# Preferred Smoking Policies at 30 Pacific Northwest Colleges

Beti Thompson, PhD[a,b]
Gloria D. Coronado, PhD[a]
Lu Chen, PhD[a]
L. Anne Thompson, BA[a]
Jennifer C. Hymer, BA[a]
Amber K. Peterson, BA[a]

## SYNOPSIS

**Objective.** Research shows that restrictive smoking policies on college campuses could discourage smoking onset or help facilitate cessation efforts among students. However, many colleges and universities are reluctant to establish restrictive smoking policies for fear of student objections. Our study examined preferred smoking policies among college students in the Pacific Northwest.

**Methods.** We conducted a baseline cross-sectional descriptive study of a grouped randomized controlled trial at 30 four-year colleges and universities in Idaho, Oregon, and Washington.

**Results.** Of the 14,237 students who responded to the survey, 17.3% were smokers. All respondents were knowledgeable about indoor smoking policies; however, there was incongruence regarding outside policies. Some 88% of never smokers wanted a completely smoke-free indoor policy, while a substantial percentage (58%) of smokers concurred (odds ratio [OR]=0.19, $p<0.001$). Fewer respondents were supportive of outdoor policies (43.3% for never smokers and 6.9% for smokers). Respondents agreed that the desire to breathe clean air should have priority over the desire to smoke; however, smokers agreed to a lesser extent (97.5% for never smokers and 81.5% for smokers [OR=0.012, $p<0.001$]).

**Conclusion.** Both non-smokers and smokers have high approval rates for restrictive smoking policies on campus. Administrators can use this information to help enact restrictive campus smoking policies.

[a]Fred Hutchinson Cancer Research Center, Seattle, WA

[b]Department of Health Services, University of Washington, Seattle, WA

Address correspondence to: Beti Thompson, PhD, Fred Hutchinson Cancer Research Center, 1100 Fairview Ave. N., M3-B232, P.O. Box 19024, Seattle, WA 98109-1024; tel. 206-667-4673; fax 206-667-5977; e-mail <bthompso@fhcrc.org>.

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College students are in a transition stage between adolescence and young adulthood.[1] During this time, they make many lifestyle behavior decisions, including the decision to use tobacco or not. Indeed, studies show that many college students take up the tobacco habit while in college.[2,3] Further, many occasional smokers become regular smokers while in college.[2]

Colleges are important places for decision-making. With approximately 15 million students attending college annually in the United States, colleges have the potential to influence a large number of individuals.[4] Comprehensive smoking policies in colleges may have an impact on college students in their decisions to use or not use tobacco once they are on campus. In the past few years, a number of college organizations have recommended that colleges implement stringent smoking policies to help prevent onset and promote cessation.[5,6] Although some colleges have implemented such policies, many have not.[7,8]

There are many potential reasons for the lack of restrictive policies on college campuses.[7] One reason may be concern about student reactions to strict policies. Limited studies have examined students' opinions of and preferences for restrictive smoking policies on campus. In a study of 119 U.S. colleges, Rigotti and colleagues found that students supported smoke-free buildings, residence halls, and dining areas.[7] Approximately half of the students surveyed supported smoke-free campus bars. Further, other studies indicate that smokers not only find non-smoking policies tolerable, but also comply with such restrictions.[9,10] However, a study of 12 colleges and universities in Texas found that restrictive policies were not associated with the likelihood of smoking.[11]

We examined smoking policies at 30 four-year colleges and universities in the Pacific Northwest, focusing on student perceptions of indoor and outdoor policies, preferred policies, and students' opinions of the schools' responsibilities to students concerning tobacco use. Students also expressed their opinions on schools' efforts toward compliance and enforcement of the restrictive smoking policies.

## METHODS

### Setting

This study took place in 30 four-year colleges and universities in the states of Idaho, Oregon, and Washington. The study, Campus Health Action on Tobacco Study (CHAT), is a four-year randomized group trial. Baseline assessment was followed by a two-year intervention. A final assessment will test the hypothesis that a comprehensive, multi-component intervention that includes environmental and individual components can increase tobacco cessation and decrease smoking onset among students at four-year colleges and universities. The results reported here are from the cross-sectional baseline survey.

The participating colleges included public ($n$=13), private independent ($n$=7), and private religious ($n$=10) institutions. The schools range in size from 488 to 15,390 students. Fifteen are located in urban settings and 15 are in rural locations. The colleges and universities have a variety of smoking policies, with private religious institutions having the most restrictive policies.

Initially, 34 schools were identified for possible inclusion in the study. This included schools closest in proximity to Seattle, where the research institution is located. For recruitment, schools received a letter describing the study and then a visit from study staff to further explain the study and its requirements. Three schools declined to participate. Once the 30 schools were recruited, the last school was not contacted.

### Baseline survey

After recruiting the schools and developing a survey instrument, we conducted a baseline survey among students attending the participating institutions. We drew a random sample of students in each school, oversampling freshmen (~750) so we could follow a cohort of freshmen to ascertain smoking onset. We sampled approximately 200 students in each of the remaining classes (i.e., sophomores, juniors, and seniors). For the 16 schools with less than 1,350 students, we surveyed all students. Surveys were sent to 30,356 individuals.

For baseline, we required that all participants be undergraduate, matriculated, degree-seeking students. School administrators were asked to provide either a list of all such students so we could draw a random sample or a random sample of students was drawn using our instructions. Two schools were not able to meet our request. One of the schools would not provide us student names, but allowed us to conduct the mailing on campus, with the provision that we travel to the campus and affix labels to envelopes with identification (ID) numbers known only to the school, thus protecting the names of the students. A data manager at the school tracked incoming surveys and informed us of ID numbers for which a response had not been received and we repeated the process during the survey period. The other school would not provide any student names or ID numbers. Instead, the school drew a sample and sent e-mails to those students along with a link to our web site questionnaire. The school allowed us to use multiple e-mail messages.

**Survey procedures**

We used an aggressive survey plan in an attempt to maximize response rates. Each identified student received an initial packet containing a cover letter from the study's principal investigator, a cover letter from a school administrator, a scannable questionnaire, a pencil, and a $2.00 bill (U.S.) as an incentive. All packets were sent first class with a request for a change of address notification. The cover letter from the principal investigator also included instructions for taking the survey online through our secure web site. The paper and web questionnaires were identical.

Two weeks later, each student was sent a reminder postcard asking him/her to return the questionnaire if it had not been completed. Two weeks later, a second survey packet was sent to non-respondents. This packet contained the same items except for the incentive and included a colored sheet of paper encouraging completion and return of the questionnaire. This was followed two weeks later with a reminder postcard. This process was repeated a third time; thus, each non-respondent had a total of six mailings (or e-mails in the case of the one school referenced above). A total of 46.9% of the students responded to the survey.

**Survey content**

The baseline student survey focused on seven major areas related to tobacco use. For this analysis, we focused on answers relating to places on campus where smoking is allowed, both indoors and outdoors. Indoor policies focused on classroom buildings, private offices, student union buildings, cafeterias and dining areas, residence halls or dorms, and sports arenas. Outdoor places included campus stadium and fields, parking garages, campus walkways, and near building entrances. Respondents could answer that smoking was allowed anywhere in that place, allowed in some areas in that place, or not allowed at all in that place.

Students were given a list of statements about the responsibilities of colleges and universities regarding smoking policies. The first statement read, "Colleges and universities should provide a smoke-free environment for students." The second stated, "Colleges and universities should provide areas for smokers to smoke." The third read, "Where campus smokers' desire to smoke conflicts with the desire to breathe clean air, the desire to breathe clean air should have priority." Students could respond that they "strongly agree," "agree," "disagree," or "strongly disagree." The categories of strongly agree and agree and strongly disagree and disagree were collapsed to two categories, agree or disagree.

Students were also asked about enforcement of smoking policies. First, they were asked about signage to acquaint students with a policy: "Should colleges and universities post signs making it clear where smoking is and is not allowed?" They were also asked about enforcement: "Should colleges and universities enforce compliance with non-smoking areas?" Finally, they were asked about penalties for non-compliance: "Should people who smoke in non-smoking areas on campus receive some kind of penalty?" Responses were yes or no.

The survey also included questions about smoking policies students would prefer on campus: "Which of the following indoor policies would you prefer on campus?" The same question, substituting "outdoors," was also asked. Response categories included smoking allowed anywhere, smoking allowed only in designated areas, smoking not allowed anywhere, and other.

Students were also asked about their personal smoking status. As is consistent with standard practice, a smoker was defined as someone who had smoked in the past 30 days.[12–15] Former smokers were those who had smoked any cigarettes, even a few, but had not smoked in the past 30 days. Never smokers were those who had never smoked cigarettes.

Sociodemographic variables included gender, age, class standing, ethnicity and race, and current grade point average (GPA). These were all determined by self-report.

**Analysis**

We calculated the frequency of self-reported demographic characteristics of our sample. To assess knowledge of smoking policies, we calculated the frequency of all respondents and current, former, and never smokers who believed that smoking was allowed, was allowed only in designated areas, or was allowed anywhere. Opinions about smoking policies were assessed among all respondents and current, former, and never smokers by calculating the frequency of respondents who strongly agreed or agreed with opinion statements. Preference for a given indoor or outdoor smoking policy (not allowed, allowed in designated areas, and allowed everywhere) was calculated using frequency of responses for never, former, and current smokers and all respondents.

The intention of this article is to be descriptive; however, we report odds ratios and *p*-values comparing current smokers to former smokers and never smokers. The odds ratios are based on non-linear mixed models adjusted for school as a random effect. Respondents were recruited from 30 colleges in the Northwest; therefore, unmeasured influences (policies governing tobacco use, etc.) may impart group-level effects on

the responses. For these analyses, we used SAS PROC MIXED, treating the colleges as random effects.[16] We also performed statistical analyses using individuals as the unit of analysis. For these analyses, generalized linear mixed models were fit for smoking status employing the SAS-supplied macro GLIMMIX.[16]

## RESULTS

A total of 14,237 students responded for an overall response rate of 46.9%, which ranged from 29% to 58% depending on the school. Some 21.6% of these responded to the web survey. A comparison of web site and scannable forms indicated no difference in sociodemographics (age, gender, class in school, type of school attended, GPA) by type of questionnaire completed. Characteristics of students are summarized in Table 1.

Two-thirds of respondents were female. As freshmen were over-sampled, 45% of respondents were in their first year of college; the remaining proportion was equally divided among sophomores, juniors, and seniors. The vast majority of study respondents were Caucasian; few were of Hispanic ethnicity. A total of 17% of the sample currently smoked, nearly a third were former smokers, and half were never smokers. One third of the sample was age 19 or younger, another third was age 20 or 21, and the remaining third was age 22 or older. More than three-quarters of survey respondents had a GPA of 3.0 to 3.99. Students were asked to provide their numeric GPA. When we discovered students with a higher than 4.0 GPA, we investigated policies at those schools and found they gave the equivalent of an A+ for courses, thereby inflating the GPA.

When we examined awareness of smoking policies in indoor places, we found that smokers, former smokers, and never smokers were similar in awareness about the prohibition of smoking in buildings with classrooms, private offices, student unions, cafés and dining areas, residence halls or dorms, and sports arenas (Table 2). By contrast, awareness about smoking policies in outdoor locations varied by smoking status. Nearly half of students who never smoked believed that smoking is prohibited in outdoor stadiums and fields and in parking garages; the proportions were slightly lower for former and current smokers. Slightly more than a quarter of students who never smoked believed that smoking is prohibited near building entrances; nearly 20% of former and current smokers believed the same. Few students believed that smoking is not allowed on campus walkways, though the percentages varied by smoking status, with 15% of students who have never smoked agreeing, and 9% and 5% of former and current smokers agreeing.

**Table 1. Demographic characteristics of college student participants, by smoking status**

| | *College students (N = 14,167)* | |
|---|---|---|
| *Characteristic* | n | *Percent* |
| Gender | | |
| Female | 9,409 | 66.3 |
| Male | 4,785 | 33.7 |
| Class standing | | |
| Freshman | 6,461 | 45.4 |
| Sophomore | 2,596 | 18.2 |
| Junior | 2,643 | 18.6 |
| Senior | 2,537 | 17.8 |
| Race | | |
| Asian/Pacific Islander | 954 | 6.8 |
| African American/Black | 169 | 1.2 |
| Native American/American Indian | 166 | 1.2 |
| Caucasian/White | 11,963 | 85.3 |
| Other | 408 | 2.9 |
| More than one race[a] | 138 | 1.0 |
| Unknown/not reported | 224 | 1.6 |
| Hispanic ethnicity | | |
| Yes | 755 | 5.4 |
| No | 13,290 | 94.6 |
| Smoking status | | |
| Current smoker | 2,455 | 17.3 |
| Former smoker | 4,354 | 30.7 |
| Never smoker | 7,358 | 51.9 |
| Age | | |
| 18 or younger | 986 | 7.1 |
| 19 | 3,795 | 27.2 |
| 20 | 2,490 | 17.9 |
| 21 | 1,948 | 14.0 |
| 22 or older | 4,712 | 33.8 |
| Grade point average | | |
| Less than 2.0 | 52 | 0.6 |
| 2.0–2.99 | 1,677 | 17.5 |
| 3.0–3.99 | 7,480 | 77.9 |
| 4.0 or greater | 398 | 4.1 |

[a]Percentages are based on non-missing values.

We also examined preferred smoking policies by smoking status. Of particular importance to note is the high proportion of students in all groups who preferred restrictions on smoking (Table 3). Nevertheless, differential proportions were noted by smoking status. Odds ratios are presented, along with their *p*-values for level of agreement with the statements by smoking status. More than 90% of students who never smoked believed that colleges should provide a smoke-free environment for students; a smaller share of former smokers (88%) and current smokers (64%) agreed. The odds ratios were significantly different

**Table 2. Knowledge of campus smoking policies, by smoking status**

| *Smoking policies* | *All (N=14,167)* n *(percent)* | *Current smokers (n=2,455)* n *(percent)* | *Former smokers (n=4,354)* n *(percent)* | *Never smokers (n=7,358)* n *(percent)* |
|---|---|---|---|---|
| Indoor places | | | | |
| Private offices | | | | |
| Not allowed | 10,606 (98.6) | 1,920 (98.6) | 3,218 (98.5) | 5,428 (98.6) |
| Designated areas | 140 (1.3) | 24 (1.2) | 45 (1.4) | 69 (1.3) |
| Allowed anywhere | 13 (0.1) | 3 (0.2) | 4 (0.1) | 6 (0.1) |
| Student union | | | | |
| Not allowed | 11,851 (97.3) | 2,111 (97.4) | 3,611 (97.1) | 6,084 (97.3) |
| Designated areas | 318 (2.6) | 52 (2.4) | 108 (2.9) | 156 (2.5) |
| Allowed anywhere | 14 (0.1) | 4 (0.2) | 0 (0.0) | 10 (0.2) |
| Residence halls/dorms | | | | |
| Not allowed | 9,768 (86.9) | 1,592 (83.2) | 2,747 (85.5) | 5,392 (88.8) |
| Designated areas | 1,455 (12.9) | 316 (16.5) | 461 (14.4) | 670 (11.0) |
| Allowed anywhere | 17 (0.2) | 5 (0.3) | 3 (0.1) | 9 (0.2) |
| Sports arenas | | | | |
| Not allowed | 8,218 (86.9) | 1,387 (84.0) | 2,401 (84.8) | 4,402 (89.1) |
| Designated areas | 1,107 (11.7) | 243 (14.7) | 385 (13.6) | 471 (9.5) |
| Allowed anywhere | 135 (1.4) | 21 (1.3) | 45 (1.6) | 68 (1.4) |
| Outdoor places | | | | |
| Campus stadium/fields | | | | |
| Not allowed | 3,516 (42.5) | 532 (36.9) | 993 (39.3) | 1,976 (46.3) |
| Designated areas | 3,214 (38.9) | 655 (45.4) | 1,044 (41.3) | 1,502 (35.2) |
| Allowed anywhere | 1,540 (18.6) | 255 (17.7) | 488 (19.3) | 794 (18.6) |
| Parking garages | | | | |
| Not allowed | 1,525 (36.3) | 226 (28.6) | 395 (30.2) | 899 (43.1) |
| Designated areas | 731 (17.4) | 136 (17.2) | 249 (19.0) | 343 (16.4) |
| Allowed anywhere | 1,945 (46.3) | 428 (54.2) | 665 (50.8) | 844 (40.5) |
| Near building entrances | | | | |
| Not allowed | 3,165 (25.5) | 501 (22.4) | 845 (22.7) | 1,811 (28.3) |
| Designated areas | 4,089 (33.0) | 812 (36.3) | 1,287 (34.5) | 1,975 (30.9) |
| Allowed anywhere | 5,149 (41.5) | 924 (41.3) | 1,598 (42.8) | 2,613 (40.8) |
| On campus walkways | | | | |
| Not allowed | 1,356 (11.5) | 114 (5.3) | 332 (9.3) | 906 (15.0) |
| Designated areas | 1,729 (14.6) | 269 (12.4) | 566 (15.8) | 883 (14.6) |
| Allowed anywhere | 8,732 (73.9) | 1,789 (82.4) | 2,676 (74.9) | 4,245 (70.4) |

NOTE: Percentages are based on non-missing values.

by smoking status. Slightly more than two-thirds of never smokers believed that colleges should provide areas for smokers to smoke, whereas 77% and 92% of former and current smokers agreed. Although nearly all never and former smokers believed that the desire for breathing clean air takes priority over the desire to smoke, about 80% of current smokers reported such. High percentages of all groups agreed that colleges should post signs where smoking is or is not allowed. Nearly all former smokers and never smokers, and nearly 90% of current smokers, believed that colleges should enforce compliance with non-smoking areas. Nearly 90% of former smokers and never smokers, but about 70% of current smokers, believed colleges should impose penalties for smoking in non-smoking areas on campus. With the exception of posting signs, all odds ratios were significant.

The majority of students preferred that smoking be prohibited in indoor areas on campus and that smoking be limited to designated outdoor areas on campus, but the students differed in their opinions according to their smoking status. Over four-fifths of never and former smokers believed that smoking should be prohibited in all indoor areas on campus; however, only about 60% of smokers concurred. The odds ratio for the probability of choosing "not allowed anywhere" compared to the other two choices was significant for both former and current smokers. The

**Table 3. Opinions on statements about campus smoking policies among college students, by smoking status[a]**

| | *Percent who agree* | *Odds ratio[b]* | p *value[b]* |
|---|---|---|---|
| College should provide smoke-free environment for students | | | |
| Never smokers | 92.7 | 1.00 | |
| Former smokers | 87.9 | 0.57 | <0.001 |
| Current smokers | 64.3 | 0.15 | <0.001 |
| College should provide areas for smokers to smoke | | | |
| Never smokers | 69.2 | 1.00 | |
| Former smokers | 77.0 | 1.43 | <0.001 |
| Current smokers | 92.5 | 4.85 | <0.001 |
| Desire to breathe clean air has priority over desire to smoke | | | |
| Never smokers | 97.5 | 1.00 | |
| Former smokers | 94.7 | 0.47 | <0.001 |
| Current smokers | 81.5 | 0.12 | <0.001 |
| College should post clear signs on where smoking is (not) allowed | | | |
| Never smokers | 94.5 | 1.00 | |
| Former smokers | 94.5 | 0.93 | 0.39 |
| Current smokers | 90.8 | 0.53 | <0.001 |
| College should enforce compliance with non-smoking areas | | | |
| Never smokers | 96.9 | 1.00 | |
| Former smokers | 95.8 | 0.75 | 0.003 |
| Current smokers | 88.6 | 0.26 | <0.001 |
| Colleges should penalize students for smoking in non-smoking areas on campus | | | |
| Never smokers | 92.5 | 1.00 | |
| Former smokers | 87.5 | 0.59 | 0.003 |
| Current smokers | 70.5 | 0.21 | <0.001 |

[a]Percentages are based on non-missing values.

[b]Based on GLIMMIX procedures that model the probability of agreeing with the statement, adjusting for schools as random effects

belief that smoking should be prohibited in all outdoor areas was held by 43% and 30% of never and former smokers, but only 7% of current smokers. The odds ratios were significant.

## DISCUSSION

Despite calls for more stringent restrictive smoking policies on campus, many colleges and universities do not implement such policies. One reason may be fear of negative student reactions to such policies. Our research shows that the majority of students, including current smokers, favor policies that state where smoking is and is not allowed. Further, a high percentage of smokers as well as non-smokers support policies that favor clean air over the right to smoke. Despite these findings, it is clear that current smokers are significantly less likely to want smoke-free and smoking-restrictive policies on campus, compared to non-smokers.

Regardless of smoking status, students appeared to be well informed about smoking in indoor places on campus. Separate information from the colleges confirmed students' knowledge of restrictions in buildings with classrooms, private offices, student unions, and dining areas. There was high agreement between student responses and college informant responses on restrictive smoking policies. A few colleges allowed smoking in some residence halls and this is also reflected in student responses. Colleges appear to be spreading information on policies effectively.

There was less consistency in the understanding of outdoor smoking policies. More never smokers than former or current smokers believed that specific outdoor areas had smoke-free policies. This may be due to a variety of factors. Outdoor areas may have less signage than indoor areas. Never smokers may be oblivious to designated smoking areas unless they encounter a smoker in a specific area. Because they are prohibited from smoking in many places indoors, smokers may be more aware of outdoor places where smoking is allowed.

We provided a number of statements about smoking and non-smoking policies on campuses. Although smokers in general had lower approval rates for restrictive policies, it is noteworthy that the majority of smokers believed that colleges should provide smoke-free environments. Seventy percent of smokers thought students caught smoking in non-smoking areas

**Table 4. Preferred smoking policies among college students, by smoking status[a]**

| | *Indoor smoking polices* | | | | *Outdoor smoking policies* | | | |
|---|---|---|---|---|---|---|---|---|
| *Smoking status* | *Not allowed* | *Designated areas* | *Anywhere* | *Odds ratio[b]* | *Not allowed* | *Designated areas* | *Anywhere* | *Odds ratio[b]* |
| Never smokers | 6,434 (88.3) | 839 (11.5) | 12 (0.16) | 1.00 | 3,165 (43.3) | 3,679 (50.4) | 461 (6.31) | 1.00 |
| Former smokers | 3,488 (81.4) | 781 (18.2) | 14 (0.33) | 0.62[c] | 1,307 (30.3) | 2,528 (58.7) | 475 (11.0) | 0.58[c] |
| Current smokers | 1,393 (57.8) | 976 (40.5) | 39 (1.62) | 0.19[c] | 168 (6.92) | 1,331 (54.9) | 927 (38.2) | 0.11[c] |

[a]Percentages are based on non-missing values.

[b]Based on the probability of choosing "not allowed" vs. choosing "allowed in designated areas" or "allowed anywhere" in GLIMMIX procedures, adjusting for schools as random effects.

[c]$p<0.001$

should be penalized. Almost 90% of smokers thought colleges should enforce compliance with non-smoking areas. These data are valuable for administrators who may wish to implement restrictive smoking policies, as they indicate a high rate of agreement among smokers as well as non-smokers for clean air on campuses. Nevertheless, significant differences in what smokers desire compared to the wishes of non-smokers suggests that some controversy exists about the policies, and administrators should be aware that not all smokers will support such policies. Administrators may wish to enact strategies that will inform smokers of upcoming policies.

When students were asked about the types of policies they preferred indoors on campus, more than 80% of all respondents stated smoking should not be allowed anywhere. These rates were higher for non-smokers, but even among smokers the majority (58%) asked for smoke-free areas indoors. An additional 40% of smokers asked for designated smoking areas. This indicates that smokers desire to spend much of their time in smoke-free areas or at least areas where smoking is restricted.

The preferred policies for outdoor areas vary less, although a large number of never smokers do prefer smoke-free areas. The most surprising finding is that among smokers and non-smokers, the desire for designated smoking areas outdoors is approximately equal (around 55%). It may be that smokers are increasingly aware of the stigma attached to smoking in public; therefore, they desire to know exactly where smoking is and is not allowed. Alternatively, designated smoking areas may provide opportunities for smokers to get together with other smokers and provide support for their activity.

**Limitations**

This study has some limitations. The student response rate was low given the effort that went into obtaining responses. Others have experienced somewhat higher response rates. Rigotti and colleagues obtained response rates of 70% (1993), 60% (1997), 60% (1999), and 52% (2001) in The Harvard College Alcohol Study.[14] However, they eliminated schools with very low response rates. The National College Health Risk Behavior Survey conducted by the Centers for Disease Control and Prevention in 1995 yielded a 65% response rate; however, phone calls were made to non-responding students.[17,18] Comparisons of web-based and mailed surveys yielded results of 58.3% and 62% respectively.[19] In another study, an e-mail survey to college students resulted in a response rate of 56.1%.[20] Our response rates fall under those; however, as The Harvard College Alcohol Study suggests, there is some indication that student response to surveys of this kind is deteriorating over time.[15]

Although we drew a random sample in the hope of obtaining a representative sample of students, the response rate threatens the validity of representation. Unfortunately, we had no demographic data on the non-respondents that would allow us to compare the two groups for representativeness of the sample. We suspect, however, that our sample is composed of higher achieving students, as GPAs for the respondents were very high compared to what could be expected for the entire college population. Students with higher GPAs have been shown in another study as less likely to smoke than those with lower GPAs.[15]

The results reported here are from four-year colleges. Other studies have shown higher smoking rates among two-year college students,[21] and, indeed, smoking rates overall in the 18- to 24-year-old group are now the highest in the country. We were unable to survey other segments of the 18- to 24-year-old population, thus our results apply only to four-year colleges. Similarly, they can be generalized only to colleges in the Northwest.

## CONCLUSIONS

We examined college students' knowledge of and attitudes toward restrictive smoking policies. In general, we found knowledge to be high regardless of smoking status. Surprisingly, a high percentage of smokers as well as non-smokers desired smoke-free policies indoors and designated policies outdoors. The responses of smokers and non-smokers indicate that restrictive smoking policies on campuses are well received and have high rates of approval. Administrators can use this information to enact and enforce restrictive campus smoking policies, recognizing that there will be some opposition by smokers to the policies.

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## REFERENCES

1. Husten CG, McCarty MC, Giovino GA, Chrismon JH, Zhu B. Intermittent smokers: a descriptive analysis of persons who have never smoked daily. Am J Public Health 1998;88:86-9.
2. Wetter DW, Kenford SL, Welsch SK, Smith SS, Fouladi RT, Fiore MC, et al. Prevalence and predictors of transitions in smoking behavior among college students. Health Psychol 2004;23:168-77.
3. Wechsler H, Rigotti NA, Gledhill-Hoyt J, Lee H. Increased levels of cigarette use among college students: a cause for national concern [published erratum appears in JAMA 1999;281:136]. JAMA 1998;280:1673-8.
4. Knapp LG, Kelly JE, Whitmore RW, Wu S, Gallego LM, Grau E. Postsecondary institutions in the United States: Fall 2000 and degrees and other awards conferred 1999-2000 (NCES 2002-156). Washington: Department of Education (US), National Center for Education Statistics; 2001.
5. American Cancer Society. Advocating for a tobacco-free campus: a manual for college and university students, vol. 2005. Boston: American Cancer Society, New England Division; 2001.
6. American College Health Association. Position statement on tobacco on college and university campuses, vol. 2005. Baltimore: American College Health Association, Alcohol Tobacco and Other Drugs Committee; 2005.
7. Rigotti NA, Regan S, Moran SE, Wechsler H. Students' opinion of tobacco control policies recommended for US colleges: a national survey. Tob Control 2003;12: 251-6.
8. Halperin AC, Rigotti NA. US public universities' compliance with recommended tobacco-control policies. J Am Coll Health 2003;51:181-8.
9. Etter JF, Ronchi A, Perneger T. Short-term impact of a university based smoke free campaign. J Epidemiol Community Health 1999;53:710-5.
10. Murphy-Hoefer R, Griffith R, Pederson LL, Crossett L, Iyer SR, Hiller MD. A review of interventions to reduce tobacco use in colleges and universities. Am J Prev Med 2005;28:188-200.
11. Borders TF, Xu KT, Bacchi D, Cohen L, SoRelle-Miner D. College campus smoking policies and programs and students' smoking behaviors. BMC-Public Health 2005;74:1471-6.
12. Delnevo CD, Lewis MJ, Kaufman I, Abatemarco DJ. Defining cigarette smoking status in young adults: a comparison of adolescent vs. adult measures. Am J Health Behav 2004;28:374-80.
13. Emmons KM, Wechsler H, Dowdall G, Abraham M. Predictors of smoking among US college students. Am J Public Health 1998;88:104-7.
14. Rigotti NA, Regan S, Majchrzak NE, Knight JR, Wechsler H. Tobacco use by Massachusetts public college students: long term effect of the Massachusetts Tobacco Control Program. Tob Control 2002;11 Suppl 2:ii20-4.
15. Rigotti NA, Lee JE, Wechsler H. US college students' use of tobacco products: results of a national survey. JAMA 2000;284:699-705.
16. SAS Institute Inc. SAS 9.0 for Windows. Cary (NC): SAS Institute; 2002.
17. Everett SA, Husten CG, Kann L, Warren CW, Sharp D, Crossett L. Smoking initiation and smoking patterns among US college students. J Am Coll Health 1999;48:55-60.
18. Douglas KA, Collins JL, Warren C, Kann L, Gold R, Clayton S, et al. Results from the 1995 National College Health Risk Behavior Survey. J Am Coll Health 1997;46:55-66.
19. Pealer LN, Weiler RM, Pigg RM Jr, Miller D, Dorman SM. The feasibility of a web-based surveillance system to collect health risk behavior data from college students. Health Educ Behav 2001; 28:547-59.
20. DeBernardo RL, Aldinger CE, Dawood OR, Hanson RE, Lee SJ, Rinaldi SR. An e-mail assessment of undergraduates' attitudes toward smoking. J Am Coll Health 1999;48:61-6.
21. Johnston LD, O'Malley PM, Bachman JG. Monitoring the future: national survey results on drug use, 1975-1999. Volume II: College students and adults ages 19–40 (NIH 00-4803). Bethesda (MD): Department of Health and Human Services (US), National Institutes of Health, National Institute of Drug Abuse; 2000.