conclusion, tobacco companies have shifted their marketing strategies away from traditional advertising in the media to methods of price discounting, including the dissemination of coupons and other brand promotions through direct-to-consumer marketing efforts. There has been little evidence to indicate the extent to which adolescents and young adults are exposed to such marketing, especially non-smokers. Our study shows direct-to-consumer tobacco marketing reaches adolescents and nonsmoking young adults and that exposure to direct tobacco mail and tobacco websites is associated with ever smoking, recent smoking, and established smoking. Our results also indicate Black and Hispanic non-smoking adolescents and young adults may be disproportionately exposed to direct marketing from the tobacco industry. Enhanced oversight may be required to keep pace with ever-evolving tobacco marketing and limit its untoward effects on youth.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Exposure to Tobacco Websites by Race/Ethnicity and Age Group

Table 1
Demographic, Behavioral, and Tobacco Exposure Characteristics (%) of Respondents, By Age Group

Category	Value	15–17 Years Old				18–23 Years Old			
		N	Pt Est	95% CI	N	Pt Est	95% CI	N	Pt Est
Gender	Female	636	49	(45, 53)	673	49	(45, 53)		
	Male	623	51	(47, 55)	604	51	(47, 55)		
Race/Ethnicity	White	890	60	(56, 64)	883	57	(53, 61)		
	Black	75	13	(9, 17)	118	15	(12, 18)		
	Hispanic	152	18	(15, 21)	150	19	(16, 23)		
	Other	142	9	(7, 11)	126	8	(6, 10)		
Region	Midwest	319	20	(17, 22)	342	23	(20, 26)		
	Northeast	236	17	(14, 19)	247	17	(15, 20)		
	South	407	38	(34, 42)	401	37	(33, 41)		
	West	297	25	(22, 29)	287	23	(20, 27)		
Urban-Rural	Large Rural Town	134	12	(8, 15)	138	11	(9, 14)		
	Small Town/Isolated Rural	150	11	(9, 13)	154	10	(8, 12)		
	Sub-Urban	177	12	(10, 14)	159	11	(9, 13)		
	Urban Core	798	66	(62, 70)	826	68	(64, 71)		
		438	34	(31, 38)	431	35	(31, 39)		
Sensation Seeking Quartile	1 st (Lowest)	438	34	(31, 38)	431	35	(31, 39)		
	2 nd	302	26	(22, 30)	314	23	(20, 27)		
	3 rd	261	20	(17, 23)	266	20	(17, 23)		
	4 th (Highest)	258	20	(17, 23)	266	22	(19, 25)		
Friends Smoke	No	602	47	(43, 50)	292	23	(20, 27)		
	Yes	654	53	(50, 57)	985	77	(73, 80)		
Parents Smoke	Never	660	55	(51, 59)	558	43	(39, 47)		
	Former	259	20	(17, 23)	271	23	(20, 26)		
	Current	313	25	(22, 28)	409	34	(30, 38)		

Category	Value	15-17 Years Old			18-23 Years Old		
		N	Pt Est	95% CI	N	Pt Est	95% CI
Current Smoking Status	Did Not Smoke in Past 30 Days	234	75	(69, 81)	367	55	(50, 60)
	Smoked in Past 30 Days	84	25	(19, 31)	296	45	(40, 50)
Lifetime Smoking Status	Smoked <100 Cig in Lifetime	1221	97	(96, 98)	1013	78	(75, 82)
	Smoked 100 Cig in Lifetime	38	3	(2, 4)	264	22	(18, 25)
# of Tobacco Websites Seen	0	1192	94	(92, 95)	1109	85	(82, 88)
	1	43	4	(2, 5)	98	8	(6, 10)
	2	11	1	(0, 2)	44	4	(3, 6)
	3+	13	2	(1, 3)	26	3	(1, 4)
Specific Tobacco Websites Seen	Newport	22	3	(1, 5)	72	7	(5, 9)
	Marlboro	42	4	(2, 5)	102	9	(6, 11)
	Kool	18	2	(1, 3)	27	3	(1, 5)
	Camel	17	1	(1, 2)	37	3	(2, 5)
	American Sprit	10	1	(0, 2)	34	3	(1, 4)
Received Direct Tobacco Mail		61	6	(3, 9)	186	17	(14, 20)

Note: CI=confidence interval; cig=cigarettes; Pt. Est.=point estimate; Yrs=years; White=Non-Hispanic White; Black=Non-Hispanic Black.

Exposure to Direct-to-Consumer Tobacco Marketing by Demographic Characteristics and Smoking Behavior for Adolescents and Young Adults

Table 2

	15–17 Years Old						18–23 Years Old					
	Received Direct			Saw Tobacco			Received Direct			Saw Tobacco		
	Tobacco Mail			Company Websites			Tobacco Mail			Company Websites		
	N	Pt Est	95% CI	N	Pt Est	95% CI	N	Pt Est	95% CI	N	Pt Est	95% CI
Overall	61	6	(3,9)	67	6	(5,8)	186	17	(14,20)	168	15	(12,18)
Gender												
Female	25	4	(2,6)	41	7	(5,10)	95	16	(12,20)	93	17	(12,22)
Male	36	8	(2,13)	26	5	(3,8)	91	18	(14,23)	75	13	(10,17)
Race/Ethnicity												
White	43	6	(4,7)	37	4	(2,5)	136	18	(14,21)	111	13	(10,16)
Black	7	15	(0,34)	7	10	(2,18)	15	16	(6,25)	25	24	(14,35)
Hispanic	5	2	(0,3)	19	15	(8,22)	22	19	(9,28)	17	16	(7,26)
Other	6	3	(0,5)	4	2	(0,4)	13	11	(5,18)	15	11	(5,17)
Sensation Seeking Quartile												
1 st (Lowest)	11	2	(1,4)	21	6	(3,9)	43	11	(7,15)	38	12	(7,17)
2 nd	10	10	(0,20)	10	4	(1,7)	46	18	(11,26)	36	13	(8,19)
3 rd	19	6	(3,9)	11	6	(2,10)	43	20	(13,27)	37	16	(9,23)
4 th (Highest)	21	7	(3,10)	25	10	(5,15)	54	23	(16,30)	57	22	(15,29)
Friends Smoke												
No	21	3	(1,4)	15	3	(1,5)	14	5	(2,8)	21	11	(5,17)
Yes	40	9	(3,14)	52	9	(6,13)	172	21	(17,25)	147	17	(13,20)
Parents Smoke												
Never	27	3	(2,5)	22	5	(2,7)	43	10	(7,14)	35	8	(5,11)
Former	11	5	(1,9)	8	3	(1,6)	35	16	(9,22)	39	16	(9,22)
Current	21	6	(3,9)	33	10	(6,15)	98	26	(19,32)	88	24	(18,31)

		15–17 Years Old				18–23 Years Old						
		Received Direct		Saw Tobacco		Received Direct		Saw Tobacco				
		Tobacco Mail		Company Websites		Tobacco Mail		Company Websites				
		N	Pt Est	95% CI	N	Pt Est	95% CI	N	Pt Est	95% CI		
Smoked in Past 30 Days												
No	14	7	(3,10)	19	11	(5,17)	55	17	(11,22)	37	10	(5,15)
Yes	8	6	(1,11)	18	18	(9,27)	87	32	(24,39)	101	34	(27,42)
Smoked 100 Cigarettes in Lifetime												
No	55	6	(3,9)	61	6	(4,8)	94	11	(8,14)	73	9	(6,12)
Yes	6	11	(1,20)	6	10	(1,19)	92	39	(30,47)	95	38	(30,46)

Note: CI=confidence interval; cig=cigarettes; Pt Est=point estimate; Yrs=years; White=Non-Hispanic White; Black=Non-Hispanic Black; Small Town=Small Town/Isolated Rural; Established smokers are respondents that smoked 100 cigarettes in their lifetime without respect to their current smoking status.

Table 3**Exposure to Direct-to-Consumer Tobacco Marketing Among Never Smokers**

	Received Direct Tobacco Mail		Saw Tobacco Company Websites	
	OR	95% CI	OR	95% CI
18–23 Yrs (Ref: 15–17 Yrs)	2.2	(1.2,4.1)	1.5	(0.7,3.4)
Male (Ref: Female)	0.9	(0.5,1.7)	0.6	(0.3,1.5)
Race/Ethnicity (Ref: Non-Hispanic White)				
Non-Hispanic Black	1.3	(0.5,3.6)	8.7	(3.4,22)
Hispanic	0.2	(0.1,0.9)	10.7	(4.1,27.9)
Other	0.3	(0.1,0.9)	6.5	(2.1,19.8)
Region (Ref: Midwest)				
Northeast	0.1	(0,0.4)	0.6	(0.1,2.4)
South	1	(0.5,2.1)	0.9	(0.3,2.5)
West	0.7	(0.2,1.8)	0.7	(0.2,2.2)
Rural-Urban (Ref: Large Rural Town)				
Small Town	0.6	(0.2,2)	0.6	(0.1,2.9)
Sub-Urban	0.4	(0.1,1.5)	0.4	(0.1,1.7)
Urban Core	0.7	(0.2,2)	0.4	(0.1,1.3)
Sensation Seeking Quartile Ref: (1 st [Lowest])				
2 nd	1.3	(0.5,3.1)	1.1	(0.5,2.5)
3 rd	2.3	(0.9,5.7)	0.6	(0.2,2)
4 th (Highest)	2.7	(1.1,6.2)	0.5	(0.1,1.8)
Friends Smoke Yes (Ref: No)	3.3	(1.3,8.2)	1	(0.4,2.5)
Parents Smoke (Ref: Never)				
Former	2.1	(0.9,5.1)	1.6	(0.4,6.2)
Current	1.9	(0.9,4)	3.3	(1.5,7)
Saw Tobacco Company Websites	2.8	(0.9,8.7)	—	—
Received Direct Tobacco Mail	—	—	3.2	(0.9,11.7)

Note: CI=confidence interval; cig=cigarettes; OR=odds ratio; Pt. Est.=point estimate; Yrs=years.

Ever Having Tried Smoking Among All Respondents, Smoked in Last Month Among All Respondents, and Established Smoking Among Ever-Smokers

Table 4

	Outcome 1: Ever Tried Smoking		Outcome 2: Smoked in Past 30 Days		Outcome 3: Established Smoker (100 Cig Among Ever Smokers	
	OR	95% CI	OR	95% CI	OR	95% CI
18–23 Yrs (Ref: 15–17 Yrs)	3.2	(2.5,4.2)	2	(1.2,3.2)	4.4	(2.4,8.2)
Male (Ref: Female)	1	(0.8,1.4)	1.1	(0.7,1.7)	1.6	(1.2,5)
Race/Ethnicity (Ref: Non-Hispanic White)						
Non-Hispanic Black	0.8	(0.4,1.4)	0.5	(0.2,1.3)	0.2	(0.1,0.6)
Hispanic	1.6	(1.2,5)	0.9	(0.5,1.7)	1	(0.5,1.9)
Other	1.3	(0.9,2)	0.5	(0.3,0.9)	1.1	(0.6,2)
Region (Ref: Midwest)						
Northeast	1.1	(0.7,1.6)	1.2	(0.6,2.3)	0.6	(0.3,1.3)
South	1.1	(0.7,1.5)	1	(0.6,1.8)	1	(0.6,1.8)
West	1.1	(0.7,1.6)	0.8	(0.5,1.6)	1	(0.6,1.9)
Rural-Urban (Ref: Large Rural Town)						
Small Town	1.3	(0.6,2.5)	1	(0.5,2.2)	0.6	(0.3,1.3)
Sub-Urban	1.1	(0.6,2.1)	1.7	(0.8,3.7)	1.3	(0.6,2.8)
Urban Core	0.8	(0.5,1.3)	1.3	(0.7,2.6)	0.8	(0.4,1.5)
Sensation Seeking Quartile (Ref: 1 st [Lowest])						
2 nd	1.5	(1.2,2)	1.1	(0.6,2.2)	1	(0.5,1.9)
3 rd	2.5	(1.7,3.6)	1.5	(0.8,2.8)	1	(0.5,1.9)
4 th (Highest)	3.4	(2.3,5.1)	2.8	(1.6,5.1)	2	(1.1,3.7)
Friends Smoke Yes (Ref: No)	3.3	(2.3,4.6)	44.5	(11.3,175.1)	13	(3,57.4)
Parents Smoke (Ref: Never)						
Former	1.2	(0.8,1.8)	1.2	(0.7,2.1)	1.9	(1,3.5)
Current	2.3	(1.6,3.1)	2.2	(1.4,3.6)	2.7	(1.6,4.6)

	Outcome 1: Ever Tried Smoking		Outcome 2: Smoked in Past 30 Days		Outcome 3: Established Smoker (100 Cig) Among Ever Smokers	
	OR	95% CI	OR	95% CI	OR	95% CI
Exposure to Direct-to-Consumer Tobacco Marketing (Ref: None)						
Either Mail or Web, Not Both	1.5	(1.2,3)	2.2	(1.3,3.8)	2.2	(1.3,3.8)
Both Mail and Web	5.4	(1.7,17.9)	2.7	(1.1,6.6)	8.2	(4,16.9)

Note: CI=confidence interval; cig=cigarettes; OR=odds ratio; Pt. Est.=point estimate; Yrs=years.