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Regional and Gender Differences in Tobacco Use among American Indian Youth

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Abstract

Background: Tobacco use is among the top preventable causes of death in the United States, and American Indian (AI) adolescents tend to use tobacco at higher rates compared to the general population.

Objective: To examine regional and gender differences in rates of smoked, smokeless, and poly-tobacco use among AI adolescents as compared to White counterparts.

Methods: Participants were sampled as part of a larger ongoing study examining substance use among American Indian adolescents who completed the American Drug and Alcohol Survey. A multilevel analytic approach was used to examine the effects of demographic variables on tobacco use.

Results: AI disparities were present for past month and lifetime rates of smoked and smokeless tobacco use, and these disparities varied by region and gender. AI disparities in smoked tobacco use were largest in the Upper Great Lakes region, with odds of current and ever smoking among AIs 3.34 to 4.15 times that of Whites, respectively, $p < .001$. Regional differences in AI disparities were not significant for lifetime smokeless or poly-tobacco use, $p = .675$. With regard to gender differences, AI disparities in reports of ever smoking were largest among females, OR = 2.61, $p < .001$. Similar to cigarette smoking, AI disparities in reports of ever using smoked, smokeless or poly-tobacco were largest among females, ORs = 2.51 and 2.56, respectively, $p < .001$.

Conclusions: Our results suggest a need for prevention and intervention programs to be implemented with consideration for adolescent's demographic characteristics, including geographic region, gender, and AI status.

Keywords

American Indian adolescents; cigarette smoking; smokeless tobacco; poly-tobacco use; social-contextual factors

1. INTRODUCTION

Tobacco use among adolescents in the United States remains a significant public health concern. Most adolescents who use tobacco regularly continue to use tobacco into adulthood, and the risk of experiencing health consequences associated with tobacco use increases as a function of the duration of time that tobacco is used (US Department of Health & Human Services, 2014). Cigarette smoking is among the top five leading causes of death in the United States (Yoon et al., 2014), and the life expectancy for smokers is at least 10 years shorter than for nonsmokers (Jha et al., 2013). Monitoring the Future reports that 18.2% of 8th, 10th, and 12th graders have smoked cigarettes, 10.3% have used smokeless tobacco, and 9.4% have reported poly-tobacco use in their lives (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2016).

Traditionally, tobacco plays a special role in American Indian spirituality and is used in ceremonies by many tribes (Burgess et al., 2007; Fu et al., 2014; Unger, Soto, & Baezconde-Garbanati, 2006). However, commercial tobacco, usually in the form of cigarettes has also become a central component of American Indian life (Fu et al., 2014; Unger et al., 2006). Researchers suggest that this may be due to the ease of access of commercially available tobacco (Fu et al., 2014; Unger et al., 2006). Qualitative studies have reported that youth have described smoking as expected at some ceremonies and even a sign of respect to the elders in the community (Unger et al., 2006). Perhaps it is no surprise then that tobacco use is particularly problematic among American Indian (AI) youth, who have been found to have a higher prevalence of use of smoked and smokeless tobacco than the general population (Beauvais, Thurman, Burnside, & Plested, 2007). Beauvais and colleagues (2004) compared lifetime tobacco use among AI adolescents attending schools on, or near, Indian reservations in the United States with non-AI adolescents from the Monitoring the Future project. They found that AI youth report significantly higher lifetime tobacco use rates in 8th (76% versus 41%), 10th (83% versus 55%), and 12th (83% versus 63%) grades, compared to non-AI youth (Beauvais et al., 2004).

Differences in daily cigarette smoking have been observed between AI and non-AI adolescents. Beauvais and colleagues (2007) compared AI and non-AI data from the Monitoring the Future Study. They found significant differences in tobacco use between AI and non-AI early in adolescence, with the gap closing later in adolescence. The prevalence of daily smoking among AI and non-AI students, respectively, was 13% versus 4% for 8th graders, 15% versus 8% for 10th graders, and 16% among both AI and non-AI adolescents for 12th graders (Beauvais et al., 2007). Data from the National Longitudinal Study on Adolescent Health found that AI adolescents tend to report younger age of cigarette use initiation than other single race and biracial groups (Clark, Doyle, & Clincy, 2013).

Other studies on tobacco use among AI adolescents have tended to focus on isolated regions or tribes, though there is reason to believe that rates may differ by region based on previous substance use research examining stimulant (Spillane, Weyandt, Oster, & Treloar, 2017) and alcohol use (Whitbeck et al., 2014). Spear and colleagues (2005) examined lifetime and past month cigarette use among 7th grades from the Northern Plains and found higher rates of smoking among American Indians, compared to White students (Spear, Longshore,

McCaffrey, & Ellickson, 2005). Forster and colleagues (2008) examined current smoking rates in 336 AI youth, between the ages of 11 and 18, in Minneapolis/St. Paul and found that 37% reported smoking cigarettes in the past 30 days (Forster, Brokenleg, Rhodes, Lamont, & Poupert, 2008). In Oklahoma, the Oklahoma Tobacco Youth Survey was administered to 399 American Indians and found that 23% of middle school students and 42% of high school students reported current use of cigarettes (Eichner et al., 2005). Despite well-documented differences in smoked and smokeless tobacco use prevalence in national samples as well as individual studies in a few regions or with a few tribes, there is limited information regarding potential regional differences in smoked and smokeless tobacco use rates and no studies have examined poly-tobacco use.

In addition to region, research has suggested there are gender differences in substance use worthy of exploring. Within the general population of adolescents, research suggests that males may be much more likely to use smokeless tobacco (Arrazola et al., 2015; LeMaster, Connell, Mitchell, & Manson, 2002). Spear and colleagues (2005) found that 7th grade AI girls from the Northern Plains were more likely to report lifetime and past-month cigarette use compared to AI boys, White girls, and White boys (Spear, Longshore, McCaffrey, & Ellickson, 2005). Similarly, Austin, Oetting, & Beauvais (1993) found that AI girls had higher rates of tobacco use than any other gender/ethnic combination. Spillane and colleagues (2012) found that sensation-seeking predicted cigarette use initiation among female AI adolescents, but not among male AI adolescents (Spillane et al., 2012). However, Forster and colleagues (2008) found no gender differences in cigarette smoking among youth aged 11–18 in the Minneapolis/St. Paul area (Forster, Brokenleg, Rhodes, Lamont, & Poupert, 2008). These contrasting findings highlight gender as an important construct in need of further attention.

Much of the existing literature has focused on either cigarette smoking or smokeless tobacco, and few studies have examined the rates of using both products. Studies conducted in non-AIs have found that more high school students are using at least two tobacco products than cigarettes alone (Arrazola et al., 2015; Lee, Hebert, Nonnemaker, & Kim, 2015). This trend is important to evaluate, as using two or more products may lead to more health problems.

We use a large sample of AI youth living on or near reservations, stratified by region to represent the concentration of AIs across the United States to examine differences in smoked and smokeless tobacco by AI status, and use of both smokeless and smoked tobacco by AI status (i.e., any AI descent indicated versus White only), age, gender, and region. A better understanding of how tobacco use differs by AI status, gender, age, and region could help to inform prevention and treatment efforts.

2. METHODS

2.1. Participants

This study was part of an ongoing study of substance use among AI adolescents. Stratified by region, schools on or near reservations that have at least 20% AI youth enrolled were recruited to be part of the study. The sampling scheme consisted of geographic regions in

which reservation-based AIs reside, including Northwest, Northern Plains, Upper Great Lakes, Southeast, and Southwest. Schools were paid \$500 for participation and were given a comprehensive report of survey findings within two months of survey completion as incentives to participate.

Thirty-three schools in 11 states with reservations participated in the study (Alabama, Arizona, Minnesota, Montana, Nebraska, Nevada, North Dakota, Oregon, South Dakota, Washington, and Wisconsin). Twenty-five of the schools were located on AI reservations, while eight schools enrolled students from nearby reservations. Twenty-eight schools were public schools and five were Bureau of Indian Education schools. Combining data from all schools, the number of completed surveys represented 80% of student enrollment in those schools.

2.2. Procedure

All survey procedures were approved by the university Institutional Review Board (IRB), appropriate tribal authority, and/or school board, and all study participants provided informed consent. Further information about survey procedures can be found in Stanley et al. (2014). Less than one percent of students did not complete the survey due to lack of parental consent.

2.3 Measures

Students were administered The American Drug and Alcohol Survey™. This survey has been adapted for use with AI youth (Oetting & Beauvais, 1990). Lifetime smoking and smokeless tobacco were measured by asking, “Have you ever used cigarettes/smokeless tobacco?” Responses were “no” or “yes.” Lifetime and current poly-tobacco use of smoke and smokeless tobacco was created for individuals who reported both smoked and smokeless tobacco use.

2.4 Data Analysis Plan

Multilevel models were used to account for the non-independence of observations due to nesting of students within schools/communities (Gibbons, Hedeker, & DuToit, 2010; Raudenbush & Bryk, 2002; Singer & Willett, 2003). Multilevel models with individual-level variables (level 1) nested within schools (level 2) were estimated with SAS 9.3 (SAS Institute Inc. 2012) PROC GLIMMIX with binary distributions and logit link functions. Dichotomous (yes/no) dependent variables were lifetime history of smoked tobacco use, smokeless tobacco use, and both, as well as past 30-day smoking, smokeless tobacco use, and both. Individual-level (level 1) independent variables were gender (male = reference), and age (standardized continuous variable). School/community-level independent variables were region (Southwest = reference), and year (2009–2010 = reference). Reference groups were chosen for interpretive value and were consistent with previous analyses of other substance use outcomes in prior years of this survey (Miller, Stanley, & Beauvais, 2012).

We were particularly interested in examining differences between AIs and White adolescents by region and gender. Thus, we adopted a backward-model-building approach whereby the multivariate significance of the three-way interactive effect of these variables was examined

first (with all respective two-way interactive effects and main effects included). If the three-way interactive effect was nonsignificant, it was removed from the model, and the multivariate significance of all two-way interactive effects were examined. Any nonsignificant two-way interactive effect was removed, and the significance of main effects were examined. All models included participant age, grade, and study year as *a priori* covariates.

3. RESULTS

3.1. Participant Characteristics

3.1.1 Demographics.—Of the 5077 youth in this study, 3498 (68.9%) were AI and 1579 (31.1%) were White only. Approximately equal numbers of males and females were represented within each group. Within the AI group, 1672 (49.5% were female); 736 (48.7%) of the White group were female. Counts of males and females were not different between the AI and White groups, χ^2 (df = 1) = 0.22, p = .639. Participant ages ranged from 10 to 21, with a mean age of 15.01 years, SD = 1.67. The AI group was younger (AI: M_{age} = 14.76, SD = 1.70; White: M_{age} = 15.56, SD = 1.44), and this difference was significant between groups, M_{diff} = 0.80 years, $t(5063)$ = 16.32, p < .001. Youth were in 7th to 12th grade, and as with age, grade level was lower for the AI group, χ^2 (df = 5) = 494.25, p < .001.

3.1.2 Smoking and smokeless tobacco use topography.—Nearly half (N = 2371, 46.7%) of youth had endorsed ever smoking tobacco, almost a third (N = 1530, 30.1%) had ever used smokeless tobacco, and nearly a quarter (N = 1206, 23.8%) had ever been poly-tobacco users. Over a quarter (N = 1408, 27.7%) were current users of smoked tobacco, seventeen percent (N = 846, 16.7%) were current users of smokeless tobacco, and twelve percent (N = 593, 11.7%) were current poly-tobacco users. The AI group tended to have higher rates of use of lifetime (53.5 vs 31.7%) and current smoked tobacco (32.6 vs 17.0%), lifetime (32.6 vs 24.6%) and current smokeless tobacco (18.7 vs 12.2%), and lifetime (26.8 vs 17.1%) and current poly-tobacco use (13.8 vs 7.0%).

3.2. Data Checking and Missingness

Instances where current use was missing and lifetime use was marked as “no” were recoded such that current use was also coded as “no” (n of cases recoded: current smoked tobacco use = 36; current smokeless tobacco use = 37; current combination use = 89). In cases where current use was indicated and lifetime use was missing, lifetime use was recoded as “yes” (n of cases recoded: lifetime smoked tobacco use = 15; lifetime smokeless tobacco use = 14; lifetime combination use = 11). In cases where there were discrepancies in reports, i.e., current use was marked as “yes” and lifetime use was marked as “no,” were recoded as missing for both current and lifetime use outcomes (n of cases recoded: smoked tobacco use = 11; smokeless tobacco use = 18; combination use = 22). In these instances, it would be impossible to know which of the two chosen responses was true, and thus, the only option was to code these as missing. After recoding, cases of missing values for outcomes (of 5,077 total cases) were as follows: lifetime smoked tobacco use = 208 (4.1%); current smoked tobacco use = 266 (5.2%); lifetime smokeless tobacco use = 315 (6.2%); current smokeless

tobacco use = 251 (4.9%); lifetime poly-tobacco use = 356 (7.0%); current poly-tobacco use = 293 (5.8%). Missingness was assumed to be at random, and 7.0% or less of cases were missing for all outcomes.

3.3. Differences in Use of Smoked, Smokeless, and Poly-Tobacco Use

Tables 1 and 2 presents odds ratios of main effects of AI (vs. White), age (sample standardized), the year data were collected (in four categories with the first study year as the reference), and female gender (vs. male gender). Table 1 reports these effects for ever (lifetime) use of smoked, smokeless, and poly-tobacco use i.e., combination. Table 2 reports these effects for current (past month) use.

An odds ratio effect of 2.84 for the variable “AI” on ever smoking is interpreted as follows: the odds of ever smoking among the AI group were 2.84 times the odds of ever smoking in the non-AI group, $p < .001$. In other terms, whereas the odds of smoking among non-AIs were 0.54, $p = .005$, which in probability terms is $0.54 \div (1 + 0.54)$ or 35.1%, the odds of smoking among AIs were 1.54, $p = .030$, which in probability terms is $1.54 \div (1 + 1.54)$ or 60.6%. Put differently, whereas a little over a third of non-AIs have ever smoked (on average), nearly two-thirds of AI youth have ever smoked. Older age and being female were also associated with increased likelihood of ever smoking, ORs = 1.44 and 1.43, respectively, $ps < .001$.

The odds of ever using smokeless tobacco among the AI group were 1.58 times the odds among the non-AI group, $p < .001$. Whereas older age was associated with increased odds of smoking, being female was associated with decreased odds of using smokeless tobacco, ORs = 1.40 and 0.52, respectively, $ps < .001$. Similarly, the odds of ever using both cigarettes and tobacco among the AI group were 1.80 times the odds of using both among the non-AI group, $p < .001$. Whereas older age was associated with increased odds of ever using both, being female was associated with decreased odds, ORs = 1.41 and 0.69, respectively, $ps < .001$. Results for current (past month) use of cigarettes, smokeless tobacco, and both, replicated findings for ever (lifetime) use (see Table 2).

3.4. Interactive Effects of AI Status with Region and Gender

Results suggested that the effect of AI status on ever (lifetime) cigarette use varied by region and gender (AI $\times$ region: $F(4,14) = 5.13$, $p = .009$; AI $\times$ gender: $F(1,14) = 7.95$, $p = .014$). AI disparities in lifetime cigarette use were largest in the Upper Great Lakes region, with odds of ever smoking among AIs 4.15 times that of non-AIs (OR = 4.15, 95%CI [3.00, 5.73], $p < .001$). AI disparities in cigarette use were also observed in the Southeast and Northern Plains regions (Southeast: OR = 1.90, 95%CI [1.16, 3.12], $p = .015$; Northern Plains: OR = 3.30, 95%CI [2.03, 5.38], $p < .001$). In contrast, AI disparities in smoking were not significant in the Northwest or Southwest regions, $ps = .709$ and $.328$, respectively. With regard to gender differences, AI disparities in reports of ever smoking were largest among females. Odds of ever smoking among female AIs were 2.61 times the odds of ever smoking among female non-AIs (OR = 2.61, 95%CI [1.90, 3.59], $p < .001$). Similarly, odds of ever smoking among male AIs were 1.78 times the odds of ever smoking among male non-AIs (OR = 1.78, 95%CI [1.30, 2.44], $p = .002$).

In contrast to ever smoking, regional differences in AI disparities were not significant for ever (lifetime) smokeless tobacco use or poly-tobacco use, $ps = .675$ and $.806$, respectively. However, gender differences in AI disparities were significant. Similar to ever smoking reports, AI disparities in reports of ever using smokeless tobacco or poly-tobacco use of both smoked and smokeless tobacco were largest among females. Odds of ever using smokeless tobacco among female AIs were 2.51 times the odds of female non-AIs (OR = 2.51, 95%CI [1.84, 3.43], $p < .001$). Similarly, odds of combination use among female AIs were 2.56 times the odds of female non-AIs (OR = 2.56, 95%CI [1.84, 3.56], $p < .001$). For males, the difference in odds was not significant for lifetime smokeless tobacco use, $p = .210$. The odds of ever poly-tobacco use among male AIs were 1.41 times the odds for male non-AIs (OR = 1.41, 95%CI [1.06, 1.87], $p = .021$).

Results suggested that the effect of AI status on current (past month) cigarette use varied by region (AI $\times$ region: $F(4,14) = 5.45$, $p = .007$), but not by gender, $p = .106$. Similar to ever (lifetime) use, AI disparities in current cigarette use were largest in the Upper Great Lakes region, with odds of current smoking among AIs 3.37 times that of non-AIs (OR = 3.37, 95%CI [2.39, 4.75], $p < .001$). AI disparities in cigarette use were also observed in the Northern Plains region (OR = 2.91, 95%CI [1.60, 5.30], $p = .002$). In contrast, AI disparities in smoking were not significant in the Southeast, Northwest, or Southwest regions, $ps = .369$, $.991$, and $.683$, respectively. Results for current (past month) smokeless tobacco use and poly-tobacco use replicated findings for ever (lifetime) use (see Table 2). All three-way interactions were not significant and therefore were dropped from the models consistent with a backward model-building approach.

4. DISCUSSION

The goal of the study was to examine differences in lifetime and current use for smoked, smokeless tobacco, and poly-tobacco use by region, gender, age, and AI status in a large, representative sample of American Indian adolescents living on or near reservations. Smoking presents a major public health concern as it is the leading cause of preventable death worldwide (US Department of Health & Human Services, 2014). Consistent with other studies showing that AIs tend to smoke more than other racial/ethnic groups, our results suggest that AIs have a substantially higher likelihood of lifetime and past-month smoked, smokeless, and poly-tobacco use. This highlights the need for effective prevention and intervention efforts targeted to AI youth. A closer look at the data revealed an effect for region of the country on smoked tobacco use, even when adjusting for other variables. For example, when region and AI status are considered, AIs in the Upper Great Lakes, Southeast, and Northern Plains region have a higher likelihood of lifetime and past month smoking tobacco as compared to AIs from the Southwest. A prior study in an urban area of the Upper Great Lakes suggested high smoking rates among AI youth (Forster et al., 2008). The present study adds significantly by comparing schools in the Upper Great Lakes region to schools across the rest of the country, and also by comparing AIs to Whites. Indeed, the present work showed that the odds of current and lifetime smoked tobacco among AI youth in the Upper Great Lakes were 3.34 to 4.15 times the odds for non-AIs in that same region. Though it is unclear why this difference may exist, similar results have also been found for other substances, including stimulant use (Spillane et al., 2017) and drug use rates

(Rumbaugh Whitesell et al., 2007; Whitesell et al., 2007). These results underscore the importance of taking geographic region into consideration when discussing disparities in cigarette smoking, as these disparities are not seen in all areas of the country. Future research should continue to seek to understand these differences, which may improve our ability to develop effective prevention and intervention programs for high risk youth in a way that is responsive to their individual needs.

While there is a growing emphasis on studying poly-tobacco use within adolescents as extant research has typically been conducted on a product by product basis, this study was among the first to consider poly-tobacco use in an American Indian population. Studies using national datasets have demonstrated an increase in use of cigarettes and smokeless tobacco use in the general population (Fix et al., 2014; Lee et al., 2015). However, as is true in many national data sets, there are small numbers of AI individuals within the samples, making it difficult to generalize findings to AI populations. Our findings suggest that lifetime and current poly-tobacco use was higher for AI adolescents (vs. Whites), and that poly-tobacco use may be a pervasive problem for AI adolescents generally, as when we adjust for other variables, the effect of ethnicity remained significant.

Results for current and lifetime smokeless tobacco mirrored those for poly-tobacco use. Main effects suggest that AI adolescents were higher in both lifetime and past-month smokeless and poly-tobacco use. However, when we adjust for other variables, the effect of ethnicity remained significant suggesting that the problem with smokeless tobacco and poly-tobacco use may not be just specific to one region of the US for AI adolescents, but is a more pervasive problem for AI adolescents as compared to Whites.

An examination of gender disparities found that differences in rates of lifetime and current cigarette smoking, smokeless tobacco, and poly-tobacco use were highest for AI females as compared to White females. For males, lifetime poly-tobacco use was higher for AI males as compared to White males. For lifetime smokeless tobacco the odds were not significantly different for AI males as compared to White males. Overall, while males may be more likely to be smokers in the general population (Jamal, 2016), our results suggest that there may exist greater disparities in tobacco use between AI and White females, as they exhibited the highest lifetime and current odds ratios of smoked, smokeless, and poly-tobacco use. Prevention programs may find it important to target females in particular to reduce these gender disparities. In addition, treatment programs may also need to be devised that are unique to female AI tobacco users.

Despite the success of population-based approaches to smoking cessation in the United States with recent estimates of cigarette smoking at 15.5% for Whites, the rates among AIs in our sample remains at 31.1% (CDC, 2018). This rate is more than double what is seen in Whites, demonstrating a widening of the disparity gap. Our results, along with rates reported at the national level suggest that prevention and intervention programs targeting AI communities are desperately needed. These programs should be culturally appropriate and designed specifically for AIs. As many communities are attempting to restore their culture and cultural practices that were lost due to colonization, including tobacco for prayer and ceremony, is seen as necessary for achieving health equity (Boudreau et al., 2016).

Interventions which are culturally tailored, including the All Nations Breath of Life that include traditional use of tobacco, have been shown to be superior to a non-culturally tailored program (Choi et al., 2016).

The results of this study should be understood within the context of its limitations. First, this was not a random sampling of all schools on or near reservations. Some schools from certain regions and states were excluded, including those from the Northeast, California, Oklahoma, and Alaska, and therefore their rates were not reflected in this study. Relatedly, while this was a representative sample of American Indian adolescents, this was not a representative sample of Whites. Second, because this study was a secondary data analysis, we were limited by the data that was collected which did not ask about traditional use of tobacco. Finally, because this was a school-based sample, findings may be an underestimation of actual smoking rates among AI youth in general, due to the high AI dropout rate from schools (Faircloth & Tippeconnic, 2010).

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Table 1

Odds ratios (and 95% confidence intervals) indicating effects of AI status and covariates on ever (lifetime) use of smoked, smokeless, and poly-tobacco

Variable	Ever Smoking			Ever Smokeless Tobacco			Ever Poly-Tobacco Use		
	OR	95% CI		OR	95% CI		OR	95% CI	
AI (White = reference)	2.84 ***	(2.30, 3.52)		1.58 ***	(1.26, 1.98)		1.80 ***	(1.41, 2.29)	
Age	1.44 ***	(1.34, 1.54)		1.40 ***	(1.30, 1.51)		1.41 ***	(1.30, 1.52)	
Year (2009–2010 = reference)									
2010–2011	0.81	(0.47, 1.38)		1.20	(0.71, 2.05)		1.05	(0.63, 1.74)	
2011–2012	0.74	(0.47, 1.17)		0.61 †	(0.36, 1.02)		0.64 †	(0.39, 1.07)	
2012–2013	0.93	(0.67, 1.30)		1.38 †	(0.97, 1.95)		1.51 *	(1.04, 2.19)	
Female (Male = reference)	1.43 ***	(1.26, 1.62)		0.52 ***	(0.45, 0.59)		0.69 ***	(0.60, 0.80)	
Region (Southwest = reference)									
Southeast (S)	1.42	(0.32, 6.34)		1.26	(0.30, 5.29)		1.06	(0.33, 3.41)	
Upper Great Lakes (UGL)	1.17	(0.43, 3.20)		0.47	(0.18, 1.24)		0.48 †	(0.21, 1.08)	
Northern Plains (NP)	1.25	(0.57, 2.71)		0.77	(0.36, 1.62)		0.91	(0.49, 1.68)	
Northwest (NW)	0.90	(0.30, 2.74)		0.56	(0.19, 1.61)		0.53	(0.21, 1.32)	

Note. Participant age was sample standardized.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$.

Odds ratios (and 95% confidence intervals) indicating effects of AI status and covariates on current (past month) use of smoked, smokeless, and poly-tobacco

Table 2

Variable	Current Smoking		Current Smokeless Tobacco		Current Poly-Tobacco Use	
	OR	95% CI	OR	95% CI	OR	95% CI
AI (White = reference)	2.26 ***	(1.78, 2.86)	1.36 *	(1.02, 1.81)	1.67 **	(1.20, 2.35)
Age	1.27 ***	(1.18, 1.36)	1.27 ***	(1.16, 1.38)	1.22 ***	(1.11, 1.34)
Year (2009–2010 = reference)						
2010–2011	0.89	(0.52, 1.50)	1.51	(0.87, 2.63)	1.21	(0.74, 1.20)
2011–2012	0.68 †	(0.43, 1.09)	0.62 †	(0.33, 1.13)	0.62 †	(0.35, 1.08)
2012–2013	0.86	(0.59, 1.26)	1.56 *	(1.01, 2.42)	1.61 *	(1.00, 2.58)
Female (Male = reference)	1.43 ***	(1.24, 1.64)	0.60 ***	(0.51, 0.71)	0.82 *	(0.68, 0.99)
Region (Southwest = reference)						
Southeast (S)	1.12	(0.32, 3.98)	0.90	(0.23, 3.55)	0.70	(0.28, 1.76)
Upper Great Lakes (UGL)	1.42	(0.60, 3.38)	0.45 †	(0.17, 1.16)	0.42 *	(0.21, 0.83)
Northern Plains (NP)	1.27	(0.65, 2.47)	0.69	(0.34, 1.41)	0.74	(0.46, 1.21)
Northwest (NW)	0.63	(0.24, 1.65)	0.47	(0.16, 1.34)	0.36 *	(0.15, 0.84)

Note. Participant age was sample standardized.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$.