

Examining tobacco use, policy awareness, and policy support at the intersection of gender and race: A cross-sectional study of students at the University of Washington

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**Abstract**

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Use of tobacco products among college students continue to rise across the United States, leading many post-secondary institutions to adopt 100% tobacco-free policies. Disparities in tobacco use and policy support are perpetuated by racism and sexism and can be further exacerbated by one's racial or gender identity. This cross-sectional study utilizes an intersectionality framework to analyze responses of students enrolled at the University of Washington in the Fall of 2020 or the Fall of 2021 to determine how gender and race intersect to influence tobacco use, policy awareness, and policy support. Using responses from an online survey, 16 logistic regression analyses were conducted. The study showed that there was a significant association between gender and policy support ( $p=0.001$ ), as well as gender and past 30-day tobacco use ( $p=0.015$ ); females were more likely to support tobacco policies and less likely to report recent tobacco use. The only significant gender x race interaction was for policy awareness regarding hookah use ( $p=0.03$ ); females, who identified as a race other than white, were more likely to properly identify policy regulations related to hookahs. We recommend that UW develops targeted messaging strategies to address unique risk factors among student groups to gain support of policy changes, as well as improve the clarity, placement, and promotion of tobacco policies on campus to address low overall awareness of current policies. Future research efforts should include additional sociodemographic factors that have been shown to

contribute to disparities in tobacco use and policy support, such as sexual orientation and socioeconomic status, to identify the need for strategies that provide appropriate support for these groups on campus.

## Introduction

In recent years, there has been a significant decline in the prevalence of cigarette smoking among young adults in the United States. However, smoking remains the primary cause of preventable disease and mortality in the United States, as it has been directly linked to various forms of cancer.<sup>1</sup> Besides accounting for almost a third of cancer-related deaths in the United States, smoking is also associated with other chronic illnesses like diabetes, respiratory disease, cardiovascular disease, and blindness.<sup>1</sup> Additionally, reductions in cigarette smoking and other forms of tobacco use have not occurred equally across populations.<sup>2</sup> As of 2015, the National Health Interview Survey (NHIS) estimated that smoking prevalence remains highest among younger adults.<sup>2</sup> Tobacco use among young adults on college campuses is of specific concern as more than 1 in 4 college students report using tobacco-related products.<sup>3</sup>

Use of emerging tobacco products, such as e-cigarettes, are also on the rise among college students because young adults tend to transition between daily and occasional use of these products more frequently.<sup>3</sup> A recent study found that use of e-cigarettes among college students was higher than the general population, with 37.4% of college students confirming use of e-cigarettes, ultimately accounting for nearly one quarter of all individuals who use e-cigarettes in the United States.<sup>4</sup> E-cigarette use is not a harmless alternative to smoking. E-cigarette aerosols contain toxic chemicals such as nicotine, lead and heavy metals, volatile organic compounds, and other cancer-causing agents.<sup>5</sup> Inhaling these chemicals can lead to adverse health effects such as nicotine addiction, cognitive or psychosocial impairment, and subsequent illicit drug use.<sup>5</sup> Despite the potential consequences of using nicotine-related products, individuals' perceptions of tobacco products like e-cigarettes have remained generally favorable, and many college students have continued to express their willingness to experiment with such products.<sup>6</sup>

Typically spanning the ages 18-29, young adulthood has been identified as an important developmental period that is marked by heightened vulnerability to uptake and continued use of nicotine and tobacco products.<sup>2</sup> Young adults typically experience psychological distress as they transition between life milestones, evoking significant changes to their social and physical environments.<sup>2</sup> These changes, along with increased vulnerabilities to peer influence and perceived social norms magnified on college campuses, make young adults more susceptible to known risk factors for nicotine and tobacco use, while also exacerbating risk factors among certain subgroups within this population.<sup>2,7</sup> Racial/ethnic minorities, sexual and gender minorities, and those with low socioeconomic status, are subgroups of young adults that experience disproportionate rates of tobacco-related risk factors, resulting in tobacco use disparities.<sup>8</sup>

In September of 2012, a collaborative effort between the U.S. Department of Health and Human Services (DHHS), the University of Michigan, and the American College Health Association (ACHA) led to the creation of the Tobacco-Free Campus Initiative, advocating for the

implementation of tobacco-free policies at post-secondary institutions within the United States.<sup>9</sup> At the time of this initiative, only 774 of the 4,726 universities in the U.S were smoke-free and 562 universities, a subset of the 774 universities, were considered 100% tobacco-free. These numbers have more than doubled over the past five years.<sup>9</sup> The implementation of tobacco-free policies on college campuses have been associated with reductions in overall tobacco use or uptake, exposure to secondhand smoke, cigarette use, and litter from tobacco products, and has increased successful cessation attempts among people who smoke, leading to overall decreases in adverse, long-term health outcomes among the student population.<sup>7</sup>

An analysis conducted in 2020 involving 605 post-secondary institutions showed that 39.2% implemented policies that prohibited e-cigarette use, 26.0% implemented bans on hookahs, and 20.0% enacted tobacco-free policies as recommended by the American College Health Association (ACHA), while ensuring appropriate resources are on campus to educate students and promote cessation efforts.<sup>8</sup> The analysis also found that students on college campuses that lacked a comprehensive tobacco policy, were more likely to smoke on campus. A comprehensive tobacco policy restricts all forms of nicotine and tobacco product use on campus property.<sup>8</sup> In fact, 65.0% of students reported actively using cigarettes on campus, 98.0% of students reported seeing others smoking on campus, and 88.0% of students reported seeing others using additional forms of tobacco-related products on campus.<sup>8</sup> In comparison, only 36.0% of students used cigarettes on campus, 69.0% saw others smoking, and 67.0% saw others using different tobacco products on campus when the college had a comprehensive policy in place.<sup>8</sup>

Students on campuses without a comprehensive policy were more likely to incorrectly identify or be unsure of the campus policy when compared to students on campuses with a comprehensive policy (14.0% vs. 8.0%).<sup>3</sup> Previous research on tobacco policy awareness among college campuses found that many students (32.7% of the total student population) did not recognize the health need for including additional tobacco products, like e-cigarettes, in campus policies or opposed a campus policy banning e-cigarettes altogether (11.4%).<sup>4</sup> Additionally, only 23.0% of college students who currently used tobacco supported a comprehensive tobacco policy while 80.0% of non-users supported the policy.<sup>4</sup> Discrepancies in policy compliance, awareness, and support among students poses problems for institutions who hope to implement 100% tobacco-free campuses and these differences can be further exacerbated among distinct student subgroups.

### **Intersectionality Framework**

Introduced in 1989 by Kimberle Crenshaw, intersectionality is a theoretical and methodological framework used to analyze socially constructed divisions across a multitude of identities such as gender, race, class, age, sexual orientation, and disability.<sup>2</sup> An intersectionality framework acknowledges individual factors that influence health are interconnected and are not mutually exclusive.<sup>1</sup> Therefore, this framework is useful for understanding the interactional effect between

multiple socio-demographic attributes that may be better predictors of disparities in health outcomes and behaviors.<sup>1</sup> Structural and political intersectionality, two subsets of the broader intersectionality framework, can be used to further examine intra- and inter-group differences. Structural intersectionality examines how the experiences of individuals within a single category differ depending on other intersections of their identity.<sup>10,11</sup> Political intersectionality is used to examine how inequalities among identity intersections are relevant when understanding policies or developing political strategies for marginalized groups.<sup>10,11</sup> Therefore, political intersectionality allows researchers to identify the role of intersectionality and the importance of it as it relates to organizational policy to adapt to the needs of different social identity groups.<sup>10,11</sup>

Prior research involving intersectionality has been heavily focused on understanding disparities among tobacco use and cessation attempts. For example, using an intersectionality lens, smoking prevalence was found to be higher among heterosexual adults with less than a high school education compared to sexual minority adults with higher levels of education.<sup>12</sup> Additional research has found that racial/ethnic communities of color who have a low annual income are less likely to succeed in their cessation attempts than white adults with higher income levels.<sup>1</sup> However, research involving intersectionality and its effect on perceptions of campus tobacco policy is limited. This gap in the literature will be addressed following the completion of the current study.

### **Current Policy at the University of Washington (UW)**

In February of 2007, UW adapted a campus-wide policy that prohibited smoking in most public places and workspaces, while requiring a minimum of 25 feet of distance be maintained from entrances, exits, and air intakes if smoking were to occur.<sup>13</sup> Following the enactment of WAC 478-136-035, UW restricted smoking on all campus property, with the exception of 28 designated smoking areas on the Seattle campus, as an effort to reduce exposure to secondhand smoke.<sup>13</sup> In September 2014, as a response to the growing popularity of e-cigarettes and concerns surrounding the potential adverse impacts of such products on the health of college students, UW revised the initial smoke-free policy to include e-cigarettes.<sup>13</sup> However, UW has yet to implement a 100% tobacco-free campus policy.

The purpose of the current study is to examine associations between select student demographics and tobacco-related behaviors, perceptions, and attitudes. Specifically, we evaluated associations between gender and race to tobacco use, tobacco policy awareness, and support for implementing a 100% tobacco-free policy at UW. This study uses an intersectionality framework to understand potential interactional differences among student subgroups. This analysis will focus exclusively on the behavior, perceptions, and attitudes of current UW students as study participants. Our findings from this analysis can be used to better understand the confluence of factors that shape students' tobacco-related perceptions and behaviors and help to inform policy efforts at UW.

## Methods

### Study Population

The current study used secondary data from the Tobacco-Free Generation Campus Initiative (TFGCI) Cohort 5 Student Survey. The TFGCI survey was constructed by researchers at Georgia State University's School of Public Health in partnership with the American Cancer Society, and with funds from the CVS Health Foundation to help 120 colleges and universities implement 100% tobacco-free policies on campus.<sup>14</sup> The UW is a public university with its main campus located in Seattle, WA and additional campuses located in Bothell and Tacoma. Over the course of the grant period November 1, 2019-October 31, 2021, UW administered two electronic surveys to students attending the UW's Seattle campus. After a delay due to the COVID-19 pandemic, the first survey was administered in the Fall of 2020 and the second survey was administered at the end of the grant period, in the Fall of 2021. During this grant period, nearly 50,000 students were enrolled at UW's Seattle Campus, which includes undergraduate and graduate students.

A representative sample of the total student population at the UW Seattle campus was selected for the TFGCI survey. The Office of Educational Assessment (OEA) generated the sample randomly and then verified that it was not significantly different from the overall demographic of students enrolled on campus. The OEA limits the number of survey invitations to two per academic quarter for each student. Therefore, it is possible that a student was randomly selected but had already been sent two surveys that quarter and therefore removed from the outreach list, preventing their participation in the TFGCI survey. Additionally, the OEA compared the list of students from 2021 to 2020 to remove any students that may have already been surveyed to prevent any repetition of participants across the two time points.

To be eligible to participate in the study, recipients of the survey had to be aged 18 or older and currently enrolled at UW's Seattle campus. The OEA took into consideration UW enrollment status and age prior to selection and participants' eligibility was assessed with questions at the beginning of the survey. If the student did not meet the age requirement, then the survey would end, and their answers were not included as part of the study. Participation in the study was voluntary, therefore questions could be skipped at the discretion of the participant. All student responses were de-identified to maintain confidentiality. An estimated 4,000 students received email invitations to participate in each online survey, with 525 students responding to the first survey administered in the Fall of 2020 and 611 students responding to the second survey administered in the Fall of 2021 for a total sample size of 1,136. Therefore, the estimated response rate for the first survey administration period in 2020 was roughly 13.1%, while the response rate for the second survey administration in 2021 was slightly higher at 15.3%.

## **Measures**

### ***Independent Variables: Intersection of Gender and Race***

Participants were asked “What is your gender?” The response options were (1) male, (2) female, (3) prefer not to disclose, and (4) other gender identity. An open-ended response box was not included for this question. We created a dichotomous variable for gender (female vs. male). Only 18 respondents identified as “prefer not to disclose” and 23 respondents identified as “other gender identity”. Additionally, when performing the crosstabs by gender for each outcome, some of the cell sizes for other gender identity were very small, which posed limitations to including all categories in the regression analysis.

For the variable of race, participants were asked to “choose one or more races that you consider yourself to be.” The response options were (1) white, (2) Black or African American, (3) American Indian or Alaska Native, (4) Asian, (5) Native Hawaiian or Pacific Islander, and (6) Other racial identity. If the participant answered, “Other racial identity”, they were asked to indicate which race(s) in an open-ended response box. Like the approach used to code the gender variable, race was re-coded as a dichotomous variable (White vs. Other racial identity) due to smaller sample sizes for participants who did not identify as white only. The group “Other racial identity” was obtained by collapsing the categories of “Black or African American”, “American Indian or Alaska Native”, “Asian, Native Hawaiian or Pacific Islander”, and “Other racial identity” into a single category. Using the dichotomous codes, four intersecting identities were identified for the regression analysis: white males, white females, males of other racial identity, and females of other racial identity.

### ***Outcome Variable: Tobacco Use***

Participants were asked “During the past 30 days, on how many days did you use (1) cigarettes, (2) electronic vapor products, (3) heated tobacco product IQOS, (4) little cigars, cigarillos, filtered cigars, (5) traditional cigars, (6) hookah, or (7) smokeless tobacco products. Participants were asked to respond to these questions by listing the number of days in which they used these products ranging from 1-30. If students did not use the product, they were asked to type 0. Based on this information, we created a dichotomous variable for tobacco use (1=past 30-day use vs. 0=no past 30-day use).

### ***Outcome Variable: Policy Awareness***

Participants were asked “What is the current written policy on tobacco product use at your campus?” Response options included: (1) allow use indoors and outdoors everywhere, (2) prohibit use indoors; allow use outdoors everywhere, (3) prohibit use indoors; allow use outdoors in specific locations only, (4) always prohibit use indoors and outdoors, or (5) don’t know. The participants provided their responses for the current written policy as it relates to (1) cigarettes, (2) electronic vapor products, (3) little cigars, cigarillos, filtered cigars, (4) traditional cigars, (5)

hookah, and (6) smokeless tobacco. The policy awareness variable for each tobacco product was created by collapsing the responses to fit into a “Yes” or “No” category. “Yes” indicated that the participant was aware of current campus policy and “No” indicated that the participant was unaware. We created the dichotomous variable for awareness based on UW’s current policy pertaining to each tobacco product. The “don’t know” responses were combined with the “No” responses.

### ***Outcome Variable: Policy Support***

Participants were asked “To what extent do you support your campus being/becoming 100% smoke-free, tobacco free, and vape-free, with all tobacco product use prohibited on campus? The response options were (1) support, strongly, (2) support, moderately, (3) neutral (4) do not support, moderately, or (5) do not support, strongly. The policy support variable was created by re-coding the responses to fit into a “Yes” or “No” category. The “Yes” category was obtained by collapsing the categories of “Support, strongly,” and “Support, moderately.” The “No” category was obtained by collapsing the categories of “Neutral,” “Do not support, moderately,” and “Do not support, strongly” into a single category, thus creating a dichotomous variable.

### ***Covariates***

We included additional factors as covariates in our regression models to adjust for potential prediction bias and limit confounding effects.<sup>13</sup> Our variables consisted of age (18–24, 25+), and time of survey administration (2020 or 2021). Age was coded into these categories because 18–24 is considered young adult, and this age group has the highest rates of nicotine and tobacco use due heightened vulnerability.<sup>2</sup> Additionally, 40.2% of respondents were graduate or doctoral students, academic years that typically encompass students who are 25 years and older. Due to the correlation between age and academic year (freshman, sophomore, junior, senior, graduate/doctoral), we used descriptive statistics to examine academic year and excluded this variable from our regression analysis.

### **Quantitative Data Analysis (Descriptive Statistics, Cross-Tabulations, Logistic Regression)**

A descriptive analysis was used to determine the distribution of sociodemographic factors and tobacco use among the total sample of participants. These factors included: age, academic year, gender, race/ethnicity, and current tobacco use. The descriptive statistics were reported using frequency counts and percentages. Second, we used cross tabulation analysis to determine the potential relationship between multiple categorical variables. To examine the distribution of responses, we ran cross-tabulation analyses for each of the racial and gender categories prior to dichotomizing these variables. Cross-tabulation analyses were also conducted using the dichotomous independent variables for race and gender. P-values from the cross-tab analysis were used to identify possible associations of significance between independent and dependent variables to help inform our statistical analysis plan.

We then used binomial logistic regression to determine if there were associations between our independent variables and dependent variables. In the logistic regression models, the dichotomized variables of race and gender were used as the independent variables, while tobacco use, policy awareness related to six different tobacco products, and policy support for 100% tobacco-free campuses were used as the dependent variables. The covariates of age and time were also included in each analysis. We ran separate logistic regression models to examine main and interactional effects for each outcome. All analyses were conducted using Stata/BE 17.0.<sup>15</sup>

## Results

### Participant Characteristics

Table 1 presents descriptive statistics of the sample population. After combining the 2020 and 2021 survey dataset, the final sample (N=1,136) consisted of 668 (59.1%) females, 422 (37.3%) males, and 41 (3.6%) respondents who selected other as their gender response. Of the participants, 743 (65.4%) were White, 37 (3.3%) were African American, 19 (1.7%) were American Indian or Alaska Native, 386 (34.0%) were Asian, 13 (1.1%) were Native Hawaiian or Pacific Islander, and 43 (3.8%) identified as another race. There were 745 (65.6%) participants who were between the ages of 18 and 24, while 391 (34.4%) of the participants were aged 25 or older. When grouped by academic year, 165 (14.6%) were freshmen, 148 (13.2%) were sophomores, 175 (15.5%) were juniors, and 186 (16.5%) were seniors in their undergraduate studies. There were 453 (40.2%) participants who were either graduate or doctoral students. Of the total sample, 178 (16.4%) had used tobacco products in the past 30 days.

**Table 1.** Descriptive Statistics of Student Sample with Combined Dataset for Fall of 2020 and 2021 (N = total student sample, n = frequency count by characteristic)

Total Sample N= 1,136		
	n	%
<b>Age group (years):</b>		
18-24	745	65.6
25+	391	34.4
<b>Academic year:</b>		
Freshman	165	14.6
Sophomore	148	13.2
Junior	175	15.5
Senior	186	16.5
Graduate/Doctoral student	453	40.2
<b>Gender:</b>		
Male	422	37.3
Female	668	59.1
Other	41	3.6
<b>Hispanic/Latino ethnicity:</b>	112	10.1

<b>Race*:</b>		
White	743	65.4
Black/African American	37	3.3
Am. Indian/Alaska Native	19	1.7
Asian	386	34.0
Native Hawaiian/Pacific Islander	13	1.1
Other	43	3.8
<b>Current tobacco product user:</b>	178	16.4

*\*Percentages may add to more than 100 since students were allowed to check all that apply  
Current tobacco use was defined as having used any tobacco product in the past 30 days*

### **Cross-Tabulations**

For each outcome variable – tobacco use, policy awareness related to cigarettes, electronic vapor products, little cigars, traditional cigars, hookah, or smokeless tobacco, and policy support for a 100% tobacco-free campus – a set of cross tabulations were run. The cross-tabulation analysis examined the breakdown of tobacco use by gender (male vs. female) and race (white vs. other racial identity) separately, as well as the interaction between the two independent variables (male/white vs. female/white vs. male/other racial identity vs. female/other racial identity) (see Table 2). Males were more likely to report engaging in tobacco use within the past 30 days when compared to females (20.3% vs. 13.8%). The association between gender and tobacco use was statistically significant ( $p=0.006$ ). In contrast, there was not a significant difference in tobacco use between students who identified as white versus those who identified as another racial identity (16.7% vs. 15.3%,  $p=0.586$ ).

Although we did not include tobacco use as an independent variable in the logistic regression, we conducted cross-tabulation analyses to examine differences in our outcomes by past 30-day tobacco use, as students who use tobacco have been show differ in policy awareness and support compared to students who do not use tobacco. The results from this cross-tabulation analyses are shown in Tables 1.1-1.7. No significant associations were found between past 30-day tobacco use and policy awareness. However, the association between past 30-day tobacco use and policy support was deemed statistically significant ( $p=0.000$ ). Table 1.7 shows that only 32.1% of students who used tobacco in the past 30 days supported a tobacco-free policy on UW’s campus, while 67.4% of students who did not use tobacco in the past 30 days supported a tobacco-free policy.

**Table 2.** Cross tabulation analysis of students past 30-day combined tobacco use stratified by gender, race, and the interaction between these characteristics

		No past 30-day use	Past 30-day use	Total	
		n (%)	n (%)	n (%)	P-value
<b>Gender</b>	Male	321 (79.7%)	82 (20.3%)	403 (100%)	<b>0.006*</b>
	Female	554 (86.2%)	89 (13.8%)	643 (100%)	
<b>Race</b>	White	254 (83.3%)	51 (16.7%)	305 (100%)	0.586
	Other racial identity	389 (84.7%)	70 (15.3%)	459 (100%)	
<b>Gender x Race</b>	Male, White	85 (78.7%)	23 (21.3%)	108 (100%)	0.127
	Male, Other racial identity	142 (81.6%)	32 (18.4%)	174 (100%)	
	Female, White	164 (86.3%)	26 (13.7%)	190 (100%)	
	Female, Other racial identity	236 (87.1%)	35 (12.9%)	271 (100%)	

*\*Bold values are statistically significant ( $p \leq 0.05$ ).*

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

Tables 3-8 show the cross-tabulation analyses of policy awareness for each of the six tobacco products using the same breakdown of gender, race, and the interaction between the two independent variables as seen in Table 2. Table 3 shows the cross-tabulation analysis for cigarette policy awareness. Most male and female students lacked awareness related to the current cigarette use policy at UW (74.9% vs. 74.4%,  $p=0.859$ ). Rates were also similar between white students and students classified as another racial identity (71.3% vs. 74.0%,  $p=0.402$ ). This trend was prevalent again for electronic vapor products (Table 4), as 80.6% of students who

identified as white and 80.5% of students who identified as another race lacked awareness pertaining to electronic vapor product policy on campus ( $p=0.961$ ).

Table 5 displays findings for student awareness of little cigarillo policy on campus, which showed non-significant differences by gender; 82.5% of male students and 84.4% of female students lacked awareness ( $p=0.392$ ). When examining student awareness of policy related to traditional cigars (Table 6), most students who identified as white or as another race were unaware of current campus policy (82.6% vs. 85.5%,  $p=0.265$ ). Regarding UW’s policy on hookah use (Table 7), students who identified as males and a race other than white were more likely to lack hookah policy awareness compared to white, males (77.6% vs. 66.7%) This finding was not significant ( $p=0.071$ ). When examining levels of policy awareness for smokeless tobacco (Table 8), 97.4% of male students and 96.9% of females lacked awareness, however this and other findings pertaining to smokeless tobacco policy awareness were not significant.

Lastly, Table 9 shows the cross-tabulation analysis for policy support of 100% tobacco-free campuses. In this analysis, females favored implementation of tobacco-free policy more so than men (50.9%), with 65.0% of female participants responding in support of policy changes. This finding was statistically significant ( $p=0.000$ ). In addition, 61.8% of participants who identified as a race other than white supported a tobacco-free policy compared to only 47.1% of white participants who supported such a policy ( $p=0.000$ ). This shift in support was further highlighted with the interaction of gender and race, as 69.6% of females who identified as a different racial identity responded favorably towards implementing tobacco-free campuses ( $p=0.000$ ). In contrast, only 41.8% of white, male participants supported implementing such a policy.

**Table 9.** Cross tabulation analysis of students’ support of or opposition towards 100% tobacco-free policy stratified by gender, race, and the interaction between these characteristics

		<b>No support</b>	<b>Support</b>	<b>Total</b>	<b>P-value</b>
		<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	
<b>Gender</b>	Male	207 (49.1%)	215 (50.9%)	422 (100%)	<b>0.000*</b>
	Female	234 (35.0%)	434 (65.0%)	668 (100%)	
<b>Race</b>	White	164 (52.9%)	146 (47.1%)	310 (100%)	<b>0.000*</b>
	Other racial identity	182	295	477	

	(38.2%)	(61.8%)	(100%)	
<b>Gender x Race</b>				
Male, White	64 (58.2%)	46 (41.8%)	110 (100%)	
Male, Other racial identity	90 (49.2%)	93 (50.8%)	183 (100%)	
				<b>0.000*</b>
Female, White	95 (49.2%)	98 (50.8%)	193 (100%)	
Female, Other racial identity	85 (30.4%)	195 (69.6%)	280 (100%)	

**\*Bold values are statistically significant ( $p \leq 0.05$ ).**

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

Tables 2.1-9.1 contain the results for the cross-tabulation analyses conducted using each categorical variable listed for gender (male, female, prefer not to disclose, other gender identity) and race (White, Black, or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, and other racial identity). Table 2.1 shows the cross-tabulation analysis for tobacco use among all categorical variables. Results showed that 20.3% of males and 13.8% of females reported using tobacco products within the past 30 days. This association between gender and tobacco use was deemed statistically significant ( $p=0.015$ ). Table 3.1 highlights the results of the cross-tabulation analysis pertaining to cigarette policy awareness. Regarding gender, those who preferred not to disclose their gender identity showed the highest level of cigarette policy awareness with 33.3% of respondents in this category properly identifying the policy. However, the association between gender and policy awareness was not statistically significant ( $p=0.478$ ). Students who identified as Asian had the lowest cigarette policy awareness (13.8%) and students who identified as Native Hawaiian or Pacific Islander had the highest awareness (30.8%,  $p=0.968$ ). As it related to electronic vapor product policy awareness, Table 4.1 shows that, like Table 11, Asian students had the lowest level of policy awareness (19.4%) when compared to other racial identities, but this association was not significant ( $p=0.901$ ).

In Table 5.1 and Table 6.1, students who identified as American Indian or Alaska Native displayed the highest levels of policy awareness as 21.0% were aware of little cigar policy and traditional cigar policy ( $p=0.867$ ). Those who identified as another gender identity showed the lowest level of awareness when examining little cigar policy in Table 5.1 ( $p=0.635$ ). Awareness of hookah policy in Table 7.1 supported previous trends in the data as Asian students were least

aware of the policy (20.7%) compared to American Indian or Alaska Native students who were the most aware (42.1%). The association between race and knowledge of current hookah policy on campus was statistically significant ( $p=0.034$ ). Table 8.1 shows the results for smokeless tobacco policy awareness. None of the Black or African American students, American Indian or Alaska Native students, or Native Hawaiian/Pacific Islander students were aware of the current smokeless tobacco policy ( $p=0.754$ ). Similarly, none of the students who identified as another gender identity were aware of the policy ( $p=0.706$ ). Lastly, Table 9.1 did provide some statistically significant results when examining policy support by race and gender. Female students displayed the highest level of support (65.0%) compared to other gender identities. The association between gender and policy support was statistically significant ( $p=0.000$ ).

### **Logistic Regression**

We conducted sixteen logistic regression analyses. Eight of the regression analyses examined main effects for gender and race separately for each outcome of interest (i.e., tobacco use, policy awareness, and policy support). The following eight regression analyses focused on examining the interactional effect of gender and race in relation to the outcome variables.

#### ***Main Effects***

Logistic regression models were conducted with and without the inclusion of covariates, but only the findings from the adjusted models with covariates age and time are reported here. In our main effects model (Table 10), we observed two statistically significant findings. Identifying as a female student was associated with an 88% increase in the likelihood of supporting a 100% tobacco-free policy on UW's campus when compared to the male reference group (OR=1.88,  $p=0.001$ , 95% CI [1.38-2.57]). Additionally, students who identified as female were 39% less likely to engage in any use of tobacco products when compared to their male counterparts (OR=0.61,  $p=0.015$ , 95% CI [0.40-0.91]). These findings were consistent with the observations made during the cross-tabulation analysis. When examining the potential association between gender and policy awareness related to cigarettes (OR= 1.1), e-cigarettes (OR = 0.71), little cigars (OR = 0.87), traditional cigars (OR=0.89), hookah (OR = 0.79), and smokeless tobacco (OR= 1.07), no significant differences were identified. Similarly, no significant differences in policy awareness existed by race.

### ***Interactional Effects***

Similar to our main effects model, we adjusted for time and age in our interaction model (Table 11). Our findings showed only one statistically significant outcome: students who identified as female and as a racial identity other than white only were significantly more likely to be aware of campus policy pertaining to the use of hookahs compared to white males. This suggests that knowledge of policy related to hookahs was 2.14 times higher in females of other racial identities ( $p=0.03$ , 95% CI [1.07-4.27]). However, when examining associations in policy support (OR=1.51), tobacco use (OR = 1.14), and awareness of current tobacco policy on UW's campus through the intersection of gender (female vs. male) and race (other racial identity vs. white), no significant differences were found.

Table 11. Logistic regression of the interactional effects of race and gender on the outcome variables

	Tobacco Use		Policy Support		Policy Awareness (Cigs)		Policy Awareness (EVP)		Policy Awareness (Little Cigars)		Policy Awareness (Trad. Cigars)		Policy Awareness (Hookah)		Policy Awareness (Smokeless)			
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI		
<b>Gender (reference = male)</b>																		
Female	0.59	(0.30, 1.1)	1.48	(0.92, 2.37)	1.46	(0.85, 2.5)	0.76	(0.42, 1.37)	1.10	(0.59, 2.04)	1.02	(0.55, 1.90)	0.50	(0.30, 0.85)	0.77	(0.24, 2.5)		
<b>Race (reference = white)</b>																		
Other racial identity	0.57	(0.29, 1.2)	0.86	(0.50, 1.48)	1.38	(0.76, 2.5)	0.96	(0.51, 1.81)	1.22	(0.62, 2.41)	1.08	(0.54, 2.14)	0.56	(0.31, 1.01)	0.33	(0.07, 1.59)		
<b>Gender x Race (reference= male, white)</b>																		
Female, Other racial identity	1.14	(0.50, 2.6)	1.51	(0.81, 2.81)	0.60	(0.30, 1.19)	0.89	(0.42, 1.89)	0.66	(0.29, 1.47)	0.80	(0.36, 1.80)	<b>2.14</b>	<b>(1.07, 4.27)*</b>	1.89	(0.35, 10.1)		
<b>Age</b>	0.96	(0.93, 0.99)	1.02	(1.01, 1.04)	0.97	(0.95, 1.01)	0.96	(0.93, 0.99)	0.97	(0.94, 1.03)	0.96	(0.93, 0.99)	0.98	(0.95, 1.01)	0.98	(0.92, 1.05)		
<b>Time</b>	1.0	(0.99, 1.01)	1.0	(1.0, 1.01)	0.99	(0.98, 1.01)	0.99	(0.99, 1.01)	0.99	(0.99, 1.01)	0.99	(0.99, 1.01)	0.99	(0.99, 1.01)	0.99	(0.99, 1.01)	1.0	(0.99, 1.01)

*\*Bold values are statistically significant ( $p \leq 0.05$ )*

*Interactional effects analysis was completed for each outcome variable*

*Covariates of time (year of survey completed) and age (18-24, 25+) are used as control measures for determining significance*

## Discussion

The current study sought to demonstrate how an intersectionality framework may be useful for examining the interactions between the demographic identifiers of gender and race and their effect on tobacco use, policy awareness, and policy support of a 100% tobacco-free campus among students attending a four-year, post-secondary university. We found gender to be an independent predictor of policy support. Based on our findings, students who identify as female are more likely than their male counterparts to support such 100% tobacco-free policies. Gender can also be used to better understand discrepancies in use of tobacco products among female and male college students, as females were shown to be less likely to use tobacco products of any type. However, race as an independent predictor was not significantly associated with our outcome variables of interest. Moreover, the only interaction between gender and race that garnered statistical significance was when examining policy awareness related to use of hookahs on campus. Students who identified as female, and a race other than white only, had higher levels of awareness pertaining to current campus policy compared to white males. We did not observe additional gender x race interactions for our outcomes of interest.

Although the results from our study did not find significant intersectional group differences between the demographic attributes of gender and race on all outcome variables, some of our findings support recent studies suggesting such attributes can be used separately to better understand differences in tobacco use and policy support. A review of previous research has shown that, when evaluating gender and race separately, white students generally show greater opposition towards tobacco-free policies, while African American and Hispanic students tend to show the greatest support for tobacco-free policies.<sup>16</sup> Furthermore, male college students are typically more opposed to tobacco-free policies, whereas female college students are more likely to support such policies.<sup>16</sup> Our findings were consistent with these independent group differences identified in previous literature.

One possibility for variations in our findings when compared to that of previous studies is the limited sample size, resulting in the need to collapse our gender and race categories into dichotomous variables to conduct our logistic regression analysis. Dichotomizing an independent variable can negatively impact the effect size and statistical significance of the findings by reducing potential explanatory information. For the purposes of conducting the analysis, students who self-reported as African American, American Indian/Alaska Native, Asian, or Native Hawaiian/Pacific Islander were re-coded under the broad label of “other racial identity”. Similarly, our regression analyses for gender were limited to female and male. However, even though not all racial and gender groups could be included in the logistic regression analysis, cross-tabulation analyses were used to examine differences in outcomes by race and gender in greater detail. Another potential explanation for the lack of significance shown in the analysis of our demographic factors and tobacco use could be due to the restrictions posed by the survey question itself. The question used for the analysis asked students whether they had used a

tobacco product within the past 30 days. Even though past 30-day measures are common indicators used to explore current tobacco product use, the time frame could limit responses to the questions because it may not encompass all individuals who use tobacco products.

Furthermore, smoke-free, and tobacco-free policies have distinct differences. Smoke-free policies limit or ban tobacco products that emit smoke in hopes of reducing exposure to secondhand smoke, while tobacco-free policies ban use of all nicotine and tobacco products to create a more comprehensive campus policy and better promote health for both the campus population and the general community.<sup>3</sup> Implementing tobacco-free policies on campus have been shown to reduce the number of individuals who initiate use of tobacco-related products, reduce exposure to environmental hazards, and decrease social acceptability of tobacco products.<sup>8</sup> Additionally, emergent literature on the health consequences associated with secondhand aerosol exposure from e-cigarettes further supports the need to address this issue through the implementation of product bans on college campuses. Unlike previous research, this study did not adjust for other potential confounders, like tobacco product use knowledge among students. Discrepancies in general student knowledge about the consequences of tobacco use could impact levels of policy support and awareness.

Lastly, this study could be used to inform future policy efforts at UW. Using the data collected, UW can gain valuable insight into students' perceptions of and attitudes towards tobacco-related policy changes on campus. Recognizing potential intersectional differences among demographic characteristics, such as gender and race, can have important implications for effective communication when promoting the adoption of 100% tobacco-free policies. By having knowledge of which groups and subgroups of students may be more likely to support or oppose such a change, the university can implement focused messaging to counter-frame arguments that remedy student opposition and emphasize health benefits that can be equally shared throughout the broader campus community when such policies are implemented. For example, since policy support lower was found to be lower among students who identified as male, UW could develop targeted message among this group to increase support by addressing their unique psychological risk factors and perceptions. Additionally, policy awareness pertaining to all forms of tobacco was extremely low among all student demographics that were examined in the study. To improve policy awareness, UW should improve the clarity, placement, and promotion of tobacco-related policies on campus, as well as include signage that educates students about the consequences of use. The UW should utilize these findings to collaborate with students via social media campaigns or focus groups to move the needle towards a more comprehensive tobacco policy on campus that is rooted in equity.

### **Limitations**

There are several limitations that should be considered within the context of the study results. To date, intersectionality research has been predominantly composed of qualitative data collection

methods, with emphasis on the utilization of one-on-one interviews and semi-structured focus groups.<sup>1</sup> The current study did not incorporate a qualitative component, limiting our ability to include a comprehensive overview of how sociodemographic factors can interact to shape lived experiences and impact individual perceptions. Secondly, efforts were made to include a representative sample of the UW student population. However, participants of the study were predominantly white. This is not necessarily surprising when considering the larger UW student population. In the Fall of 2020, 39.7% of all students enrolled at UW's Seattle campus identified as white.<sup>17</sup> Asian students were also well-represented in our sample as this student population accounts for 22.1% of UW's campus community.<sup>17</sup> Other racial/ethnic minorities were not overtly represented in our sample. Only 37 African American students, 19 American Indian or Alaska Native students, and 13 Native Hawaiian or Pacific Islander students completed the survey. When examining the broader student population at UW, only 3.2% of students identify as African American, and less than 1.0% identify as American Indian, Alaska Native, Native Hawaiian, or Pacific Islander, helping to explain the lack of representation of certain student subgroups within our sample.<sup>17</sup> Additionally, the response rate for each survey administration period was very low, with only a 13.1% and a 15.3% response rate from UW students in 2020 and 2021, respectively. Limitations in sample size among racial and gender minorities and low overall survey response rates also make it difficult to know whether these findings accurately represent student's views and behaviors regarding tobacco use, policy awareness, and support of a 100% tobacco-free policy on UW's campus. Future researchers exploring this topic should make a deliberate effort to oversample populations that have historically experienced oppression. Increased sampling of groups that have been historically marginalized and less represented in scientific studies would allow researchers to fully explore potential differences to enhance understanding of why health inequities persist.

Response options for the demographic questions on the survey were limited. For example, students were not able to indicate their specific gender identity via an open-ended response option. Opportunities exist to improve how questions about gender identity are asked to ensure that all gender identities are acknowledged, and that potential explanatory information is not omitted. Additionally, the quantitative analysis relied on data collected from a self-administered survey, making the results of the survey susceptible to response bias. Participants may answer survey questions untruthfully if they feel the urge to portray themselves in a way that is deemed socially acceptable. This is particularly true when participants are self-reporting on topics pertaining to substance use. However, to reduce potential response bias, it was emphasized to UW students that the survey was confidential and responses would be de-identified prior to analysis. Lastly, because findings of the current study were from an urban, four-year post-secondary public institution, the results may lack generalizability to accurately reflect the interactional effects of gender and race at other post-secondary institutions.

Despite these limitations, the current study provides insight into students' perceptions and expands upon the current literature by including an analysis of the interactional effect between gender and race to determine the association of outcomes related to policy awareness, an outcome not readily measured in previous research of college students.

### **Conclusion**

Even though we did not find significant gender x race interactions for most of our outcome variables (tobacco use, policy awareness, and policy support), future research should continue to explore the use of intersectionality to predict attitudes toward and perceptions of different health-related topics. Future efforts to better understand the intersection of identities and how it relates to tobacco-related health outcomes should include additional sociodemographic factors that have been shown to contribute to disparities in tobacco use and policy support, such as sexual orientation and socioeconomic status. In sum, utilizing an intersectionality framework will enable colleges and universities to better understand interactional group differences pertaining to tobacco use, awareness, and policy support within the larger student population. This will also help universities move towards adoption of comprehensive tobacco policies that simultaneously promote the health of campus communities and reduce tobacco-related health disparities among vulnerable subgroups.

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## Appendix

**Table 1.** Descriptive Statistics of Student Sample with Combined Dataset for Fall of 2020 and 2021 ( $N$  = total student sample,  $n$  = frequency count by characteristic)

Total Sample N= 1,136		
	n	%
<b>Age group (years):</b>		
18-24	745	65.6
25+	391	34.4
<b>Academic year:</b>		
Freshman	165	14.6
Sophomore	148	13.2
Junior	175	15.5
Senior	186	16.5
Graduate/Doctoral student	453	40.2
<b>Gender:</b>		
Male	422	37.3
Female	668	59.1
Other	41	3.6
<b>Hispanic/Latino ethnicity:</b>	112	10.1
<b>Race*:</b>		
White	743	65.4
Black/African American	37	3.3
Am. Indian/Alaska Native	19	1.7
Asian	386	34.0
Native Hawaiian/Pacific Islander	13	1.1
Other	43	3.8
<b>Current tobacco product user:</b>	178	16.4

*\*Percentages may add to more than 100 since students were allowed to check all that apply  
Current tobacco use was defined as having used any tobacco product in the past 30 days*

**Table 1.1.** Cross tabulation analysis of student awareness related to current *cigarette* policy on UW campus stratified by past 30-day tobacco use

		No knowledge of policy N (%)	Knowledge of policy N (%)	Total N (%)	P-value
Tobacco Use	Yes	126 (70.8%)	52 (29.2%)	178 (100%)	0.353
	No	673 (74.2%)	234 (25.8.1%)	907 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 1.2.** Cross tabulation analysis of student awareness related to current *electronic vapor products* policy on UW campus stratified by past 30-day tobacco use

		No knowledge of policy N (%)	Knowledge of policy N (%)	Total N (%)	P-value
Tobacco Use	Yes	145 (81.4%)	33 (18.6%)	178 (100%)	0.610
	No	720 (79.4%)	187 (20.6%)	907 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 1.3.** Cross tabulation analysis of student awareness related to current *little cigars, cigarillos, or filtered cigars* policy on UW campus stratified by past 30-day tobacco use

		No knowledge of policy N (%)	Knowledge of policy N (%)	Total N (%)	P-value
Tobacco Use	Yes	140	38	178	

	(78.7%)	(21.3%)	(100%)	0.100
No	762 (84.0%)	145 (16.0%)	907 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 1.4.** Cross tabulation analysis of student awareness related to current *traditional cigars* policy on UW campus stratified by past 30-day tobacco use

		No knowledge of policy N (%)	Knowledge of policy N (%)	Total N (%)	P-value
Tobacco Use	Yes	142 (79.8%)	36 (20.2%)	178 (100%)	
	No	769 (84.8%)	138 (15.2%)	907 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 1.5.** Cross tabulation analysis of student awareness related to current *hookah* policy on UW campus stratified by past 30-day tobacco use

		No knowledge of policy N (%)	Knowledge of policy N (%)	Total N (%)	P-value
Tobacco Use	Yes	124 (69.7%)	54 (30.3%)	178 (100%)	
	No	681 (75.1%)	226 (24.9%)	907 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 1.6.** Cross tabulation analysis of student awareness related to current *smokeless tobacco* policy on UW campus stratified by past 30-day tobacco use

		<b>No knowledge of policy</b>	<b>Knowledge of policy</b>	<b>Total</b>	<b>P-value</b>
		<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	
<b>Tobacco Use</b>	Yes	171 (96.1%)	7 (3.9%)	178 (100%)	0.472
	No	881 (97.1%)	26 (2.9%)	907 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 1.7** Cross tabulation analysis of students' support of or opposition towards 100% tobacco-free policy stratified by past 30-day tobacco use

		<b>No support</b>	<b>Support</b>	<b>Total</b>	<b>P-value</b>
		<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	
<b>Tobacco Use</b>	Yes	121 (67.9%)	57 (32.1%)	178 (100%)	<b>0.000*</b>
	No	296 (32.6%)	611 (67.4%)	907 (100%)	

**\*Bold values are statistically significant ( $p \leq 0.05$ )**

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 2.** Cross tabulation analysis of students past 30-day combined tobacco use stratified by gender, race, and the interaction between these characteristics

		No past 30-day use	Past 30-day use	Total	
		n (%)	n (%)	n (%)	P-value
<b>Gender</b>	Male	321 (79.7%)	82 (20.3%)	403 (100%)	<b>0.006*</b>
	Female	554 (86.2%)	89 (13.8%)	643 (100%)	
<b>Race</b>	White	254 (83.3%)	51 (16.7%)	305 (100%)	0.586
	Other racial identity	389 (84.7%)	70 (15.3%)	459 (100%)	
<b>Gender x Race</b>	Male, White	85 (78.7%)	23 (21.3%)	108 (100%)	0.127
	Male, Other racial identity	142 (81.6%)	32 (18.4%)	174 (100%)	
	Female, White	164 (86.3%)	26 (13.7%)	190 (100%)	
	Female, Other racial identity	236 (87.1%)	35 (12.9%)	271 (100%)	

**\*Bold values are statistically significant ( $p \leq 0.05$ ).**

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 2.1.** Cross tabulation analysis of students past 30-day combined tobacco use stratified by each categorical variable for gender and race

		No past 30-day use	Past 30-day use	Total	P-value
		n (%)	n (%)	n (%)	
<b>Race</b>	White	600 (82.4%)	128 (17.6%)	728 (100%)	0.513
	Black or African American	28 (77.8%)	8 (22.2%)	36 (100%)	
	American Indian or Alaska Native	15 (78.9%)	4 (21.1%)	19 (100%)	
	Asian	319 (86.2%)	51 (13.8%)	370 (100%)	
	Native Hawaiian or Pacific Islander	10 (76.9%)	3 (23.1%)	13 (100%)	
	Other racial identity	34 (81.0%)	8 (19.0%)	42 (100%)	
	<b>Gender</b>				
Male	321 (79.7%)	82 (20.3%)	403 (100%)		
Female	554 (86.2%)	89 (13.8%)	643 (100%)		
Prefer not to disclose	15 (93.8%)	1 (6.2%)	16 (100%)		
Other gender identity	17 (73.9%)	6 (26.1%)	23 (100%)		

*\*Bold values are statistically significant ( $p \leq 0.05$ )*

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

**Table 3.** Cross tabulation analysis of student awareness related to current *cigarette* policy on UW campus stratified by gender, race, and the interaction between these characteristics

		No knowledge of policy	Knowledge of policy	Total	P-value
		n (%)	n (%)	n (%)	
<b>Gender</b>	Male	316 (74.9%)	106 (25.1%)	422 (100%)	0.859
	Female	497 (74.4%)	171 (25.6%)	668 (100%)	
<b>Race</b>	White	221 (71.3%)	89 (28.7%)	310 (100%)	0.402
	Other racial identity	353 (74.0%)	124 (26.0%)	477 (100%)	
<b>Gender x Race</b>	Male, White	84 (76.4%)	26 (23.6%)	110 (100%)	0.344
	Male, Other racial identity	132 (72.1%)	51 (27.9%)	183 (100%)	
	Female, White	132 (68.4%)	61 (31.6%)	193 (100%)	
	Female, Other racial identity	210 (75.0%)	70 (25.0%)	280 (100%)	

**P-values were based on chi-square analyses.**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 3.1.** Cross tabulation analysis of student awareness related to current *cigarette* policy on UW campus stratified by each categorical variable for gender and race

		No knowledge of policy n (%)	Knowledge of policy n (%)	Total n (%)	P-value
<b>Race</b>	White	552 (74.3%)	191 (25.7%)	743 (100%)	0.968
	Black or African American	26 (70.3%)	11 (29.7%)	37 (100%)	
	American Indian or Alaska Native	14 (73.7%)	5 (26.3%)	19 (100%)	
	Asian	288 (86.2%)	98 (13.8%)	386 (100%)	
	Native Hawaiian or Pacific Islander	9 (69.2%)	4 (30.8%)	13 (100%)	
	Other racial identity	30 (69.8%)	13 (30.2%)	43 (100%)	
	<b>Gender</b>	Male	316 (74.9%)	106 (25.1%)	
	Female	497 (74.4%)	171 (25.6%)	668 (100%)	
	Prefer not to disclose	12 (66.6%)	6 (33.3%)	18 (100%)	
	Other gender identity	20 (87.0%)	3 (13.0%)	23 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

**Table 4.** Cross tabulation analysis of student awareness related to current *electronic vapor product* policy on UW campus stratified by gender, race, and the interaction between these characteristics

		No knowledge of policy n (%)	Knowledge of policy n (%)	Total n (%)	P-value
<b>Gender</b>	Male	328 (77.7%)	94 (22.3%)	422 (100%)	0.053
	Female	551 (82.5%)	117 (17.5%)	668 (100%)	
<b>Race</b>	White	250 (80.6%)	60 (19.4%)	310 (100%)	0.961
	Other racial identity	384 (80.5%)	93 (19.5%)	477 (100%)	
<b>Gender x Race</b>	Male, White	86 (78.2%)	24 (21.8%)	110 (100%)	0.345
	Male, Other racial identity	141 (77.0%)	42 (23.0%)	183 (100%)	
	Female, White	158 (81.9%)	35 (18.1%)	193 (100%)	
	Female, Other racial identity	233 (83.2%)	47 (16.8%)	280 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 4.1.** Cross tabulation analysis of student awareness related to current *electronic vapor product* policy on UW campus stratified by each categorical variable for gender and race

		No knowledge of policy n (%)	Knowledge of policy n (%)	Total n (%)	P-value
<b>Race</b>	White	593 (79.8%)	150 (20.2%)	743 (100%)	0.901
	Black or African American	29 (78.4%)	8 (21.6%)	37 (100%)	
	American Indian or Alaska Native	14 (73.7%)	5 (26.3%)	19 (100%)	
	Asian	311 (80.6%)	75 (19.4%)	386 (100%)	
	Native Hawaiian or Pacific Islander	9 (69.2%)	4 (30.8%)	13 (100%)	
	Other racial identity	35 (81.4%)	8 (18.6%)	43 (100%)	
	<b>Gender</b>				
Male	328 (77.7%)	94 (22.3%)	422 (100%)		
Female	551 (82.5%)	117 (17.5%)	668 (100%)		
Prefer not to disclose	12 (66.6%)	6 (33.3%)	18 (100%)		
Other gender identity	20 (87.0%)	3 (13.0%)	23 (100%)		

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

**Table 5.** Cross tabulation analysis of student awareness related to current *little cigar, cigarillo, or filtered cigar* policy on UW campus stratified by gender, race, and the interaction between these characteristics

		No knowledge of policy	Knowledge of policy	Total	P-value
		n (%)	n (%)	n (%)	
<b>Gender</b>	Male	348 (82.5%)	74 (17.5%)	422 (100%)	0.392
	Female	564 (84.4%)	104 (15.6%)	668 (100%)	
<b>Race</b>	White	254 (81.9%)	56 (18.1%)	310 (100%)	0.346
	Other racial identity	403 (84.5%)	74 (15.5%)	477 (100%)	
<b>Gender x Race</b>	Male, White	91 (82.7%)	19 (17.3%)	110 (100%)	0.378
	Male, Other racial identity	150 (82.0%)	33 (18.0%)	183 (100%)	
	Female, White	156 (80.8%)	37 (19.2%)	193 (100%)	
	Female, Other racial identity	242 (86.4%)	38 (13.6%)	280 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 5.1.** Cross tabulation analysis of student awareness related to current *little cigar, cigarillo, or filtered cigar* policy on UW campus stratified by each categorical variable for gender and race

		No knowledge of policy n (%)	Knowledge of policy n (%)	Total n (%)	P-value
<b>Race</b>	White	614 (82.6%)	129 (17.4%)	743 (100%)	0.867
	Black or African American	32 (86.5%)	5 (13.5%)	37 (100%)	
	American Indian or Alaska Native	15 (79.0%)	4 (21.0%)	19 (100%)	
	Asian	324 (83.9%)	62 (16.1%)	386 (100%)	
	Native Hawaiian or Pacific Islander	12 (92.3%)	1 (7.7%)	13 (100%)	
	Other racial identity	37 (86.1%)	6 (13.9%)	43 (100%)	
	<b>Gender</b>				
Male	348 (82.5%)	74 (17.5%)	422 (100%)		
Female	564 (84.4%)	104 (15.6%)	668 (100%)		
Prefer not to disclose	15 (83.3%)	3 (16.7%)	18 (100%)		
Other gender identity	21 (91.3%)	2 (8.7%)	23 (100%)		

*Row totals may vary due to incompleteness of survey responses by participants.*

**Table 6.** Cross tabulation analysis of student awareness related to current *traditional cigar* policy on UW campus stratified by gender, race, and the interaction between these characteristics

		No knowledge of policy n (%)	Knowledge of policy n (%)	Total n (%)	P-value
<b>Gender</b>	Male	351 (83.2%)	71 (16.8%)	422 (100%)	0.452
	Female	567 (84.9%)	101 (15.1%)	668 (100%)	
<b>Race</b>	White	256 (82.6%)	54 (17.4%)	310 (100%)	0.265
	Other racial identity	408 (85.5%)	69 (14.5%)	477 (100%)	
<b>Gender x Race</b>	Male, White	91 (82.7%)	19 (17.3%)	110 (100%)	0.564
	Male, Other racial identity	153 (83.6%)	30 (16.4%)	183 (100%)	
	Female, White	158 (81.9%)	35 (18.1%)	193 (100%)	
	Female, Other racial identity	242 (86.4%)	38 (13.6%)	280 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 6.1** Cross tabulation analysis of student awareness related to current *traditional cigar* policy on UW campus stratified by each categorical variable for gender and race

		No knowledge of policy n (%)	Knowledge of policy n (%)	Total n (%)	P-value
<b>Race</b>	White	621 (83.6%)	122 (16.4%)	743 (100%)	0.869
	Black or African American	31 (83.8%)	6 (16.2%)	37 (100%)	
	American Indian or Alaska Native	15 (79.0%)	4 (21.0%)	19 (100%)	
	Asian	330 (85.5%)	56 (14.5%)	386 (100%)	
	Native Hawaiian or Pacific Islander	12 (92.3%)	1 (7.7%)	13 (100%)	
	Other racial identity	37 (86.1%)	6 (13.9%)	43 (100%)	
	<b>Gender</b>	Male	351 (83.2%)	71 (16.8%)	
Female		567 (84.9%)	101 (15.1%)	668 (100%)	
Prefer not to disclose		17 (94.4%)	1 (5.6%)	18 (100%)	
Other gender identity		22 (95.7%)	1 (4.3%)	23 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

**Table 7.** Cross tabulation analysis of student awareness related to current *hookah* policy on UW campus stratified by gender, race, and the interaction between these characteristics

		No knowledge of policy	Knowledge of policy	Total	P-value
		n (%)	n (%)	n (%)	
<b>Gender</b>	Male	311 (73.7%)	111 (26.3%)	422 (100%)	0.382
	Female	508 (76.0%)	160 (24.0%)	668 (100%)	
<b>Race</b>	White	232 (74.8%)	78 (25.2%)	310 (100%)	0.457
	Other racial identity	368 (77.1%)	109 (22.9%)	477 (100%)	
<b>Gender x Race</b>	Male, White	73 (66.7%)	37 (33.3%)	110 (100%)	0.071
	Male, Other racial identity	142 (77.6%)	41 (22.4%)	183 (100%)	
	Female, White	153 (79.3%)	40 (20.7%)	193 (100%)	
	Female, Other racial identity	214 (76.4%)	66 (23.6%)	280 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 7.1.** Cross tabulation analysis of student awareness related to current *hookah* policy on UW campus stratified by each categorical variable for gender and race

		No knowledge of policy n (%)	Knowledge of policy n (%)	Total n (%)	P-value
<b>Race</b>	White	546 (73.5%)	197 (26.5%)	743 (100%)	<b>0.034*</b>
	Black or African American	23 (62.2%)	14 (37.8%)	37 (100%)	
	American Indian or Alaska Native	11 (57.9%)	8 (42.1%)	19 (100%)	
	Asian	306 (79.3%)	80 (20.7%)	386 (100%)	
	Native Hawaiian or Pacific Islander	8 (61.5%)	5 (38.5%)	13 (100%)	
	Other racial identity	31 (72.1%)	12 (27.9%)	43 (100%)	
	<b>Gender</b>				
Male	311 (73.7%)	111 (26.3%)	422 (100%)	0.814	
Female	508 (76.1%)	160 (23.9%)	668 (100%)		
Prefer not to disclose	14 (77.8%)	4 (22.2%)	18 (100%)		
Other gender identity	18 (78.3%)	5 (21.7%)	23 (100%)		

**\*Bold values are statistically significant ( $p \leq 0.05$ )**

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

**Table 8.** Cross tabulation analysis of student awareness related to current *smokeless tobacco* policy on UW campus stratified by gender, race, and the interaction between these characteristics

		No knowledge of policy n (%)	Knowledge of policy n (%)	Total n (%)	P-value
<b>Gender</b>	Male	411 (97.4%)	11 (2.6%)	422 (100%)	0.609
	Female	647 (96.9%)	21 (3.1%)	668 (100%)	
<b>Race</b>	White	298 (96.1%)	12 (3.9%)	310 (100%)	0.473
	Other racial identity	463 (97.1%)	14 (2.9%)	477 (100%)	
<b>Gender x Race</b>	Male, White	105 (95.5%)	5 (4.5%)	110 (100%)	0.722
	Male, Other racial identity	179 (97.8%)	4 (2.2%)	183 (100%)	
	Female, White	186 (96.4%)	7 (3.6%)	193 (100%)	
	Female, Other racial identity	271 (96.8%)	9 (3.2%)	280 (100%)	

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 8.1.** Cross tabulation analysis of student awareness related to current *smokeless tobacco* policy on UW campus stratified by each categorical variable for gender and race

		No knowledge of policy n (%)	Knowledge of policy n (%)	Total n (%)	P-value
<b>Race</b>	White	722 (97.2%)	21 (2.8%)	743 (100%)	0.754
	Black or African American	37 (100%)	0 (0.0%)	37 (100%)	
	American Indian or Alaska Native	19 (100%)	0 (0.0%)	19 (100%)	
	Asian	374 (96.9%)	12 (3.1%)	386 (100%)	
	Native Hawaiian or Pacific Islander	13 (100%)	0 (0.0%)	13 (100%)	
	Other racial identity	41 (95.4%)	2 (4.6%)	43 (100%)	
	<b>Gender</b>				
Male	411 (97.4%)	11 (2.6%)	422 (100%)		
Female	647 (96.9%)	21 (3.1%)	668 (100%)		
Prefer not to disclose	17 (94.4%)	1 (5.6%)	18 (100%)		
Other gender identity	23 (100%)	0 (0.0%)	23 (100%)		

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

**Table 9.** Cross tabulation analysis of students’ support of or opposition towards 100% tobacco-free policy stratified by gender, race, and the interaction between these characteristics

		<b>No support</b>	<b>Support</b>	<b>Total</b>	<b>P-value</b>
		<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	
<b>Gender</b>	Male	207 (49.1%)	215 (50.9%)	422 (100%)	<b>0.000*</b>
	Female	234 (35.0%)	434 (65.0%)	668 (100%)	
<b>Race</b>	White	164 (52.9%)	146 (47.1%)	310 (100%)	<b>0.000*</b>
	Other racial identity	182 (38.2%)	295 (61.8%)	477 (100%)	
<b>Gender x Race</b>	Male, White	64 (58.2%)	46 (41.8%)	110 (100%)	<b>0.000*</b>
	Male, Other racial identity	90 (49.2%)	93 (50.8%)	183 (100%)	
	Female, White	95 (49.2%)	98 (50.8%)	193 (100%)	
	Female, Other racial identity	85 (30.4%)	195 (69.6%)	280 (100%)	

**\*Bold values are statistically significant ( $p \leq 0.05$ )**

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

*Frequency counts and percentages were used to examine potential trends in distributions.*

**Table 9.1.** Cross tabulation analysis of students’ support of or opposition towards 100% tobacco-free policy stratified by each categorical variable for gender and race

		<b>No support</b>	<b>Support</b>	<b>Total</b>	<b>P-value</b>
		<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	
<b>Race</b>	White	314 (42.3%)	429 (57.7%)	743 (100%)	0.612
	Black or African American	16 (43.2%)	21 (56.8%)	37 (100%)	
	American Indian or Alaska Native	10 (52.6%)	9 (47.4%)	19 (100%)	
	Asian	145 (37.6%)	241 (62.4%)	386 (100%)	
	Native Hawaiian or Pacific Islander	5 (38.5%)	8 (61.5%)	13 (100%)	
	Other racial identity	17 (39.5%)	26 (60.5%)	43 (100%)	
	<b>Gender</b>				
	Male	207 (49.1%)	215 (50.9%)	422 (100%)	<b>0.000*</b>
	Female	234 (35.0%)	434 (65.0%)	668 (100%)	
	Prefer not to disclose	9 (50.0%)	9 (50.0%)	18 (100%)	
	Other gender identity	13 (56.5%)	10 (43.5%)	23 (100%)	

*\*Bold values are statistically significant ( $p \leq 0.05$ )*

**P-values were based on chi-square analyses**

*Row totals may vary due to incompleteness of survey responses by participants.*

Table 10. Logistic regression of the main effects of race and gender on the outcome variables.

	Tobacco Use		Policy Support		Policy Awareness (Cigs)		Policy Awareness (EVP)		Policy Awareness (Little Cigars)		Policy Awareness (Trad. Cigars)		Policy Awareness (Hookah)		Policy Awareness (Smokeless)		
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	
<b>Gender (reference = male)</b>																	
Female	<b>0.61 (0.40, 0.91)*</b>		<b>1.88 (1.38, 2.57)*</b>		1.1 (0.80, 1.5)		0.71 (0.49, 1.02)		0.87 (0.59, 1.28)		0.89 (0.60, 1.34)		0.79 (0.56, 1.11)		1.07 (0.47, 2.5)		
<b>Race (reference = white)</b>																	
Other racial identity	0.61 (0.37, 1.06)		1.12 (0.77, 1.62)		1.0 (0.67, 1.5)		0.90 (0.56, 1.43)		0.95 (0.60, 1.5)		0.94 (0.59, 1.52)		0.87 (0.57, 1.33)		0.49 (0.16, 1.58)		
<b>Age</b>																	
	0.96 (0.93, 0.99)		1.02 (1.01, 1.04)		0.97 (0.95, 1.01)		0.96 (0.93, 0.99)		0.97 (0.94, 1.01)		0.96 (0.93, 0.99)		0.98 (0.95, 1.01)		0.98 (0.92, 1.05)		
<b>Time</b>																	
	1.0 (0.99, 1.01)		1.0 (1.0, 1.01)		0.99 (0.98, 1.01)		0.99 (0.99, 1.01)		0.99 (0.99, 1.01)		0.99 (0.99, 1.01)		0.99 (0.99, 1.01)		1.0 (0.99, 1.01)		

**\*Bold values are statistically significant ( $p \leq 0.05$ )**

Main effects analysis was completed for each outcome variable

Covariates of time (year of survey completed) and age (18-24, 25+) are used as control measures for determining significance

Table 11. Logistic regression of the interactional effects of race and gender on the outcome variables

	Tobacco Use		Policy Support		Policy Awareness (Cigs)		Policy Awareness (EVP)		Policy Awareness (Little Cigars)		Policy Awareness (Trad. Cigars)		Policy Awareness (Hookah)		Policy Awareness (Smokeless)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
<b>Gender (reference = male)</b>																
Female	0.59	(0.30, 1.1)	1.48	(0.92, 2.37)	1.46	(0.85, 2.5)	0.76	(0.42, 1.37)	1.10	(0.59, 2.04)	1.02	(0.55, 1.90)	0.50	(0.30, 0.85)	0.77	(0.24, 2.5)
<b>Race (reference = white)</b>																
Other racial identity	0.57	(0.29, 1.2)	0.86	(0.50, 1.48)	1.38	(0.76, 2.5)	0.96	(0.51, 1.81)	1.22	(0.62, 2.41)	1.08	(0.54, 2.14)	0.56	(0.31, 1.01)	0.33	(0.07, 1.59)
<b>Gender x Race (reference= male, white)</b>																
Female, Other racial identity	1.14	(0.50, 2.6)	1.51	(0.81, 2.81)	0.60	(0.30, 1.19)	0.89	(0.42, 1.89)	0.66	(0.29, 1.47)	0.80	(0.36, 1.80)	<b>2.14</b>	<b>(1.07, 4.27)*</b>	1.89	(0.35, 10.1)
<b>Age</b>	0.96	(0.93, 0.99)	1.02	(1.01, 1.04)	0.97	(0.95, 1.01)	0.96	(0.93, 0.99)	0.97	(0.94, 1.03)	0.96	(0.93, 0.99)	0.98	(0.95, 1.01)	0.98	(0.92, 1.05)
<b>Time</b>	1.0	(0.99, 1.01)	1.0	(1.0, 1.01)	0.99	(0.98, 1.01)	0.99	(0.99, 1.01)	0.99	(0.99, 1.01)	0.99	(0.99, 1.01)	0.99	(0.99, 1.01)	0.99	(0.99, 1.01)

**\*Bold values are statistically significant ( $p \leq 0.05$ )**

*Interactional effects analysis was completed for each outcome variable*

*Covariates of time (year of survey completed) and age (18-24, 25+) are used as control measures for determining significance*