

US College Students' Exposure to Tobacco Promotions: Prevalence and Association With Tobacco Use

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Tobacco use among young adults in the United States is a growing public health concern. Cigarette smoking rates declined between 1993 and 2000 among all US adults except those aged 18 to 24 years.¹ Among US college students, the prevalence of smoking rose dramatically during the 1990s before it declined slightly between 1999 and 2001.²⁻⁴ Smoking rates among young adults who do not attend college are higher than smoking rates among college students.⁴ Several factors account for young adults' increased tobacco use. One factor is the aging of the cohort of adolescents whose smoking rates increased after 1991, but it does not explain all of the change.²⁻⁵ Another factor may be that young adults are initiating regular tobacco use in larger numbers.⁵

Young adults (aged 18–24 years) are the youngest legal targets of tobacco industry marketing. Internal tobacco industry documents show that tobacco marketing targets young adults.⁶⁻⁹ The industry envisions the uptake of smoking as a process that extends into young adulthood, during which time adolescents' experimental or occasional smoking becomes solidified into a regular smoking habit.⁹ The tobacco industry has developed novel marketing strategies to promote this transition. A well-documented strategy is to sponsor social events at bars and nightclubs where free cigarettes and promotional items are distributed.^{6,7,9} Similar promotions take place at college social events sponsored by organizations such as fraternities and sororities.¹⁰ Bars and nightclubs have assumed greater importance for tobacco marketing since the 1998 Master Settlement Agreement between the tobacco industry and 46 states' attorneys general, because the agreement limits the distribution of free cigarette samples to facilities that do not admit minors.^{6,9,11} Bars and nightclubs also are smoker-friendly environments for the tobacco industry, because they are among the

few places where smoking is not generally restricted by clean-air laws.⁷

Promotional events at bars, nightclubs, and college social events aim to link alcohol with tobacco use and to make tobacco products a visible part of young adults' social lives.^{6,7} The events reinforce brand visibility, allow the industry to reach specific target groups, and generate names for future marketing efforts.^{6,7,9} Promotions at social events have the potential to increase tobacco use by encouraging nonsmokers to try cigarettes, by encouraging experimental smokers to develop regular use, and by discouraging current smokers from quitting.

There is no information about the extent of young adults' exposure to these new tobacco promotions or about the impact of these promotions on young adults' tobacco use. The potential impact could be substantial, because young adults are more susceptible to tobacco marketing than adults in older age groups.¹² Colleges and universities provide a key channel for reaching young adults, because approximately one third of young adults attend college.¹³ Our study used data from a large nationally representative random sample of US

college and university students to assess the prevalence of students' exposure to tobacco promotions at bars, nightclubs, and campus social events and to explore the association between that exposure and smoking behavior. We hypothesized that students' tobacco use before entering college might modify this association, because students who did not smoke regularly before college would be more susceptible to bar/nightclub promotions than students who entered college as regular smokers.

METHODS

Sample

The 2001 Harvard School of Public Health College Alcohol Study (CAS) surveyed a random sample of students enrolled in 120 four-year US colleges and universities.¹⁴ Each school provided a list of 215 randomly selected students from all full-time undergraduates during the 2000–2001 school year.^{14,15} The 120 schools were a subset of the 140 schools selected in 1993 as a nationally representative sample of US colleges and universities.¹⁵ In 2001, 20 schools could not provide a student sample within acceptable time limits

Objectives. We assessed young adults' exposure to the tobacco industry marketing strategy of sponsoring social events at bars, nightclubs, and college campuses.

Methods. We analyzed data from the 2001 Harvard College Alcohol Study, a random sample of 10904 students enrolled in 119 nationally representative 4-year colleges and universities.

Results. During the 2000–2001 school year, 8.5% of respondents attended a bar, nightclub, or campus social event where free cigarettes were distributed. Events were reported at 118 of the 119 schools (99.2%). Attendance was associated with a higher student smoking prevalence after we adjusted for demographic factors, alcohol use, and recent bar/nightclub attendance. This association remained for students who did not smoke regularly before 19 years of age but not for students who smoked regularly by 19 years of age.

Conclusions. Attendance at a tobacco industry-sponsored event at a bar, nightclub, or campus party was associated with a higher smoking prevalence among college students. Promotional events may encourage the initiation or the progression of tobacco use among college students who are not smoking regularly when they enter college. (*Am J Public Health.* 2004;94:XXX–XXX)

and were excluded. One additional college was excluded from analysis because its response rate was substantially lower than other schools.

The 119 colleges in the sample were located in 38 states and the District of Columbia. Sixty-nine percent of respondents attended public colleges, and 31% attended private colleges; the US distribution of full-time 4-year college students is similar (67% and 33%, respectively).¹³ Forty-seven percent of respondents attended large colleges (>10 000 students), 23% attended medium-sized colleges (5001–10 000 students), and 29% attended small colleges (<5000 students); the US distribution is 37%, 24%, and 40%, respectively.¹³ Large colleges are overrepresented in the CAS sample because colleges were selected with probability proportional to size. Sixty-nine percent of respondents attended schools in large or medium-sized cities compared with 71% of students nationwide, and 13% of respondents attended schools with a religious affiliation compared with 16% of students nationwide.

Questionnaire and Measures

The questionnaire assessed students' demographics; tobacco, alcohol, and marijuana use; and interests and lifestyle choices.¹⁵ The demographics that were assessed included age, gender, race/ethnicity, year in school, marital status, highest parental educational attainment (a proxy for socioeconomic status), and residence (on-campus vs off-campus). Other factors assessed were grade point average, and the importance to a student of participating in 9 activities (e.g., athletics, academic work, parties, fraternity or sorority life).

To assess tobacco use, respondents were asked if they had smoked a cigarette, cigar, pipe, or bidi (a small hand-rolled and often flavored cigarette primarily made in India) or used smokeless tobacco. Current use was defined as use within the past 30 days. The survey assessed respondents' age at first use and first regular use of cigarettes, daily cigarette consumption, frequency of use (number of days of smoking in the past 30 days), time to first morning cigarette (measure of nicotine dependence),¹⁶ and intentions regarding quitting smoking entirely.¹⁷ Students who did not smoke before 19 years of age were considered nonsmokers prior to entering college.

To assess exposure to tobacco marketing, students were asked 2 questions about their experience since the start of the current school year: (1) "Have you been to a bar or club when free samples of cigarettes were available?" and (2) "Have you been to an event or party on campus when free samples of cigarettes were available?" We considered this a conservative measure of exposure to tobacco industry marketing, because students might have attended a tobacco industry-sponsored event but did not witness free cigarette distribution.

Mailing and Response Rate

Questionnaires were mailed to 21 055 students in February 2001. Three mailings were sent within 3 weeks (a questionnaire, a reminder postcard, and a second questionnaire). Responses were anonymous, and cash prizes were offered to encourage response. The response rate was 52% (n=10 904), and response rates ranged from 22% to 86% among the 119 colleges.

We conducted several analyses to examine the potential bias introduced by nonresponse. A college's response rate did not correlate with the college's smoking rate (Spearman's $\rho=0.15$; $P=0.10$) or its students' prevalence of exposure to tobacco promotions ($\rho=0.02$; $P=0.85$). There was no statistically significant difference in current smoking rates between students who responded before and after the second mailing (24.8% vs 26.0%, respectively; $P=0.19$). To help control for any nonresponse bias, college response rate was included as a continuous covariate in all the multivariate models. Additionally, following analyses of the full data set, we repeated analyses of the subset of 2809 students who were enrolled in the 24 colleges with the highest response rates (>60%).

Analysis

Statistical analyses were conducted with Stata software (Stata Corp, College Station, Tex). Data were weighted to account for colleges' varying sampling fractions. Data also were weighted to match each college's actual distribution of gender, race/ethnicity (White/non-White), and age (<18 years, 18–22 years, >22 years). Univariate analyses identified student-level and college-level characteristics

associated with exposure to tobacco promotions at bars/nightclubs and at campus social events. Binge drinking was defined as consuming 5 or more drinks in a row (men) or 4 or more drinks in a row (women) during the past 2 weeks.¹⁵ College-level characteristics were enrollment, geographic region, location in a major tobacco-producing state (Georgia, Kentucky, North Carolina, South Carolina, Tennessee, or Virginia),¹⁸ campus location (urban, suburban, small town, or rural), public versus private status, religious affiliation, coeducational versus female only, commuter school (>90% of students live off-campus), and competitiveness (percentage of applicants accepted).

Student-level and college-level characteristics associated with exposure to a tobacco promotion in the univariate analysis ($P<.10$) were included in multiple logistic regression models. All models also adjusted for each schools' survey response rate, student demographics (age, gender, race/ethnicity, year in school, and highest parental educational attainment), students' attendance at a bar/nightclub or campus social event in the past month, and college-level characteristics (size of enrollment, public vs private, region, and competitiveness). We used generalized estimating equations to fit the logistic regression models to account for clustering in our sampling scheme.^{19,20} Adjusted odds ratios (OR) and 95% confidence intervals (CI) are reported.

Additional univariate analyses explored the association between exposure to tobacco promotions at bars/nightclubs/campus social events and current and past-year use of cigarettes and all tobacco products (cigarettes, cigars, pipes, bidis, or smokeless tobacco). The analysis of the association between tobacco promotions and current smoking was stratified by student and college characteristics. Multivariate models were constructed to control for potential confounders of these univariate associations. We tested first-level interactions between age at onset of regular smoking and exposure to promotions in the models on the basis of the stratified analysis and our hypothesis that this factor would modify the effect of exposure on tobacco use.

RESULTS

Sample Characteristics

Of the 10 904 respondents, 64% were female, 74% were White, and 89% were aged 18 to 24 years; of the respondents at the 119 participating schools, 53% of full-time undergraduates were female, 70% were White, and 90% were aged 18 to 24 years. In a national sample of full-time undergraduates, 54% were female, 73% were White, and 84% were aged 18 to 24 years old.²¹ Twenty-three percent of respondents were freshmen, 22% were sophomores, 25% were juniors, 23% were seniors, and 7% were fifth-year or postgraduate students. Six percent were married, 59% had a parent with a college degree, 39% lived in campus housing, 58% lived off-campus, and 3% lived in a fraternity or sorority.

Exposure to Tobacco Industry Sponsored Promotional Events

Between the start of the 2000–2001 school year and the survey approximately 6 months later, 8.5% of respondents reported having attended a social event at a bar, nightclub, or on campus where free cigarettes were distributed: 6.8% attended an event at a bar or nightclub, and 3.2% attended a campus social event. Students at all but 1 school (N=118, 99.2%) reported exposure to a tobacco promotion at a bar, nightclub, or campus social event. Exposure to a bar or nightclub promotion was reported by students at 115 colleges (96.6%), and exposure to an on-campus tobacco promotion was reported by students at 109 colleges (91.6%). The proportion of students at individual schools who reported exposure to bar or nightclub tobacco promotions ranged from 0.9% to 27.3%; the proportion of students who reported exposure to on-campus promotions ranged from 0.8% to 12%. Similar results were found when the analysis was repeated only with the subset of students from schools with high response rates. Among this subgroup, 8% ($\pm 0.6\%$, 1 SE) of students reported exposure to any tobacco promotion, 6.3% ($\pm 0.5\%$) reported exposure to a bar/nightclub promotion, and 2.9% ($\pm 0.3\%$) reported exposure to an on-campus tobacco promotion.

Table 1 shows student-level and college-level characteristics independently associated with exposure to tobacco promotions at bars/nightclubs, campus social events, or either venue. Exposure to tobacco promotions increased with grade in school. Asian American students reported more exposure and Black students reported less exposure than non-Hispanic Whites. Exposure was greater at colleges in urban areas, in the South, and in major tobacco-producing states. Binge drinkers, current tobacco and marijuana smokers, and students who rated parties and fraternity or sorority life as very important had more exposure to tobacco promotions. When the analysis was limited to tobacco promotions in bars and nightclubs, the pattern of exposure changed little. In contrast, exposure to tobacco promotions at campus social events was unrelated to grade in school or student tobacco use, but exposure was higher among Asian American students (Table 1).

Relationship Between Exposure to Tobacco Promotions and Tobacco Use

Students who reported exposure to tobacco industry promotions at a bar, nightclub, or campus social event were more likely than unexposed students to be current cigarette smokers (42.6% vs 23.8%, respectively; $P < 0.001$) or current users of any tobacco product (48.3% vs 28.3%, respectively; $P < 0.001$). Exposed students also were more likely than unexposed students to have smoked cigarettes (54.1% vs 32.8%, respectively; $P < 0.001$) or to have used a tobacco product in the past year (62.3% vs 40.7%, respectively; $P < 0.001$).

The association between exposure to tobacco promotions and higher rates of current cigarette smoking was consistent and remained statistically significant across subgroups of students defined by gender, age (<21 or ≥ 21 years), race (non-Hispanic White, Black, Hispanic, or Asian/Pacific Islander), year in school, geographic region (West, South, Northeast, North Central), urban location (large city or not), binge drinking during the past 2 weeks, and recent (past 30 days) attendance at a bar, nightclub, or campus social event (data not shown). After we controlled for these factors in a multivariate analysis, exposure to tobacco promotions

remained strongly associated with current smoking (adjusted OR=1.75; 95% CI=1.47, 2.08; $P < .001$). Exposure to tobacco promotions also was independently associated with past-year cigarette smoking (adjusted OR=1.82; 95% CI=1.54, 2.17; $P < .001$) in a multivariate model that controlled for the same factors.

The effect of exposure to tobacco promotions differed by age at onset of regular smoking. Of the 8482 students (78%) who did not smoke regularly before 19 years of age, the current smoking prevalence rate was 23.7% among those who had attended a promotional event compared with 11.8% among those who had not ($P < .001$). However, of the 2334 students (22%) students who smoked regularly before 19 years of age, there was no significant difference in current smoking prevalence between those who had and had not attended a tobacco promotional event (77.5% vs 72.2%, respectively; $P = .09$). Table 2 shows the results of a multiple logistic regression analysis that included an interaction between tobacco promotion and smoking history. Among students who did not smoke regularly before 19 years of age, those who were exposed to a bar/nightclub or campus tobacco promotion had higher rates of current cigarette use than students who were not exposed to promotions (adjusted OR=1.73; 95% CI=1.35, 2.21). In contrast, there was no significant association between tobacco promotions and current cigarette use among students who did not smoke regularly before 19 years of age (adjusted OR=1.10; 95% CI=0.76, 1.59).

Because of the possibility of response bias, we repeated the analyses of the subset of students who attended colleges with response rates that exceeded 60%. Among this subset of students (n=2809), exposure to tobacco promotions remained independently associated with current cigarette smoking (adjusted OR=1.72; 95% CI=1.21, 2.45; $P = .002$) and with past-year cigarette smoking (adjusted OR=1.88; 95% CI=1.32, 2.68; $P < .001$).

DISCUSSION

To our knowledge, this is the first study that measured young adults' exposure to a to-

TABLE 1—Student and College Characteristics Associated With Exposure to Tobacco Promotions: Univariate and Multivariate Analyses

	n	Any Promotion			Bar/Nightclub Promotion			Campus Promotion		
		%	AOR (95% CI) ^a	P	%	AOR (95% CI) ^a	P	%	AOR (95% CI) ^a	P
All students	10 874	8.5			6.8			3.2		
Student characteristics										
Year in school										
Freshman	2495	5.3	ref		3.2	ref		3.3	ref	
Sophomore	2348	7.7	1.43 (1.06, 1.93)	.02	5.3	1.60 (1.12, 2.29)	.01	4.1	1.33 (0.92, 1.92)	.13
Junior	2686	9.5	1.51 (1.12, 2.04)	.007	8.1	1.94 (1.36, 2.77)	<.001	2.9	0.95 (0.64, 1.42)	.81
Senior	2473	10.6	1.77 (1.25, 2.51)	.001	9.6	2.25 (1.50, 3.38)	<.001	2.7	1.12 (0.67, 1.87)	.65
Race/ethnicity										
Non-Hispanic White	7995	8.3	ref		6.8	ref		2.7	ref	
Black	765	4.9	0.60 (0.37, 0.98)	.04	3.9	0.62 (0.37, 1.06)	.08	3.3	1.02 (0.55, 1.89)	.94
Hispanic	901	9.6	1.07 (0.80, 1.43)	.66	7.2	0.93 (0.67, 1.29)	.65	4.0	1.46 (0.99, 2.17)	.06
Asian/Pacific Islander	817	10.7	1.41 (1.04, 1.92)	.03	8.1	1.37 (0.97, 1.92)	.07	6.1	2.35 (1.58, 3.50)	<.001
Binge drinking in the past 2 weeks										
Yes	4088	13.1	1.67 (1.34, 2.07)	<.001	11.0	1.75 (1.37, 2.23)	<.001	3.8	1.42 (1.03, 1.96)	.03
No	6766	5.5	ref		4.1	ref		2.9	ref	
Current cigarette smoker										
Yes	2731	14.1	1.61 (1.34, 1.94)	<.001	11.8	1.66 (1.35, 2.03)	<.001	3.7	1.16 (0.86, 1.57)	.32
No	8090	6.5	ref		5.0	ref		3.0	ref	
Current marijuana use										
Yes	1780	14.8	1.44 (1.17, 1.76)	<.001	12.7	1.54 (1.24, 1.93)	<.001	4.0	...	
No	9053	7.1	ref		5.5	ref		3.0	...	
Fraternity/sorority life										
Important or very important	1182	11.6	1.38 (1.09, 1.74)	.008	9.6	1.47 (1.14, 1.91)	.003	5.0	...	
Not important	9508	8.0	ref		6.4	ref		3.0	...	
Parties										
Important or very important	3257	12.5	1.34 (1.10, 1.64)	.004	10.4	1.40 (1.12, 1.74)	.003	4.1	...	
Not important	7446	6.6	ref		5.1	ref		2.9	...	
College characteristics										
Geographic region										
South	3169	10.6	ref		8.7	ref		3.8	ref	
Northeast	2553	9.5	0.87 (0.65, 1.16)	.34	7.9	0.88 (0.64, 1.20)	.41	3.7	0.94 (0.66, 1.36)	.76
West	1933	7.5	0.57 (0.42, 0.79)	.001	5.9	0.51 (0.36, 0.72)	<.001	2.8	0.64 (0.41, 0.98)	.04
North central	3219	6.3	0.65 (0.49, 0.85)	.002	4.7	0.55 (0.40, 0.75)	<.001	2.7	0.83 (0.58, 1.19)	.31
Tobacco state										
Yes	1230	11.3	1.55 (1.12, 2.13)	.008	9.7	1.77 (1.25, 2.52)	.001	3.9	...	
No	9644	8.1	ref		6.4	ref		3.1	...	
Location										
Large city	3002	13.1	2.32 (1.90, 2.84)	<.001	11.5	2.70 (2.17, 3.37)	<.001	4.0	1.54 (1.14, 2.08)	.004
Other	7872	6.7	ref		5.0	ref		3.0	ref	

Note. AOR = adjusted odds ratio; CI = confidence interval.

^aAll models also are adjusted for parental educational attainment; students' age, gender, residence (on/off campus), and past 30-day attendance at a bar, nightclub, or campus social event; and colleges' size of enrollment, public/private status, and survey response rate. Models for exposure to any promotion and exposure to bar/club promotion are also adjusted for students' marital status and grade point average.

bacco industry marketing strategy that has assumed greater prominence since the 1998 Master Settlement Agreement. During the first 6 months of the 2000–2001 school year, 8.5% of US college students attended a tobacco industry–sponsored social event

where free cigarettes were distributed. Students at all but one of the 119 colleges surveyed reported attending these events. Bars and nightclubs were the most common settings, but students also reported attending events on college campuses, a site that has

received less attention and that provides direct access to students.

Our study shows that there is an association between attendance at these promotional events and tobacco use. It has been hypothesized that the tobacco industry's

TABLE 2—Association Between Exposure to Tobacco Promotion and Current Cigarette Smoking: Multivariate Analysis

	n	Current Cigarette Smoking OR (95% CI)	P
Exposure to tobacco promotion (stratified by smoking history) ^a			
Did not smoke regularly before age 19 y			
Exposed to tobacco promotion	572	1.73 (1.35, 2.21)	<.001
Not exposed to tobacco promotion	7910	ref	
Smoked regularly before age 19 y			
Exposed to tobacco promotion	323	1.10 (0.76, 1.59)	.61
Not exposed to tobacco promotion	2011	ref	
Gender			
Female	6972	ref	
Male	3882	0.86 (0.75, 0.99)	.03
Age, ys			
<21	5461	ref	
>21	5407	1.07 (0.88, 1.31)	.49
Year in school			
Freshman	2495	ref	
Sophomore	2348	1.08 (0.89, 1.30)	.45
Junior	2686	0.88 (0.72, 1.09)	.25
Senior	2473	0.97 (0.74, 1.26)	.81
Race/ethnicity			
Non-Hispanic White	7995	ref	
Hispanic	765	0.78 (0.60, 1.03)	.08
Black	901	0.66 (0.43, 1.00)	.05
Asian/Pacific Islander	817	1.24 (0.80, 1.89)	.34
Attended bar, nightclub, or campus social event in past 30 days			
Yes	7300	3.56 (2.90, 4.37)	<.001
No	3574	ref	
Binge drinking in the past 2 weeks			
Yes	4088	2.60 (2.25, 3.01)	<.001
No	6766	ref	
Geographic region			
South	3169	ref	
Northeast	2553	0.83 (0.69, 1.01)	.06
West	1933	0.95 (0.76, 1.18)	.65
North Central	3219	1.00 (0.85, 1.19)	.97
Location			
Large city	3002	0.97 (0.83, 1.14)	.70
Other	7872	ref	

^aThere is a statistically significant interaction between exposure to tobacco promotion and smoking history. Consequently, adjusted odds ratios for the association between current cigarette smoking and tobacco promotion are presented separately according to smoking history.

new promotional strategies have contributed to the observed increase in young-adult tobacco use. To date, however, the evidence is only indirect; the introduction of these strategies corresponds temporally with the increase in smoking among young

adults.^{5–7,9} We add to the evidence by showing an association between exposure to the new tobacco promotional events and current smoking. The association remained strong after we adjusted for potential confounding factors, such as the fact that smok-

ers drink more alcohol and are more likely to go to bars.

Furthermore, the effect of tobacco promotions on smoking behavior was modified by a student's history of tobacco use before entering college. Nearly 80% of the students had not smoked regularly before 19 years of age. Among this group, students exposed to a tobacco promotional event had higher odds of being a current smoker at the time of our study. In contrast, students who were already smoking regularly when they entered college continued to smoke at high rates, and attending a tobacco promotional event had no effect on their smoking prevalence. This finding suggests that the tobacco industry sponsorship of social events may be encouraging the initiation or the progression of smoking among young adults.

Between 1988 and 1998, the tobacco industry shifted its marketing from traditional advertising to promotional activities, such as sponsorship of events.²² Concurrently, substantial tobacco industry resources were spent on marketing research that targeted young adults.⁹ New promotional strategies in bars, nightclubs, and other venues began in the late 1980s.^{6–8} The extent of young adults' exposure to these activities has been unclear. Our study shows that these promotional events have already reached students at nearly every college in our sample. This is a broad base from which promotional activities can be expanded to reach an even larger proportion of college students in the future. Industry documents show that bar and nightclub promotions are a key marketing strategy, and these promotions are among the few promotional activities permitted by the 1998 Master Settlement Agreement. The success of these tobacco industry promotions in reaching college students may provide an inroad to a group of young adults who historically have lower tobacco use rates than their non-college peers.

Tobacco industry promotions were much more common in urban areas, perhaps because of the greater density of bars near these campuses, and in the South, particularly in the major tobacco-producing states. As would be expected, students reached by promotions in bars and nightclubs were those who frequented these venues, drank more

heavily, placed a greater value on attending parties, and were of legal drinking age. In contrast, tobacco promotions at campus social events reached students in all grades equally. Thus, they provided a way for tobacco marketers to access students under 21 years of age who are more difficult to reach at bars. The finding that tobacco promotions reached Asian American students disproportionately was unexpected and needs to be confirmed in future research, because there is evidence that the tobacco industry has targeted Asian Americans in other settings.²³

LIMITATIONS

Our study has both strengths and limitations. Strengths include the large nationally representative sample of US colleges, the selection of a random sample of students at each school, and the large number of respondents. One limitation is the potential for bias because of survey nonresponse. The potential for response bias was reduced by the demographic resemblance of respondents to the overall enrollment in the 119 colleges and to all US 4-year college students. Furthermore, the smoking prevalence among our sample was almost identical to that among college students surveyed by the Monitoring the Future study in 2001.⁴ While we cannot eliminate the possibility of nonresponse bias, we attempted to minimize its impact through weighting procedures, which matched respondents' demographics to the actual demographic distribution of schools from which samples were drawn, and by including college response rate as a covariate in all multivariate analyses. We also conducted analyses to explore the potential for response bias and found no evidence to suggest that it had a large effect. Limiting analyses to students from schools with high response rates did not change the findings, which supports the validity of the results from the full sample. Taken together, these analyses make it unlikely that the internal validity of associations observed within the data set was compromised by the survey response rate.

Another limitation is that our survey asked students whether they had seen the distribution of free cigarette samples at a bar, nightclub, or campus social event, but it did not

ask who was offering these samples. It is possible that some of the free samples were not part of a tobacco industry promotion. However, the ample evidence of the existence of these tobacco promotions in other studies^{6,7} makes it likely that the large majority of events reported by our respondents were examples of tobacco marketing.

A cross-sectional sample such as ours cannot show a conclusive causal link between exposure to promotions and tobacco use. However, the associations we found, particularly among students who did not enter college as regular smokers, are suggestive. A potential alternative explanation for our findings is recall bias: smokers might be more likely than nonsmokers to notice or recall attending tobacco promotional events where free cigarettes are offered. For this to account for our findings, however, new smokers' awareness of tobacco promotional events would have to exceed that of more established smokers. We believe that recall bias is unlikely to account entirely for the association between exposure to promotions and tobacco use.

CONCLUSIONS

Our findings call attention to a tobacco marketing strategy that is reaching college students across the United States and may be encouraging them to use tobacco. The potential for these tobacco promotions to spread more widely and to target more college populations is great, because these promotional events have already reached most colleges and are among the few promotional strategies allowed in the wake of the 1998 Master Settlement Agreement. They clearly deserve further investigation. Future work should examine both the effect of exposure to tobacco promotions on all young adults, including those who do not attend college, and the association between exposure to tobacco promotions and tobacco use in longitudinal studies.

Our findings have implications for universities, states, and communities. Colleges and universities should be alert to tobacco industry sponsorship of events on their campuses. As the American College Health Association and American Cancer Society recommend, colleges should ban the free distribution of tobacco products on campus, including distribu-

tion to fraternities and sororities, and prohibit tobacco industry sponsorship of social events held by any organization that receives college funds.^{10,24} States and communities already have a good reason for adopting smoking bans in bars and nightclubs: eliminating exposure to secondhand smoke.^{25,26} Our findings provide an additional rationale for adopting these policies: tobacco promotions are likely to be less successful in a smoke-free bar or nightclub, because smoking would not be modeled as an integral part of this social activity. Decoupling smoking and drinking will likely be an effective way to counteract the tobacco industry's marketing strategies. ■

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Contributors

N.A. Rigotti originated the study, participated in the study design and data collection, oversaw data analysis, and wrote the article. S.E. Moran conducted the data analysis. H. Wechsler oversaw data collection and assisted with data analysis. All the authors contributed to interpreting the results and editing the article.

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Human Participant Protection

The Harvard College Alcohol Study was reviewed and approved by the institutional review board of the Harvard School of Public Health.

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