



HHS Public Access

Author manuscript

J Health Care Poor Underserved. Author manuscript; available in PMC 2024 August 28.

Published in final edited form as:

J Health Care Poor Underserved. 2022 ; 33(3): 1245–1257. doi:10.1353/hpu.2022.0110.

Implications for Coding Race and Ethnicity for American Indian and Alaska Native High School Students in a National Survey

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Abstract

Objectives.—To examine the impact of racial/ethnic coding strategies on the estimated prevalence of risk behaviors among American Indian/Alaska Native (AI/AN) high school students.

Methods.—Data from the national Youth Risk Behavior Survey (2017 and 2019) were analyzed (N=28,422). Racial/ethnic data were coded to identify “Multiracial/ethnic AI/AN students” and “AI/AN alone students.” The prevalence of persistent feelings of sadness or hopelessness, suicidality, and violence victimization were compared across the coding schemes and with non-Hispanic White students.

Results.—Of students who self-identified as AI/AN, one in six (18%) were AI/AN alone. The prevalence of many health risk behaviors was significantly higher among AI/AN students than non-Hispanic/Latino White students. The precision of the risk behavior prevalence estimates, however, varied considerably.

Conclusion.—How racial/ethnic data were coded affected the precision of calculations of risk behavior prevalence among AI/AN students, who are often multiracial and of Hispanic/Latino ethnicity.

Keywords

Adolescent; American Indian; Alaska Native; violence; suicide

In the U.S., American Indian and Alaska Native (AI/AN) people experience among the highest rates of poor health outcomes,¹ with an estimated 19%–23% of AI/AN adults experiencing fair or poor health status.² The prevalence of cigarette smoking, overweight and obesity, and inadequate physical activity is significantly higher among AI/AN high school students than among their non-Hispanic White peers.³ Further, racial discrimination

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and racially motivated harassment are common experiences among AI/AN adults,⁴ and among AI/AN youth, discrimination is associated with anger and aggression,⁵ suicidal behavior,⁶ and substance use.⁷

Reasons for these health disparities are complex and based on both current living conditions and historical traumas.^{8–11} First, one in five AI/AN people live at or below the poverty level¹² and 15% lack any health insurance coverage.¹² Although most live in metropolitan areas, approximately 22% of AI/AN people live on reservations or other trust lands,¹² some of which have concentrated poverty, inadequate or limited educational and employment opportunities, poor housing, and poor access to health care.^{12–13}

Second, emerging evidence shows lasting effects of trauma on later generations through a biological (epigenetic) mechanism.¹³ In other words, current generations remain affected by historical policies that, for example, forced removal of AI/AN people from tribal lands and mandated removal of youth from families for placement into Indian boarding schools.¹⁰ These historical policies ultimately resulted in the loss of community shaped by language, culture, and religious beliefs.^{8–11,14}

To accurately document health disparities among various racial and ethnic populations, it is necessary to have adequate data that describe the prevalence of behaviors, social determinants of health, and health outcomes.^{1,15} This is particularly important for population groups that constitute a small percentage of the U.S. population and are, therefore, missed in many surveillance systems. American Indian and Alaska Native people, alone or in combination with another race, are such a group, constituting 1.7% of the U.S. population.¹⁶

One approach to improving data quality for AI/AN groups includes oversampling AI/AN respondents during health surveys.^{17–18} However, even with oversampling, how data are coded or tabulated to describe racial and ethnic groups for the purpose of analysis can undermine the integrity of epidemiologic data.¹ Further, racial/ethnic misclassification of AI/AN people is a common problem with surveillance data.¹

To address these data concerns, there is a growing literature, and calls from tribal leaders, to fill the data gaps for Indian Country so that accurate information is used to both create and implement programs that effectively address health disparities.^{1,15,19} Using nationally representative samples of U.S. high school students, this study explored how choices for coding race and ethnicity could affect sample sizes, prevalence estimates, and data precision related to risk behaviors and experiences among AI/AN students. Then, the data were used to examine whether the prevalence of persistent feelings of sadness or hopelessness, suicidal thoughts and attempts, and violence victimization varied among non-Hispanic White, AI/AN alone, and AI/AN multiracial/ethnic students.

Methods

This study examined data from the national Youth Risk Behavior Survey (YRBS), a cross-sectional, school-based survey that has been conducted by the Centers for Disease Control and Prevention (CDC) biennially since 1991. Each survey year, an independent three-stage, cluster sample design is used to obtain a nationally representative sample of

public and private school students in grades 9–12 in the 50 U.S. states and the District of Columbia. Student participation in the YRBS is anonymous and voluntary, and local parental permission procedures are used. Survey participants complete a self-administered pencil and paper questionnaire during a regular class period and record their responses on a computer-scannable answer sheet. More information about the YRBS sampling and psychometric properties has been published elsewhere.^{20–23}

For the current analysis, we combined data from the national 2017 and 2019 YRBS to improve statistical power. During 2017 and 2019, respectively, the number of students in the sample was 14,765 and 13,677, the school response rate for both years was 75%, the student response rates were 81% and 80%, and the overall response rate (the product of the school and student response rates) for both years was 60%. The CDC's Institutional Review Board approved the protocol for the national YRBS.

Measures.

The 2017 and 2019 YRBS questionnaires asked students to indicate their sex (female or male) and grade (9th, 10th, 11th, or 12th). In addition, students were asked their race and ethnicity using two questions. First students were asked, “Are you Hispanic or Latino?” with response options yes and no. Second, students were asked, “What is your race? (Select one or more responses.)” The response options were American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and White. The following two coding schemes for AI/AN students were studied: 1) *Multiracial/ethnic AI/AN* students were respondents who selected their race as AI/AN and at least one other race or Hispanic/Latino ethnicity, and 2) *AI/AN alone* students were respondents who selected their race as AI/AN and no other race or ethnicity. Respondents who indicated they were not Hispanic or Latino, but had selected their race as White, were categorized as non-Hispanic White (hereafter “White”). Data for other racial/ethnic groups are not presented but remained in the analytic sample.

In addition, 11 variables assessing persistent feelings of sadness or hopelessness, suicidal thoughts and attempts, and violence victimization were examined as outcomes. Question wording and analytic coding for each of the 11 variables are provided in Table 1.

Analysis.

A weight based on student sex, race/ethnicity, and grade was applied to each record to adjust for school and student nonresponse and oversampling of Black and Hispanic/Latino students. The overall weights were scaled so that the weighted count of students equals the total sample size, and the weighted proportions of students in each grade match the national population proportions.²¹ Missing data were not imputed. Only 1% of records were missing both race and ethnicity data. The percentage of missing data for AI/AN alone, AI/AN multiracial/ethnic, and White students differed across variables, and in some cases, across race/ethnicity. For example, for six variables, missingness was under 5% for each group. For other variables, missingness exceeded 10%, notably, among AI/AN alone, AI/AN multiracial/ethnic, and White students, the percentage of missing data was 35%, 25%, and 21%, respectively, for attempted suicide; 22%, 17%, and 20%, respectively, for having been

in a physical fight; and 23%, 15%, and 16%, respectively, for having experienced sexual dating violence.

To account for the complex sample design of the survey and weighting, all analyses were conducted using SUDAAN statistical software (version 11.0.1) (Research Triangle Institute, Research Triangle Park, North Carolina). First, percentages and 95% confidence intervals (CI) were calculated for all risk behaviors and experiences overall, and then for students who were AI/AN alone, multiracial/ethnic AI/AN, and White. Non-Hispanic White is a common referent group in epidemiological studies. Second, a series of logistic regression models, controlling for sex and grade, were used to assess whether the adjusted odds of past-12-month persistent feelings of sadness or hopelessness, suicidal thoughts and attempts, and violence victimization were significantly different among AI/AN alone students, multiracial/ethnic AI/AN students, and White students. Findings were considered statistically significant if p-values were $< .05$.

Results

During 2017 and 2019, based on the race question only, 1,554 (unweighted N) students indicated their race was AI/AN (Figure 1). Of those respondents, 843 (54%) selected only AI/AN as their race and 711 (46%) selected another race in addition to AI/AN. When combined with the ethnicity question, 1,247 (82%) of respondents were Hispanic/Latino and multiracial, and 282 (18%) of respondents were AI/AN alone.

Persistent feelings of sadness or hopelessness and suicidal thoughts and attempts.

Nationwide, among high school students overall (i.e., all racial/ethnic groups combined), 34.0% had persistent feelings of sadness or hopelessness, 17.9% had seriously considered attempting suicide, and 8.1% had attempted suicide during the 12 months before the survey (Table 2). Compared with White students, the odds of experiencing persistent feelings of sadness or hopelessness were significantly higher among AI/AN alone (adjusted odds ratio [AOR]=1.5 [95% CI=1.0,2.2]) and among AI/AN multiracial/ethnic students (AOR=1.7 [1.4,2.0]), as were the odds of having seriously considered attempting suicide (AOR=2.0 [1.3,3.1] and AOR=1.4 [1.2,1.7], respectively) and of having attempted suicide (AOR=3.0 [1.5,6.4] and AOR=1.9 [1.6,2.3], respectively) (Table 3).

Violence victimization on school property and bullying.

Nationwide, among high school students overall, 7.7% did not go to school because of safety concerns during the 30 days before the survey, and during the 12 months before the survey, 6.6% had been threatened or injured with a weapon on school property, 22.8% were in a physical fight, 19.3% had been bullied on school property, and 15.3% had been electronically bullied. Compared with non-Hispanic White students, the odds of not going to school because of safety concerns were significantly higher among AI/AN alone (AOR=3.1 [1.8,5.5]) and among AI/AN multiracial/ethnic students (AOR=2.3 [1.7,3.1]), as were the odds of having been threatened or injured with a weapon on school property (AOR=2.2 [1.4,3.5] and AOR=1.6 [1.3,2.1], respectively) and being in a physical fight (AOR=2.3 [1.5,3.4] and AOR=1.7 [1.4,2.1], respectively). The odds of being bullied on school property

or being electronically bullied did not significantly differ among non-Hispanic White, AI/AN alone, AI/AN multiracial/ethnic students.

Forced sexual intercourse and dating violence.

Nationwide, among high school students overall, 7.4% had ever been forced to have sexual intercourse when they did not want to, and during the 12 months before the survey 5.0% had experienced sexual dating violence and 5.5% had experienced physical dating violence. Compared with non-Hispanic White students, the odds of ever having been forced to have sexual intercourse when they did not want to were significantly higher among AI/AN alone (AOR=3.5 [1.9,6.2]) and among AI/AN multiracial/ethnic (AOR=1.5 [1.2,1.9]) students, as were the odds of physical dating violence (AOR=2.9 [1.7,5.1] and AOR= 1.9 [1.4,2.6], respectively). Compared with non-Hispanic White students, the odds of having experienced sexual dating violence were significantly higher among students who were AI/AN alone (AOR=4.3 [2.2,8.3]). Compared with AI/AN multiracial/ethnic students, the odds of ever having been forced to have sexual intercourse when they did not want to were significantly higher among students who were AI/AN alone (AOR=2.3 [1.2,4.2]), as were the odds of having experienced sexual dating violence (AOR=4.0 [1.9,8.4]) (data not shown).

Discussion

The findings of this study show that most AI/AN students are multiracial or Hispanic/Latino; thus, to limit analyses to those students who identify themselves as AI/AN alone captures only about 18% or one in six AI/AN students. Further, the findings suggest that limiting analyses to students who were AI/AN alone reduces precision of the estimates of risk behaviors and experiences as evidenced by the considerably smaller sample sizes and wide 95% confidence intervals around the AI/AN alone prevalence estimates. Decisions that affect the accuracy and precision of health data inevitably affect public health planning and policy decisions. In addition, if the number of students who were AI/AN alone is particularly small, such data may be entirely suppressed (i.e., not reported) and the needs of a population known to suffer significant health disparities may go ignored among policymakers.^{1,15,24} The current analysis suggests that both combining multiple years of data, and reconsidering the use and reporting of data among only those youth who are single race AI/AN, are two ways to address the dearth of data describing health behavior prevalence among AI/AN youth. To improve data quality and availability, a third option is to oversample AI/AN populations in surveillance systems.

Compared with non-Hispanic White students, both AI/AN alone and AI/AN multiracial/ethnic students were significantly more likely to experience persistent feelings of sadness or hopelessness, seriously consider attempting suicide, attempt suicide, not go to school because of safety concerns, be threatened or injured with a weapon on school property, be in a physical fight, ever be forced to have sexual intercourse when they did not want to, and experience physical dating violence. Additionally, compared with non-Hispanic White students AI/AN multiracial/ethnic students were significantly more like to experience sexual dating violence. Such findings underscore the importance of policy and programmatic work

needed to address these health disparities in health behaviors and experiences disfavoring AI/AN youth.

With only two exceptions, (i.e., having ever been forced to have sexual intercourse when they did not want to and having experienced sexual dating violence) this study did not find significant differences in odds of AI/AN alone and AI/AN multiracial/ethnic students reporting the studied risk behaviors and experiences. That there were similar prevalence findings in both AI/AN groups suggests that it may be valid to combine such groups when reporting AI/AN data. Doing so adds to both statistical power and precision, and in some surveillance systems, may allow for reporting of data that would otherwise be suppressed. These findings should be interpreted with caution, however, because of the small sample sizes of AI/AN alone students that may have reduced statistical power to detect differences between the two AI/AN groups. Researchers could investigate the wisdom of collapsing both AI/AN groups on a case-by-case basis but are cautioned against a default assumption that AI/AN alone data are all that should be reported.

An estimated one in four to one in five AI/AN people live in poverty¹² and about 60% of AI/AN people live in metropolitan areas. As noted in a recent study, persistent feelings of sadness or hopelessness, suicidal thoughts and attempts, and violence victimization were more prevalent among students attending high-poverty schools than low-poverty schools.²⁵ Similarly, living in violent neighborhoods and low-income housing are associated with increased exposure to violence²⁶ and being a victim of violence.²⁷ Programs designed to address such health disparities will be most effective if they consider the socioeconomic and cultural context in which AI/AN students live, both on reservation lands and in urban communities.

The CDC's violence prevention technical packages that describe programs, policies, and practices that can be used to reduce suicide, youth violence (including bullying), sexual violence, and intimate partner violence may be useful to address AI/AN youths' experiences with the prevalence of persistent feelings of sadness or hopelessness, suicidal thoughts and attempts, and violence victimization. These technical packages summarize the best available evidence that can be used by schools, communities, and states.^{28–31} For example, community strategies to address interpersonal violence include modifying the physical and social environments of neighborhoods, strengthening work-family supports, strengthening household financial security, and providing housing programs.^{30,p.12} In addition, feeling safe and connected to peers and adults at school is widely recognized for its health benefits for youth.^{30,32,33} School-based prevention strategies can target all students enrolled in the school, regardless of race and ethnicity; however, it is important to ensure that programs are sensitive to the particular needs and cultural context of AI/AN students in schools that serve such students. Further, because of the relatively high dropout rate among 16–24-year-old single race AI/AN youth (9.5%),³⁴ school-based programs that address suicide and youth violence will be most likely to reach these youth and be most effective if they begin in middle school, before the transition to high school. Early intervention may address both the health and welfare of AI/AN youth, but also work to foster resiliency that keeps students in school and reduces disadvantages in educational attainment.¹²

American Indian/Alaska Native scholars and tribal leaders call for traditional teaching and culturally-grounded health promotion as a means of promoting the health of AI/AN communities, families, and youth.^{8,35} One such successful example of a community-designed program is the Traditional Foods Project sponsored by the CDC, which funded tribally-driven programs to address chronic disease prevention.³⁵ These programs were effective because they embraced traditional AI/AN approaches to health promotion that reach their communities through AI/AN traditions, values, education, and experiences.³⁵

Limitations.

First, the extent of student under-reporting or over-reporting of behaviors and experiences cannot be determined; however, YRBS questions generally demonstrate good test-retest reliability.²⁰ Second, the YRBS does not include a question asking students to identify their tribal affiliation, if any. Thus, with national YRBS data, it is not possible to examine the prevalence and experiences among youth in specific tribes. Some tribes, however, administer the YRBS to allow for tribe-specific YRBS data (see: https://www.cdc.gov/healthyyouth/data/yrbs/pdf/2019/2019_hs_participation_history.pdf). Third, even when two years of data were combined, the number of students who were AI/AN alone was still small.

Conclusion.

This study confirmed health disparities in experiences with persistent feelings of sadness or hopelessness, suicidality, and violence victimization among AI/AN high school students. The findings of this study also showed that of the 1,554 students answering the YRBS who self-identified as AI/AN, most were multiracial or Hispanic/Latino. This means that if a researcher were to limit analyses of this dataset to those students who identify themselves as AI/AN alone, the research would include responses of only about one in six AI/AN students. Other AI/AN responses would be lost in either a Hispanic or unspecific multiracial category. These findings illustrate the importance of collecting, analyzing, and disseminating data for students who are AI/AN alone and multiracial/ethnic AI/AN for a more complete picture. By exploring different ways to code race and ethnicity responses on health-related questionnaires, we respect the responses of all participants, including those in smaller racial/ethnic groups.

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**American Indian or Alaska Native (AI/AN) Racial/Ethnic Classifications
National Youth Risk Behavior Survey, 2017 and 2019**

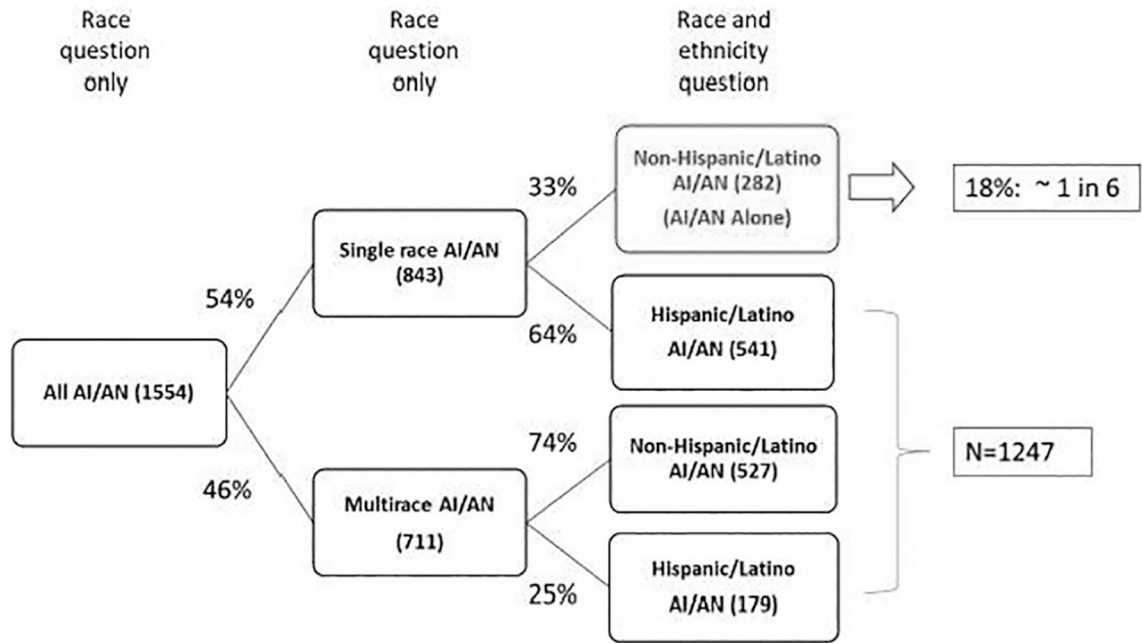


Figure 1. American Indian or Alaska Native (AI/AN) racial/ethnic classifications National Youth Risk Behavior Survey, 2017 and 2019.^a

Note:

^aThe Ns for the race and ethnicity column do not add up to 1554 because 25 respondents who identified as AI/AN did not answer the ethnicity question.

QUESTION WORDING AND ANALYTIC CODING FOR INCLUDED HEALTH RISK BEHAVIORS AND EXPERIENCES, NATIONAL YOUTH RISK BEHAVIOR SURVEYS 2017 AND 2019

Table 1.

Variable	Question	Analytic Coding
Persistent feelings of sadness or hopelessness	During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?	Yes vs. No
Seriously considered attempting suicide	During the past 12 months, did you ever seriously consider attempting suicide?	Yes vs. No
Attempted suicide	During the past 12 months, how many times did you actually attempt suicide?	1 or more times vs. 0 times
Did not go to school because of safety concerns	During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to or from school?	1 or more days vs. 0 days
Threatened or injured on with a weapon on school property	During the past 12 months, how many times has someone threatened or injured you with a weapon such as a gun, knife, or club on school property?	1 or more times vs. 0 times
In a physical fight	During the past 12 months, how many times were you in a physical fight?	1 or more times vs. 0 times
Bullied on school property	Bullying is when 1 or more students tease, threaten, spread rumors about, hit, shove, or hurt another student over and over again. It is not bullying when 2 students of about the same strength or power argue or fight or tease each other in a friendly way. During the past 12 months, have you ever been bullied on school property?	Yes vs. No
Electronically bullied	During the past 12 months, have you ever been electronically bullied? (Count being bullied through texting, Instagram, Facebook, or other social media.)	Yes vs. No
Ever physically forced to have sexual intercourse when they did not want to	Have you ever been physically forced to have sexual intercourse when you did not want to?	Yes vs. No
Sexual dating violence	During the past 12 months, how many times did someone you were dating or going out with force you to do sexual things that you did not want to do? (Count such things as kissing, touching, or being physically forced to have sexual intercourse.)	1 or more times vs. I did not date or go out with anyone during the past 12 months and 0 times
Physical dating violence	During the past 12 months, how many times did someone you were dating or going out with physically hurt you on purpose? (Count such things as being hit, slammed into something, or injured with an object or weapon.)	1 or more times vs. I did not date or go out with anyone during the past 12 months and 0 times

THE PREVALENCE OF PERSISTENT FEELINGS OF SADNESS OR HOPELESSNESS, SUICIDAL THOUGHTS AND ATTEMPTS, AND VIOLENCE VICTIMIZATION AMONG HIGH SCHOOL STUDENTS, BY NON-HISPANIC/LATINO WHITE VS AI/AN ALONE AND AI/AN MULTIRACIAL/ETHNIC—NATIONAL YOUTH RISK BEHAVIOR SURVEYS, 2017 AND 2019

Table 2.

	Total (N=28,442) ^a % ^c (95% CI) ^d	White ^b (N=12,929) ^a % (95% CI)	AI/AN alone ^b (N=282) ^a % (95% CI)	AI/AN multirace/ethnicity (N=1,247) ^a % (95% CI)
Persistent Feelings of Sadness or Hopelessness ^e	34.0 (32.7–35.3)	32.9 (31.0–34.8)	40.7 (31.2–51.0)	42.8 (38.6–47.1)
Seriously Considered Attempting Suicide ^e	17.9 (17.2–18.7)	18.2 (17.0–19.4)	27.7 (20.2–36.7)	23.1 (20.3–26.2)
Attempted Suicide ^e	8.1 (7.4–8.8)	7.0 (6.2–7.8)	17.2 (9.1–29.9)	12.2 (10.4–14.3)
Did not go to school because of safety concerns ^f	7.7 (6.9–8.5)	5.7 (4.9–6.7)	17.3 (11.4–25.5)	12.2 (9.7–15.1)
Threatened or injured with a weapon on school property ^e	6.6 (6.1–7.3)	6.0 (5.3–6.8)	13.1 (8.7–19.3)	10.0 (8.2–12.2)
In a physical fight ^e	22.8 (21.5–24.1)	20.4 (19.1–21.6)	37.7 (28.9–47.3)	31.8 (27.9–35.9)
Bullied on school property ^e	19.3 (18.3–20.3)	22.2 (20.9–23.6)	27.5 (21.5–34.4)	22.0 (18.4–26.1)
Electronically bullied ^e	15.3 (14.5–16.2)	17.9 (16.8–19.1)	17.7 (10.8–27.7)	15.0 (12.1–18.5)
Ever physically forced to have sexual intercourse	7.4 (6.8–8.0)	7.2 (6.4–8.1)	16.4 (10.2–25.2)	9.5 (7.6–11.7)
Sexual dating violence ^e	5.0 (4.7–5.4)	5.1 (4.6–5.8)	14.4 (8.3–23.9)	5.0 (3.6–6.9)
Physical dating violence ^e	5.5 (5.0–6.0)	5.0 (4.5–5.5)	11.6 (7.0–18.5)	8.5 (6.4–11.2)

Notes:

^a Unweighted sample size

^b Non-Hispanic/Latino

^c Weighted prevalence

^d Confidence interval

^e During the 12 months before the survey

^f During the 30 days before the survey

Table 3.

ADJUSTED ODDS RATIOS (AOR) OF PERSISTENT FEELINGS OF SADNESS OR HOPELESSNESS, SUICIDAL THOUGHTS AND ATTEMPTS, AND VIOLENCE VICTIMIZATION AMONG HIGH SCHOOL STUDENTS, BY NON-HISPANIC/LATINO WHITE VS AI/AN ALONE AND AI/AN MULTIRACIAL/ETHNIC RACIAL/ETHNIC CATEGORIES—NATIONAL YOUTH RISK BEHAVIOR SURVEYS, 2017 AND 2019

	White ^d AOR ^b (95% CI) ^c	AI/AN Alone ^d AOR (95% CI)	AI/AN Multiracial/Ethnic AOR (95% CI)
Persistent Feelings of Sadness or Hopelessness ^d	ref	1.5 (1.0,2.2) *	1.7 (1.4,2.0) *
Seriously Considered Attempting Suicide ^d	ref	2.0 (1.3,3.1) *	1.4 (1.2,1.7) *
Attempted Suicide ^d	ref	3.0 (1.5,6.4) *	1.9 (1.6,2.3) *
Did not go to school because of safety concerns ^e	ref	3.1 (1.8,5.5) *	2.3 (1.7,3.1) *
Threatened or injured with a weapon on school property ^d	ref	2.2 (1.4,3.5) *	1.6 (1.3,2.1) *
In a physical fight ^d	ref	2.3 (1.5,3.4) *	1.7 (1.4,2.1) *
Bullied on school property ^d	ref	1.4 (1.0,2.1)	1.0 (0.8,1.2)
Electronically bullied ^d	ref	1.2 (0.6,2.1)	0.8 (0.6,1.1)
Ever physically forced to have sexual intercourse	ref	3.5 (1.9,6.2) *§	1.5 (1.2,1.9) *
Sexual dating violence ^d	ref	4.3 (2.2,8.3) *§	1.1 (0.7,1.5)
Physical dating violence ^d	ref	2.9 (1.7,5.1) *	1.9 (1.4,2.6) *

Notes:

Bolding indicates significance differences.

* Significantly different than White, non-Hispanic/Latino (p < .05) and

§ Significantly different than AI/AN Multiracial/Ethnic (p<.05).

^aNon-Hispanic/Latino.

^b Adjusted odds ratios (AORs) determined using logistic regression models that controlled for sex and grade.

^cConfidence interval.

^dDuring the 12 months before the survey.

^eDuring the 30 days before the survey.