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A Multimodal Assessment of Tobacco Use on a University Campus and Support for Adopting a Comprehensive Tobacco-Free Policy

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Abstract

Many college campuses now prohibit tobacco use. At a private U.S. university, the current study assessed cigarette and e-cigarette use and characterized the climate for adopting a comprehensive tobacco-free policy. Data were gathered January–August 2018 via an: environmental scan; cigarette-urn audit; and representative surveys with campus community members. Despite low prevalence of tobacco (0.5%–8%) and e-cigarette use (0.9%–6%) among all groups, campus cigarette clean-up costs exceeded \$114,000 for an estimated >1 million butts left on campus annually. A majority of respondents (63% of N=2218) favored a campus-wide tobacco-free policy, 16% opposed, and 21% abstained. Most respondents endorsed benefits of supporting health (93%), ensuring tobacco-free air to breathe (92%), reducing litter (88%), preventing tobacco use (84%) and fires (83%), and helping tobacco users quit (65%). Identified challenges included policy enforcement (69%) and stigmatization of smoking (57%); 30% viewed a policy as

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DISCLOSURES

Dr. Prochaska has served as an expert witness against the tobacco companies in lawsuits and has provided consultation to pharmaceutical and technology companies that make medications and other treatments for quitting smoking. No other authors have disclosures to report related to this work.

compromising personal freedoms. In a model explaining 35% of variance in policy support, those more likely to favor comprehensive tobacco-free campus policy were Asian respondents; diagnosed with asthma; exposed to secondhand smoke on campus; who viewed campus cigarette butt litter as problematic; and identified health, prevention, and cessation benefits of a tobacco-free campus. Those less likely in favor were students, those who smoke, and those perceiving impingement upon personal freedoms, stigmatization, and broader (slippery slope) implications. Findings indicate low tobacco use prevalence among the campus community, yet a large volume of butt litter and high tobacco clean-up costs. Predictors of policy support can inform campus outreach efforts.

Keywords

tobacco; university; perceptions; policy

1. INTRODUCTION

The smoking prevalence among young adults in the U.S. has nearly halved since 2014, while nicotine vaping has increased: 30% of college students report ever use of e-cigarettes and 15% report current use.^{1,2} Nearly all (99%) people who smoke start before age 26,³ making the college setting relevant for prevention and cessation efforts to avert later health harms.

Tobacco-free policies on college campuses protect the community from secondhand smoke exposure, make tobacco use inconvenient and less socially acceptable, reduce smoking initiation, and increase efforts to quit smoking.⁴ Students and faculty tend to support tobacco-free policies.⁵ Over the last five years, smoke and tobacco-free policies at U.S. college campuses more than doubled. As of April 2019, 2,356 of the 4,298 U.S. college and university campuses have smoke-free policies (55%), of which 1,986 are tobacco-free and 1,965 include e-cigarettes in their policy.^{6,7}

Tobacco-free campus policies can face opposition. Historically, tobacco companies have targeted universities with youthful marketing.^{8,9} Vape shops and hookah lounges cluster around college campuses.^{2,10} Arguments opposing tobacco-free campus policies emphasize concerns around socially marginalizing those who smoke,¹¹ relinquishing personal freedoms, and creating enforcement challenges.¹²

Previous research has examined support for college campus tobacco-free policies, often after implementation. A systematic review of polling data on tobacco or smoke-free policies at four-year public universities identified 54 campus newspaper articles with data on over 130,000 respondents and found general approval.¹³ A U.S. public university reported 72% of students and 77% of faculty and staff favored the campus's smoke-free policy with greater support among never smokers, those who perceived support by peers, and those exposed to smoke on campus.¹⁴ An Australian study assessed smoke-free campus policy support prior to implementation and found 66% of respondents in favor.¹⁵

Few studies of tobacco-free policies have taken place at private U.S. universities or employed mixed methodologies to engage all facets of a campus community prior to policy

adoption and implementation. Private universities are less likely to have updated tobacco control policies and dedicated prevention and treatment programming.¹⁶ In a systematic review of interventions to reduce tobacco use at universities, only 1 of 14 studies was at a private university setting.¹⁷ With environmental measures and representative surveys of students, postdoctoral fellows, faculty, and staff, the current study aimed to assess tobacco use on campus and characterize the climate for adopting a comprehensive tobacco-free policy.

2. METHODS

2.1 Setting

The setting was a private university in California with >33,000 students, faculty, and staff. The majority of undergraduate students live in on-campus guaranteed housing, and most graduate students qualify for on-campus housing for at least a year. A quarter of students are international. The university reports 150,000 visitors with registered tours on campus annually; the number of unregistered visitors is believed to be magnitudes greater. Although the adjacent medical school has a comprehensive tobacco-free policy, smoking and tobacco use remain permitted on the main campus in all outdoor areas at least 30 feet away from doorways, open windows, covered walkways, and ventilation. Previous efforts to increase regulation of tobacco use on campus received mixed results, with some successes (e.g., prohibiting on-campus tobacco sales) and challenges (e.g., rejection of designated smoking zones).

2.2 Formative Work and Collaborations

A committee taskforce of faculty, students, and staff was formed in 2017 to advise on study procedures. In addition, two small group community dialogues were held during a campus —wellness weekll for community members to discuss the current campus tobacco-free policy and provide study input. To broaden data sources, the research team consulted with the campus employee wellness program and the department of student health and substance use on the tobacco-related items to be included in their health risk assessments. The collaborations yielded multiple multimodal data sources with input from a variety of constituency groups.

2.3 Data Sources

Table 1 shows study data sources and aims. For assessing tobacco use on campus, two environmental observational measures and three self-report surveys (two anonymous, one confidential; two with random sampling) were used. For characterizing the campus climate for adopting comprehensive tobacco-free policy, an anonymous opinion poll was conducted with students, postdoctoral fellows, faculty, and staff. The environmental measures captured cigarette waste, clean-up costs, and included tobacco use by visitors to campus.

Campus enviro-scan.—An environmental scan was conducted in January 2018 to quantify cigarette litter on the core campus using a tool from the American Cancer Society’s Tobacco-Free Generation Campus Initiative. The tool suggested 12 area types to survey (e.g., exteriors of dormitories, cafeterias, student union; parking lots; outdoor green areas).

In selecting areas to survey on campus, the team chose those within each type located closest to the campus center and student activity. Three research team members surveyed all selected areas for approximately four hours on one day and counted the no-smoking signage, the active use of any tobacco products, and the number of cigarette butts on the ground. Two team members also surveyed the campus's forest and lake area for approximately two hours on another day. The sampled areas represented less than a tenth of areas on the core campus (e.g., 1 of 17 dormitories, 1 of 9 cafeterias (plus cafes), 1 of 11 libraries, 1 of >100 classroom buildings).

Cigarette urn audit.—Partnering with the campus facilities department, research staff collected butts from a sample of 15 ashtrays in five locales in high-traffic areas around campus (out of 317 total campus ashtrays). The urns were emptied daily by facilities during the week and not during the weekend. The audits were completed on two consecutive days in February 2019: Monday after a 72-hour weekend period and Tuesday after a 24-hour weekday period. The sampled days did not coincide with any major sporting or other campus events. Butts were collected from the urns, placed into labeled plastic bags, counted by hand, and recorded into an Excel spreadsheet. Where still visible, brand names were noted. Totals were calculated separately for the 72-hour weekend period and 24-hour weekday period.

Faculty and staff health risk appraisal.—Data on past 30-day cigarette and e-cigarette use and past 30-day on-campus secondhand smoke exposure were obtained from the university employee wellness program's health risk appraisal conducted annually with benefits-eligible faculty and staff. Data obtained were aggregated and reported by the campus wellness office for faculty and staff separately.

Student substance use survey.—The university department overseeing student health and substance use conducted a campus survey in 2018 with a randomly selected, representative sample of 2,000 undergraduate students, stratified by class year. Data on past 12-month and 30-day tobacco product use and exposure to secondhand smoke were aggregated and reported by class year.

Policy opinion poll.—A 20-item policy opinion poll was created for this study to assess: 1) university affiliation; 2) residence status on or off campus; 3) episode of asthma in the last 12 months; 4) gender identity; 5) age; 6) race/ethnicity; 7) exposure to cigarette smoke or vapor when on campus (never, rarely, sometimes, often); 8) perception of cigarette litter on campus (no problem, minor, serious, severe, no opinion); and 9) current smoking status (every day, some days, not at all). For the polling item, the campus's tobacco policy language was presented, followed by the question, "Would you favor or oppose a tobacco policy that would prohibit the use of all tobacco products on core campus, including all outdoor areas within the perimeter of Campus Drive?" Response options were: favor, oppose, neither favor nor oppose (abstain). Ten statements assessed agreement with potential effects of a tobacco policy, such as "reduces fire danger" and "violates personal freedoms" (Figure 1). Response options were: strongly disagree, disagree, agree, and strongly agree.

Respondents were recruited from January to August 2018 using three sources: 1) print directories (undergraduate students); 2) online directories (graduate students, faculty); and 3) listservs (postdoctoral fellows, staff). Using a random digit table, we randomly selected and emailed a survey link to 1,016 undergraduate students (14% of total undergraduate population), 1,679 graduate students (19% of total), and 996 faculty (16% of total). Given the smaller number, we invited all postdoctoral scholars to participate via a listserv (2,262, 94% of total). Participants could elect to receive a \$5 Amazon gift card as compensation for completing the survey by providing their email address separately from survey responses to ensure anonymity. To avoid duplicate or fraudulent responses, survey responses with the same IP address completed in near time or with very similar email addresses for payment were removed from the final analysis (n=247 removed). Respondents who identified as alumni or other affiliation were removed due to small numbers (n=9).

2.4 Data Analyses

Data were summarized with descriptive statistics. Where sample sizes allowed, we tested for group differences in tobacco use, secondhand exposure, and policy support using Analysis of Variance tests and chi-square tests. A binary logistic multiple regression was run to identify predictors of comprehensive tobacco-free campus policy support. The model included demographic variables, reported tobacco use and exposure, and perceptions of the benefits and challenges of a tobacco-free campus policy. For model testing, race was analyzed as White, Asian, and other and gender as female versus male/other due to small numbers of all other racial and gender groups. One participant missing data on past year episode of asthma and smoking status was excluded from the regression analysis. Respondent age and residency status were not included in model testing because both overlapped greatly with campus affiliation.

3. RESULTS

3.1 Enviro-Scan

The environmental scan of cigarette litter on the ground identified cigarette butts at 7 of 14 locations visited, including a fraternity, library, dining hall, and the forest and lake area. We counted 596 butts on campus and 296 butts in the forest and lake area. Litter was primarily concentrated around the parking lots and outside dining halls. These were cigarettes on the ground, not deposited in the campus cigarette urns. Four people were seen smoking: outside the student union and a dorm. The low number of observed people smoking may have been due to rainy, cold weather. Signage prohibiting smoking was present in 3 of 14 observed areas but not very visibly, often blending in with foliage.

3.2 Cigarette Urn Audit

We counted 1,280 butts over a 72-hour weekend period and 39 butts over a 24-hour weekday period in the 15 sampled ashtrays. While the majority were American brands (Marlboro, Pall Mall, Parliaments, Camels), many were international Chinese brands (i.e., with traditional Chinese characters), Japan (e.g., Mevius), and Great Britain (e.g., Dunhill). Extrapolated to a year with 52 Friday-Sunday periods and 200 other days, this would be 74,360 butts in the 15 assessed ashtrays (5% of the 317 campus urns). The cost of campus urn clean-up in 2018

was approximately \$9,533 a month or >\$114,000 a year, which does not include grounds-keeping costs of removing cigarette butts littered on the ground.

3.3 Faculty and Staff Health Risk Appraisal

Of 10,492 employees who completed the health risk appraisal, 10,415 identified as faculty or staff (69% participation rate). Current cigarette smoking was more common among staff (2.8%) than faculty (0.9%) ($X^2=7.48$, $p<.01$), as was current e-cigarette use (staff: 1.7%; faculty: 0.5%, $X^2=4.77$, $p=.02$). Staff also were more likely to report a little or a lot of exposure to others' tobacco smoke on campus in the past 30 days compared to faculty: 12% versus 6%, respectively ($X^2=16.87$, $p<.01$).

3.4 Student Substance Use Survey

Respondents ($n=754$, 37.5% response rate) were 30% freshmen, 25% sophomores, 24% juniors, and 21% seniors; 55% female, 35% male, and 10% other; racial/ethnic identities were 30% Asian, 8% African American, 48% Caucasian/White, 15% Hispanic/Latinx, 3% American Indian/Alaska Native (not exclusive categories). Overall, 21% of respondents reported past-year tobacco product use and 15% past 30-day use, with no significant difference by class year (Table 2). Usual tobacco products of past-year tobacco users were: cigarettes (51%), e-cigarettes (43%), and other (19%, e.g., cigars, hookah, smokeless). By class, among past-year tobacco users, the proportion reporting cigarette vs. e-cigarette use was freshmen: 50/50, sophomores: 36/50, juniors: 48/30, and seniors: 73/33 (students could choose more than one usual product type and could select other). Exposure to secondhand smoke on campus in the past 30-days was reported overall as none (43%), 1–3 times (43%), 4–6 times (10%), and 7+ times (4%). Table 2 shows the percent reporting exposure to secondhand smoke on campus at least once in the past 30-days, which differed significantly by class year with a weak linear increasing trend.

3.5 Policy Opinion Poll

There were $N=2218$ respondents to the policy opinion poll with response rates of 38% for undergraduates, 31% for graduate students, 25% for postdoctoral fellows, and 15% for faculty (staff responses collected via convenience sample from a staff-wide email list could not be determined). The sample was diverse and reflective of the campus community (Table 3) with similar demographic characteristics as the student substance use survey sample. The percent residing on campus was undergraduates (94%), graduate students (54%), postdoctoral fellows (4%), faculty (18%), and staff (7%) ($X^2=1148$, $p<.001$). Reported exposure to tobacco smoke on campus was greatest among undergraduates (86%), followed by graduate students (78%), staff (77%), postdoctoral fellows (69%), and lowest among faculty (66%) ($X^2=44.6$, $p<.01$). Exposure to e-cigarette use on campus also was greatest among undergraduates (92%), followed by graduate students (71%), staff (68%), postdoctoral fellows (61%), and lowest among faculty (59%) ($X^2=122.1$, $p<.01$). Smoking cigarettes some or every day was greatest among undergraduates (7%), followed by graduate students (4.8%), staff (3.9%), postdoctoral fellows (5.8%), and faculty (1.3%) ($X^2=10.7$, $p=.03$).

Support for adopting a comprehensive tobacco-free policy on campus was: 63% in favor, 16% opposed, and 21% abstained. Policy support differed significantly by campus affiliation, age, race, place of residence, smoking status, problems with asthma, perception of litter on campus, and exposure to others' tobacco smoke and e-cigarette use (Table 3).

Table 4 summarizes results of the binary logistic multiple regression model predicting support for a comprehensive tobacco-free campus policy. Relative to undergraduates, support for a comprehensive tobacco-free campus policy was greater among staff (OR=2.04, 95%CI 1.43–2.91); postdoctoral scholars (OR=1.55, 95%CI 1.09–2.21); and faculty members (OR=2.22, 95%CI 1.30, 3.78). Respondents identifying as Asian reported greater support than Caucasians (OR=1.76, 95%CI 1.35–2.28). People who smoke were less supportive than nonsmokers (OR=0.48, 95%CI 0.26–0.89). A past-year asthma attack (OR=1.98, 95%CI 1.18–3.35), exposure to tobacco smoke on campus (OR=1.39, 95%CI 1.04–1.84), and viewing cigarette litter as a problem on campus (OR=1.77, 95%CI 1.39–2.25) predicted greater support for a comprehensive tobacco-free campus policy. Attitudes significantly associated with policy support were beliefs that a tobacco-free campus protects the health of the community (OR=2.85, 95%CI 1.40–5.78), prevents the uptake of tobacco (OR=2.44, 95%CI 1.74–3.41), reduces fire danger (OR=1.41, 95%CI 1.02–1.95), and helps people quit using tobacco (OR=1.84, 95%CI 1.44–2.35). In contrast, participants who reported beliefs that a tobacco-free campus violates personal freedoms (OR=0.21, 95%CI 0.16–0.27), stigmatizes those who smoke (OR=0.46, 95%CI 0.36–0.58), or is the start of a slippery slope (OR=0.57, 95%CI 0.42–0.77) were less likely to support a comprehensive tobacco-free campus policy. The full model explained 35% of the variance in respondents' support for a comprehensive tobacco-free campus policy.

4. DISCUSSION

At a U.S. private university, consolidating multiple data sources, including environmental observations and surveys with members of key constituency groups, findings indicated few community members use tobacco, yet many are exposed to secondhand smoke and a large number of cigarette butts are left on campus, incurring substantial clean-up costs. In a representative anonymous opinion poll, a majority of respondents (63%) favored adopting a comprehensive tobacco-free policy campus-wide to cover all tobacco products, including e-cigarettes. Support was greatest among faculty and staff, those with a past-year episode of asthma, never smokers, and those who believed that a tobacco-free campus advanced the health of the community and assisted tobacco prevention and cessation. Support was lower among undergraduates, people who smoke, and those who believe a tobacco-free campus violates personal freedoms, stigmatizes smoking, and is the start of a slippery slope.

Most respondents believed cigarette litter was a minor or nonexistent problem on campus, which may reflect the investment the university has made in cigarette urns and regular tobacco removal from the grounds. The cigarette urn audit collected >1300 butts in a 4-day period from 15 sampled cigarette urns. Extrapolated over the course of a year (with 52 weekends Friday-Sunday and 200 weekdays), this would be >74,000 butts in just a minority (5%) of the campus's 317 urns. The sampled urns were in high-traffic areas. If normally distributed, the 317 urns would collect about 740,000 butts a year (74,000 * 20/2). The

environmental scan, conducted in 6-hours on two week-days, counted nearly 900 cigarette butts littered on campus grounds in locations representing about a tenth of the campus's outdoor area. Combining the urn and enviro-scan data sources, it is highly likely that the campus is disposing of >1 million cigarette butts annually. The cost of cigarette litter removal was estimated as >\$114,000 annually for emptying the urns and grounds-keeping. Most respondents to the opinion poll (88%) believed that a comprehensive tobacco-free campus policy reduces cigarette litter on campus.

Tobacco use among faculty, staff, postdoctoral fellows, and students on campus ranged from 0.9% to 8% for cigarette smoking and 0.9% to 6% for e-cigarette use, while exposure to secondhand smoke and nicotine vaping on campus was reported by 50% to 76%, with higher levels of exposure among undergraduates. Most (94%) undergraduates reside on-campus; hence, a comprehensive tobacco-free policy would greatly affect their exposure to tobacco and could prevent uptake.

In the policy opinion poll, 21% of respondents abstained and 16% of respondents opposed expanding the university's policy to be comprehensive and cover all tobacco products, campus-wide. A majority (59%) of respondents endorsed concern about stigmatizing smoking, while a minority endorsed concerns about personal freedoms (30%) or the start of a slippery slope (22%). Many (69%) believed a tobacco-free policy would raise enforcement challenges, yet this belief was unrelated to policy support. Messaging ought to focus on providing access to tobacco-free air for all, avoid labeling people as "smokers" or "vapers," and emphasize the distinction of prohibiting tobacco products and not people.

Study strengths include the triangulation of data from environmental and survey sources, the latter incorporating the perspectives of students, postdoctoral fellows, faculty, and staff, who work and may also live on campus. Samples were large and diverse, and student response rates were above the norm for a web-based college student survey on tobacco.^{15,18} This study could help inform methods for assessing campus climate for comprehensive tobacco-free policies at other private academic institutions, many of which are not yet tobacco-free.

Our policy opinion poll survey attempted to represent the campus community; however, we were unable to survey community members without email, and the response rate from faculty was low (15%). Students and faculty also could have opted out of the print and online source directories. Lack of a staff directory left us with convenience sampling via a staffers email listserv. We were unable to contact staff hired through third parties or as contractors, such as construction workers, dining hall workers, bus drivers, and janitorial staff. Postdoctoral fellows were surveyed only in the policy poll and were invited via a listserv. Hence, more postdoctoral fellows and staff had the potential for participating given the use of listservs for their recruitment. Policy support was reported separately by respondent characteristics including affiliation (Table 3), and affiliation was included in the logistic regression model (Table 4). Observing people smoking could alter their behavior; however, our environmental scan was brief and unobtrusive and was complemented with the cigarette urn audit. While the clean-up schedule for the grounds-keeping department was less specific, the urns were serviced daily on weekdays. There are uncertainties in the estimation process for the number of cigarette butts left on campus annually, and our final

estimate is conservative. Due to variations in survey sampling and survey items, the data sources were examined separately. Triangulating different data sources enhanced our perspective into the campus tobacco climate. Focused on one private university campus in California, generalizability is limited.

5. CONCLUSION

Through a mixed-methods approach, a variety of community data sources were aggregated to estimate tobacco product use among university students, postdoctoral fellows, faculty, and staff. The majority of the community was supportive of adopting a comprehensive tobacco-free policy; however, support was lowest among undergraduates with the largest challenge being beliefs that such a policy would stigmatize people who smoke. While all groups would benefit from tobacco-free air, student involvement could help close the disparity in support. For example, training and employing peer ambassadors to publicize the policy and approach violators has demonstrated success in increasing compliance and reducing tobacco litter on college campuses.¹⁹

In the current study, tobacco use was uncommon among members of all constituent groups surveyed. Yet, exposure to tobacco smoking and vaping was reported by most. Cigarette litter was substantial and costly to remove. Given the campus community's very low smoking prevalence, a sizeable, yet unmeasured proportion of the butt waste may be due to the over 150,000 annual visitors to campus. Implementation of a comprehensive tobacco-free campus policy could benefit from signage and messaging that emphasizes the campus's tobacco-free social norms, community values of environmental sustainability and access to tobacco-free air, and ample savings in clean-up costs.

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HIGHLIGHTS

- This study assessed perspectives toward a campus-wide tobacco-free policy prior to adoption at a private U.S. university.
- In a mixed-methods design, this study consolidated findings from multiple constituent groups and data sources.
- Despite low tobacco use prevalence among the campus community, butt litter and clean-up costs were substantial.
- Policy opinion polling found 63% favored a campus-wide tobacco-free policy with 16% opposed and 21% abstaining.
- Most endorsed community and environmental benefits; 69% identified policy enforcement challenges.

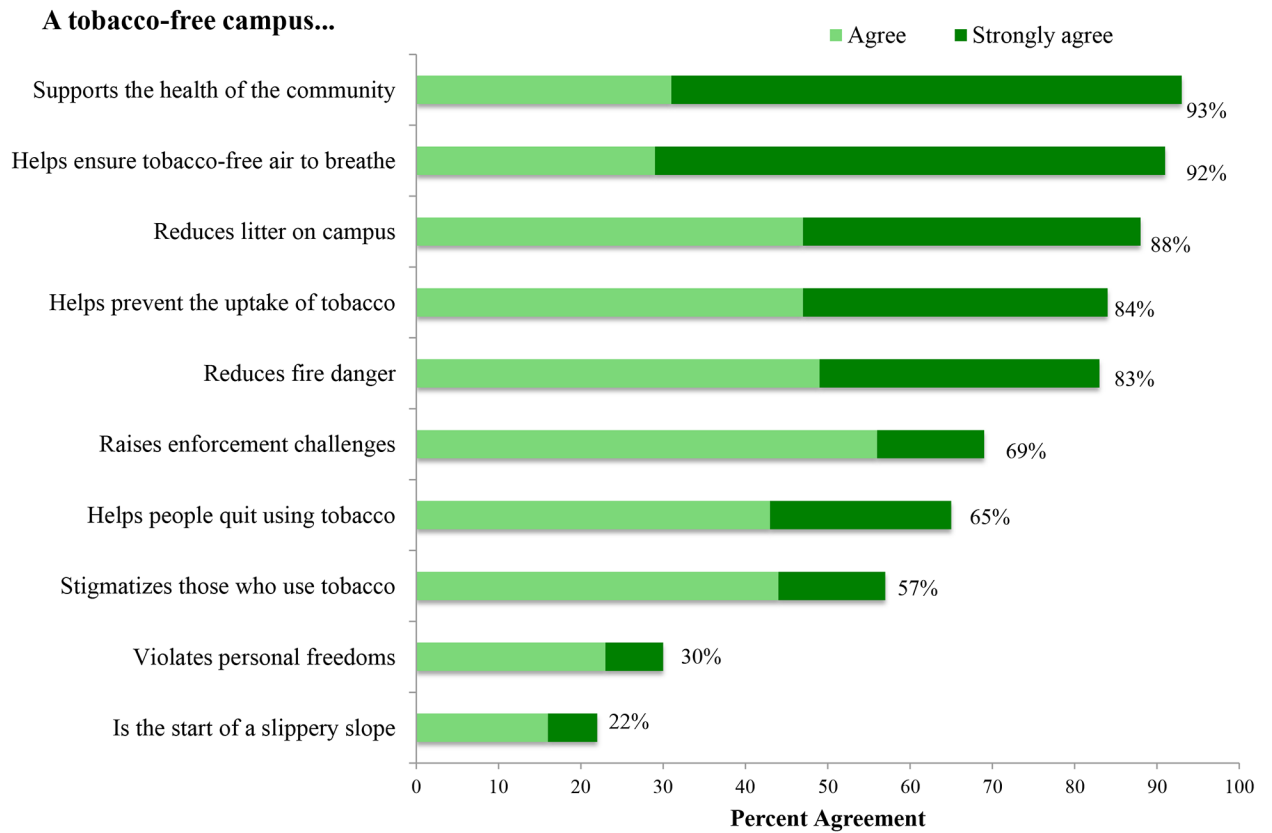


Figure 1.
Beliefs of policy opinion poll respondents (N=2218)

Table 1.

Study Aims and Description of Data Sources

Data Source	Description
Aim 1: Assess tobacco use on campus	
Campus enviro-scan	6-hour observational count of cigarette butt litter on campus in 14 areas
Cigarette urn audit	Weekday and weekend observational count of butts in 15 campus urns
Faculty and staff HRA	Tobacco assessment in university employee wellness survey
Student survey	Tobacco assessment in undergraduate student substance use survey
Aim 1: Assess tobacco use on campus	
Aim 2: Characterize climate in support of / opposition to a campus-wide tobacco-free policy	
Policy opinion poll	Survey of students, postdoctoral fellows, staff, and faculty regarding tobacco use and perceptions around updating the campus policy from smoke-free to tobacco-free and covering the core campus

HRA = health risk assessment

Table 2.

Undergraduate Student Substance Use Survey (N=754): Tobacco Use and Secondhand Smoke Exposure on Campus, Reported by Class Year

Class year	Freshmen	Sophomores	Juniors	Seniors	Eta
Sample size (n)	226	189	181	158	
Past 12-month tobacco use (%)	20%	19%	23%	21%	0.02
Past 30-day tobacco use (%)	14%	12%	18%	16%	0.04
Past 30-day secondhand smoke exposure on campus (%)	50%	56%	58%	66%	0.11*

* indicates significant difference by class year at $p < .05$

Note: Eta measures the degree of association, ranging from 0 (no association) to 1.00 (high association), between an interval scale variable (e.g., class year) and a nominal scale variable (e.g., tobacco use, secondhand smoke exposure)

Table 3.

Policy Opinion Poll Survey Responses by Participant Characteristics (N=2218)

	Favor	Abstained	Oppose
	% (n)	% (n)	% (n)
Overall	63% (1396)	21% (465)	16% (357)
Affiliation			
Undergraduate student	49% (188)	30% (117)	21% (83)
Graduate student	56% (294)	24% (124)	20% (106)
Postdoctoral Scholar	66% (373)	21% (117)	13% (76)
Staff	73% (427)	15% (87)	12% (72)
Faculty	74% (114)	13% (20)	13% (20)
Age (years)			
18–27	56% (464)	26% (215)	18% (148)
28–37	65% (640)	19% (192)	16% (159)
38–57	75% (226)	14% (41)	11% (33)
58+	66% (65)	16% (16)	17% (17)
Gender			
Male	59% (646)	21% (228)	20% (221)
Female	67% (743)	21% (229)	12% (132)
Transgender/Genderqueer/Different Identity	35% (6)	41% (7)	24% (4)
Race			
African-American/Black	57% (40)	23% (16)	20% (14)
Asian	71% (511)	19% (139)	9% (67)
Caucasian/White	60% (646)	22% (238)	19% (200)
Multiracial	62% (71)	22% (25)	16% (18)
Other/Unknown	58% (72)	17% (21)	26% (32)
Hispanic/Latinx	58% (118)	23% (48)	19% (39)
Current smoking status			
Smokes every day / some days	19% (21)	11% (12)	70% (78)
None	65% (1375)	22% (452)	13% (279)
Episode of asthma in last year			
Yes	74% (97)	18% (24)	8% (11)
No	62% (1299)	21% (440)	17% (346)
Problem of cigarette litter on campus?			
No Problem / No Opinion	54% (570)	24% (253)	22% (227)
Minor	68% (661)	20% (194)	13% (122)
Moderate / Serious / Severe	86% (165)	9% (18)	4% (8)
Exposure to others' tobacco smoke on campus			
Never	58% (315)	22% (120)	19% (105)
Rarely	63% (825)	22% (291)	15% (197)
Sometimes / Often	70% (256)	15% (54)	15% (55)
Exposure to e-cigarette / vape pen on campus			

	Favor	Abstained	Oppose
	% (n)	% (n)	% (n)
Never	66% (432)	19% (124)	15% (101)
Rarely	64% (664)	21% (218)	15% (155)
Sometimes / Often	57% (300)	24% (123)	19% (101)
Lives on campus			
Yes	55% (407)	26% (191)	19% (141)
No	67% (989)	19% (274)	15% (216)

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Table 4.

Binary logistic regression model of support for a campus tobacco-free policy in the opinion poll as a function of respondent demographics, tobacco use, secondhand exposure, and beliefs (N=2217)*

Variable	Odds Ratio	95% Confidence Interval
Affiliation, referent: undergraduate	--	
Graduate student	1.16	[0.82, 1.64]
Staff	2.04	[1.43, 2.91]
Postdoctoral scholars	1.55	[1.09, 2.21]
Faculty	2.22	[1.30, 3.78]
Female (referent: male / other)	1.16	[0.92, 1.45]
Race/ethnicity, referent: Caucasian/White	--	
Asian	1.76	[1.35, 2.28]
Other race	1.13	[0.83, 1.54]
Smokes cigarettes (referent: does not smoke)	0.48	[0.26, 0.89]
Has been exposed to tobacco smoke on campus	1.39	[1.04, 1.84]
Has been exposed to vape smoke on campus	0.81	[0.62, 1.07]
Had an episode of asthma/asthma attack in the past 12 months	1.98	[1.18, 3.35]
Believes a tobacco-free campus...		
supports the health of the community	2.85	[1.40, 5.78]
helps prevent the uptake of tobacco	2.44	[1.74, 3.41]
helps people quit using tobacco	1.84	[1.44, 2.35]
helps ensure tobacco-free air to breathe	1.57	[0.90, 2.74]
reduces fire danger	1.41	[1.02, 1.95]
reduces litter on campus grounds	1.44	[0.96, 2.16]
violates personal freedoms	0.21	[0.16, 0.27]
stigmatizes those who use tobacco	0.46	[0.36, 0.58]
is the start of a slippery slope	0.57	[0.42, 0.77]
raises enforcement challenges	0.95	[0.74, 1.23]
Believes cigarette litter is a problem on campus	1.77	[1.39, 2.25]

*Note: One participant missing data on both past year episode of asthma and current smoking status was excluded from the analysis.