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Transgender Youth Substance Use Disparities: Results from a Population-Based Sample

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Abstract

Purpose: To examine rates of substance use between transgender and non-transgender youth using a representative population-based sample, and to examine mediating risk factors.

Methods: A statewide cross-sectional sample of California middle and high schools collected between 2013-2015. This representative sample of students in California included 335 transgender and 31,737 non-transgender youth. Using multivariate linear and logistic regression, we assessed differences between transgender and non-transgender youth in substance use behaviors related to alcohol, cigarette, marijuana, other illicit drugs, polysubstance use, and heavy episodic drinking. Substance use was assessed with lifetime use, age of onset, and past 30-day use for alcohol, cigarettes, and marijuana. Past 30-day use was also assessed for other illicit drugs and polysubstance use. Models adjusted for demographics and risk factors including victimization, depressive symptoms, and perceived risk of substance use.

Results: The prevalence of substance use was 2.5 to 4 times higher for transgender youth compared to their non-transgender peers (depending on the substance). Transgender youth were also at greater risk for early age of onset and recent substance use than non-transgender youth. Additionally, psychosocial risk factors related to victimization, depressive symptoms, and perceived risk of substance use partially mediated the relationship between gender identity and substance use.

Conclusions: Using data from the first representative study of youth to include a measure of gender identity, we show that transgender youth are at heightened risk for substance use compared

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to non-transgender peers. Future research is needed to identify the structural and psychosocial mechanisms that drive these disparities.

Adolescent substance use remains a major public health concern given that it is a notable contributor to adolescent morbidity and mortality and has implications for later health and well-being,[1–4] especially early onset substance use.[5,6] The short- and long-term effects of adolescent substance use underscore the importance of identifying at-risk groups and modifiable risk factors—such as victimization,[7] mental health,[8] and perceived risk of substance use[9]—that exacerbate substance use during adolescence in order to inform targeted policies and programs aimed at reducing these behaviors.

Though little research exists on substance use among transgender youth (often referred to as gender minority youth in studies on substance use),[10,11] extant research demonstrates heightened risk for substance use among this population.[12–14] To date, most research has come from community-based samples of youth that include measures of gender identity. In the most comprehensive assessment of gender identity-related substance use disparities to date, Reisner and colleagues[14] examined a large online sample and found elevated rates of alcohol, tobacco, marijuana, and other illicit drug use among gender minority compared to cisgender (i.e., gender identity aligns with natal sex) youth. Additionally, a recent non-representative school-based sample of students in California found consistent disparities related to gender identity in lifetime and recent alcohol, tobacco, and other drug use.[15] However, community and web-based samples are limited in their generalizability as they are biased towards those who are engaged with the sampling communities or have access to the internet.[16] Thus, though preliminary studies demonstrate elevated rates of substance use among transgender relative to non-transgender youth, the lack of representative data has stymied understanding of the extent of disparities between transgender and non-transgender youth, the prevalence and correlates of substance use among a diverse population of transgender youth, and risk factors that may mediate the relationship between gender identity and substance use—critical information for targeted prevention and intervention efforts.

Although evidence for disparities in substance use between cisgender and transgender youth is preliminary, emergent research has documented factors that may contribute to elevated risk for substance use among transgender youth.[14] Studies indicate, for example, that transgender youth encounter more hostile school environments[17] and are at higher risk of poor mental health outcomes relative to cisgender youth.[18] Compared to cisgender youth, transgender youth are also more likely to experience victimization in school,[17] especially bias-based bullying based on actual or perceived sexual identity or gender expression.[19] Transgender youth who experience bullying or harassment are also at greater risk for depression.[18,20,21] Each of these factors—hostile school environments,[7] adverse mental health outcomes[8,22], and school-based victimization[23]—has been shown to contribute to substance use among general populations of youth. Further, though more research is needed to understand how perceptions of risk of substance use relates to substance use behaviors among transgender youth,[24] preliminary findings from general populations suggest that youth are less likely to engage in substance use when they perceive it as high risk behavior.[25]

The Current Study

The current study addresses several gaps in the literature regarding substance use among transgender youth through the use of a representative population-based sample that includes 335 transgender youth. To identify disparities in substance use between transgender and non-transgender youth, we examine: (1) lifetime use and age of onset for alcohol, cigarette, and marijuana use among youth who report having ever used each respective substance; and (2) heavy episodic drinking, cigarette use, marijuana use, other illicit drug use, and polysubstance use in the last 30 days. In addition, we examine whether psychosocial risk factors, including victimization,[7,26] depressive symptoms[22], and the perceived risk of substance use,[27] mediate the relationship between gender identity and substance use among adolescents.

Methods

Study design and participants

This study used cross-sectional data from the 2013-2015 Biennial Statewide California Student Survey (CSS), a weighted subsample of schools representative of the Californian middle and high school student population ($n = 36,070$ students; grades 7 through 12). The CSS was administered by WestEd with support from the California Department of Education to track health risks and resilience among youth in California,[28] and had a response rate of 71%.[29] Every survey cycle, WestEd randomly selects schools who participate in the California Healthy Kids Survey whose data are weighted to generalize the sample to the student population of California.

Based on recommendations from WestEd, we excluded youth whose response validity was questionable (1.32%) based on: (1) meeting three or more criteria related to inconsistent responses (e.g., reporting both never using a drug and also reporting drug use in the past 30 days); (2) exaggerated drug use (i.e., reported alcohol and drug use 20-30 days in the last month); (3) reporting use of a fake drug; and (4) self-report of answering dishonestly to all or most of the questions on the survey (“How many questions on this survey did you answer honestly”).[28,29] Additionally, 3,998 youth (11.08%) were excluded from the analytic sample because they attended schools that did not administer the measure of sexual orientation and gender identity. The final analytic sample included 32,072 youth.

The demographic composition of the sample was diverse (see Table 1). Three hundred and thirty-five (335; 1.02%) of the youth identified as transgender, and 5.18% identified as lesbian, gay, and bisexual (LGB). Over half of the youth were Hispanic (56.43%), 37.67% multiracial, 33.46% White, 13.64% Asian, 9.30% Black or African American, 3.70% American Indian or Alaska Native, and 2.23% Native Hawaiian or Pacific Islander. The mean age was 15.74 years old, and just over half (51.17%) reported their sex as female.

Measures

Substance use.—Several substance use behaviors were assessed, including: (1) age of onset for alcohol, smoking, and marijuana use; and (2) heavy episodic drinking in the past 30-days, and past 30-day use of cigarettes, marijuana, other drugs, and multiple drugs.

Lifetime use and age of onset.—Participants reported age of onset for various substances by answering the prompt, “About how old were you the first time you...”: (1) *had a drink of an alcoholic beverage (other than a sip or two)*; (2) *smoked part or all of a cigarette*; and (3) *used marijuana or hashish*. A dichotomous variable for *lifetime use* was created based on youth who reported having never used (coded 0) as opposed to reporting an age of first use (coded 1). *Age of onset* was only modeled for youth who had reported ever using alcohol, cigarettes, or marijuana.

Use in past 30 days.—Youth provided estimates of past 30-day use for various substances (0 days; 1 day; 2 days, 3-9 days; 10-19 days; 20-30 days), including: (1) *five or more drinks of alcohol in a row, that is, within a couple of hours* (i.e., heavy episodic drinking [HED]); (2) *cigarettes*; (3) *marijuana (pot, weed, grass, hash, bud)*; (3) *inhalants/prescription pain medications to get “high” or for reason other than prescribed*; (4) *any other drug, pill, or medicine to get “high” or for other than medical reasons*; and (5) *two or more drugs at the same time (for example, alcohol with marijuana, ecstasy with mushrooms)* (i.e., polysubstance use; 57 middle schools [$n = 9,059$] did not administer this item). Based on the distribution of responses, we created a dichotomous variable (0 = no use in past 30 days; 1 = at least one day of use in past 30 days), and combined inhalants, prescription drugs, and “any other drug” into a single item reflecting the use of “other drugs,” consistent with national reporting.[25]

Transgender identity.—A single item was used to assess youths’ sexual and gender identities: “Which of the following best describes you? (Mark all that apply)”: (a) Heterosexual (straight); (b) Gay or Lesbian or Bisexual; (c) Transgender; (d) Not sure; (e) Decline to respond. Cases were coded 1 if youth marked that they were transgender (0 = non-transgender; 1 = transgender). We were unable to determine if youth identified as cisgender as they were not specifically asked about their natal sex. We therefore use “non-transgender” to refer to youth who did not identify as transgender. Of the 335 transgender youth in the sample, 132 (39.40%) identified as solely transgender and did not mark heterosexual, LGB, or unsure.

Covariates.—The following demographic covariates were included: sex (“What is your sex?” 0 = female; 1 = male); sexual identity; race and ethnicity; and age. For sexual identity, we dichotomized each response to the item detailed above: “heterosexual” (0 = non-heterosexual; 1 = heterosexual); “LGB” (0 = non-LGB; 1 = LGB); and “unsure” (0 = non-unsure; 1 = unsure). Youth could select multiple responses (e.g., youth who indicated they were heterosexual and LGB were coded as a 1 for both the “heterosexual” and “LGB” variable). Although over 10% of youth marked multiple responses for sexual orientation and gender identity (13.08%), 78.45% identified as heterosexual only, 4.19% as LGB only, 3.79% as unsure only, and 0.49% as transgender only. Given that there is not a discrete reference category for measures of sexual and gender identity, these dichotomous items were included concurrently to account for complex responses. Due to issues of multicollinearity, we only include dichotomous items for LGB, unsure, and transgender.

Mediators.—We assessed three mediators: experiences of victimization, depressive symptoms, and perception of risk associated with alcohol, cigarette, and marijuana use (youth were not asked about the perception of risk for other illicit drug or polysubstance use). Past-year victimization was a count variable constructed using 9 dichotomized items (Kuder-Richardson [KR-20] coefficient = .82)[30] assessing experiences with physical and verbal assault and harassment, such as: *having been pushed, shoved, slapped, hit or kicked, having mean rumors or lies spread, having been threatened or injured with a weapon* (0 = no victimization; 9 = high victimization). Depressive symptoms were assessed using a single item: “In the past 12 months, have you ever felt so sad or hopeless almost every day for two weeks or more that you stopped doing some usual activities?” (0 = no; 1 = yes). Perception of risk was assessed with the question, “How much do people risk harming themselves physically and in other ways when they...”: (1) *have five or more drinks of an alcoholic beverage once or twice a week* (HED risk); (2) *smoke 1-2 packs of cigarettes each day* (cigarette risk); (3) *smoke marijuana once or twice a week* (marijuana risk). Items were reverse coded and dichotomized (0 = no/slight risk; 1 = moderate/great risk).

Analytic Plan

Multivariate linear regressions for age of onset and logistic regressions for lifetime and recent substance use were estimated using methods that adjust standard errors to account for the clustered survey design (i.e., that students were nested in schools; Stata 14.2, *clusterid* option).[31] Complete case analysis resulted in a loss of 7% of the sample. Therefore, multiple imputation was used to account for missing data, though sample sizes fluctuate based on missing values on auxiliary variables.[32] Values were not imputed for sexual or gender identity. We first estimated unadjusted logistic regression models to assess the risk of substance use for transgender youth relative to non-transgender youth, followed by adjusted logistic regression models accounting for demographic factors. Finally, we estimated adjusted logistic regression models that account for both demographic factors and mediators of substance use (i.e., victimization, depressive symptoms, and perceived risk of substance use). Adjusted models were compared to estimate the proportion of the disparity explained by psychosocial mediators. Mediation analyses were conducted using bootstrapping techniques to obtain standard errors and confidence intervals.[33] For models testing differences in age of onset, we include only those youth who report having used each respective substance.

Results

Descriptive Analyses

Preliminary analyses indicated that compared to students in schools that did not administer the sexual orientation and gender identity measure, students in the analytic sample did not differ in their: Age of onset for alcohol use ($b = -.07$, $p = .836$), cigarette use ($b = -.20$, $p = .659$), and marijuana use ($b = .03$, $p = .952$); or in recent heavy episodic drinking ($b = .10$, $p = .804$), cigarette use ($b = -.38$, $p = .282$), marijuana use ($b = .32$, $p = .449$), other drug use ($b = .14$, $p = .576$), and polysubstance use ($b = -.44$, $p = .167$).

Compared to non-transgender youth, transgender youth had markedly higher prevalence of substance use (see Table 1). Specifically, transgender youths' prevalence of lifetime use of alcohol was 1.5 times higher (56.32% versus 38.31%), cigarette use was 2.7 times higher (34.75% versus 12.95%), and marijuana use was 1.91% higher (40.42% versus 21.12%) than non-transgender youth. Transgender youth also had higher prevalence of past 30-day substance use compared to non-transgender youth: HED was 3.2 times higher (26.96% versus 8.57%); cigarette use was 4.2 times higher (15.96% versus 3.82%); marijuana use was 2.5 times higher (29.47% versus 11.56%); other illicit drug use 4.8 times higher (24.68% versus 5.11%); and polysubstance use was 4 times higher (23.98% versus 5.93%). The prevalence of transgender youth who perceived frequent alcohol, cigarette, and marijuana use as moderate to high risk was 7% to 11% lower than non-transgender youth.

Lifetime Use and Age of Onset

Unadjusted models examining lifetime substance use indicated that transgender youth had higher odds of having ever used alcohol ($OR = 2.11$, 95% CI [1.67–2.66]), cigarettes ($OR = 3.65$, 95% CI [2.83–4.71]), and marijuana ($OR = 2.62$, 95% CI [2.05–3.33]) compared to their non-transgender peers. For youth who reported lifetime use, transgender youth had younger age of onset for alcohol ($b = -.62$, $p < .001$), cigarette ($b = -.88$, $p < .001$), and marijuana ($b = -.82$, $p < .001$) use compared to non-transgender youth. Disparities in substance use between transgender and non-transgender youth remained after adjusting for demographic factors (results available upon request). Specifically, transgender youth had higher odds of lifetime alcohol ($AOR = 1.62$, 95% CI [1.24–2.12]), cigarette ($AOR = 2.25$, 95% CI [1.65–3.08]), and marijuana ($AOR = 1.84$, 95% CI [1.38–2.46]) use than non-transgender youth. Models adjusted for demographic factors also indicated that among youth reporting lifetime substance use, transgender youth had younger age of onset for alcohol ($b = -.38$, $p = .029$), cigarette ($b = -.67$, $p = .004$), and marijuana ($b = -.62$, $p = .008$) use relative to non-transgender youth.

In models adjusted for risk factors (see Table 2), transgender youth had higher odds of lifetime alcohol ($AOR = 1.45$, 95% CI [1.13–1.86]), cigarette ($AOR = 1.96$, 95% CI [1.47–2.59]), and marijuana ($AOR = 1.73$, 95% CI [1.28–2.34]) use relative to their non-transgender peers. However, among youth reporting lifetime use, gender identity was only associated with younger age of onset for marijuana use ($b = -.52$, $p = .018$), but not alcohol or cigarette use. Analyses of risk factors showed that perceptions of frequent alcohol, cigarette, and marijuana use as moderate to high risk were associated with lower odds of lifetime substance use and later age of onset for all substance use outcomes (see Table 2). Higher levels of victimization were associated with greater odds of lifetime use and younger age of onset for alcohol, cigarette, and marijuana use. Depressive symptoms were associated with lifetime alcohol, cigarette, and marijuana use, but not age of onset for these substances.

The inclusion of these mediating risk factors (i.e., victimization, perceptions of risk, and depression) attenuated the direct effect between gender identity and age of onset by 28.32% for alcohol use, 17.33% for cigarette use, and 10.62% for marijuana use. Victimization, but not depressive symptoms or perceptions of risk, significantly mediated the association between gender identity and age of onset for alcohol ($b = -.07$, 95% CI [–.11, –.04]) and

cigarette ($b = -.09$, 95% CI $[-.15, -.02]$) use; victimization and depression, but not perceptions of risk, significantly mediated the relationship between gender identity and age of onset for marijuana use ($b = -.04$, 95% CI $[-.08, -.002]$).

Substance Use in Last 30 Days

Unadjusted logistic regression models revealed disparities in past 30-day substance use between non-transgender and transgender youth. Specifically, transgender youth had 3.97 times greater odds of HED (95% CI $[3.01-5.22]$), 4.92 times greater odds of cigarette use (95% CI $[3.57-6.77]$), 3.31 times greater odds of marijuana use (95% CI $[2.53-4.34]$), 6.09 times greater odds of other illicit drug use (95% CI $[4.53-8.18]$), and 5.00 times greater odds of polysubstance use (95% CI $[3.55-7.04]$) in the past 30 days, compared to non-transgender youth (results available upon request). In models adjusted for demographic factors (results available upon request) transgender youth were more likely to engage in HED ($AOR = 2.86$, 95% CI $[1.954.19]$), cigarette ($AOR = 2.30$, 95% CI $[1.48-3.56]$), marijuana ($AOR = 2.20$, 95% CI $[1.543.13]$), other illicit drug ($AOR = 3.30$, 95% CI $[2.22-4.92]$), and polysubstance ($AOR = 2.89$, 95% CI $[1.85-4.52]$) use compared to non-transgender youth.

The results for logistic regressions for past 30-day substance use adjusted for risk factors are presented in Table 3. Relative to their non-transgender peers, transgender youth were more likely to engage in HED ($AOR = 2.33$, 95% CI $[1.63-3.34]$), cigarette ($AOR = 1.79$, 95% CI $[1.22-2.65]$), marijuana ($AOR = 1.93$, 95% CI $[1.35-2.75]$), other illicit drug ($AOR = 2.70$, 95% CI $[1.90-3.84]$), and polysubstance ($AOR = 2.35$, 95% CI $[1.57-3.51]$) use.

Victimization and depressive symptoms were associated with higher odds of use for all substances, and perceptions of frequent alcohol, cigarette, and marijuana use as moderate to high risk were associated with lower odds of use for each respective substance (see Table 3).

Overall, accounting for these risk factors substantially attenuated the direct effect of gender identity on substance use. Mediating risk factors reduced the direct effect between gender identity and substance use by 16.63% for HED, 24.50% for cigarette use, 26.43% for marijuana use, 13.60% for other illicit drug use, and 13.21% for polysubstance use. Only victimization, however, significantly mediated the relationship between gender identity and HED ($b = .004$, 95% CI $[.001, .007]$), cigarette ($b = .005$, 95% CI $[.001, .008]$), marijuana ($b = .004$, 95% CI $[.001, .006]$), other illicit drugs ($b = .007$, 95% CI $[.003, .012]$), and polysubstance ($b = .008$, 95% CI $[.003, .013]$) use.

Discussion

This study capitalizes on data from the first representative population-based sample to include a measure of gender identity. Findings establish stark disparities in substance use between transgender and non-transgender youth. Additionally, findings indicate that disparities in substance use are only partially attenuated by psychosocial risk factors.

This study documents that transgender youth are at higher risk for lifetime and recent substance use relative to their non-transgender peers, consistent with findings from community- and school-based samples.[14,15] Specifically, we found that transgender youth were more likely to have ever used alcohol, cigarettes, and marijuana than their non-

transgender peers. Although there were clear gender-identity-related disparities in age of onset for each respective substance in unadjusted models, age of onset for marijuana, but not cigarettes or alcohol, remained significant in models adjusting for demographic and risk factors. Results also indicated that, compared to their non-transgender peers, transgender youth were more likely to have used alcohol, cigarettes, marijuana, other illicit drugs, and multiple drugs in the past 30 days.

Additionally, the relationship between gender identity and substance use was partially attenuated by psychosocial risk factors, particularly victimization. Specifically, accounting for known psychosocial risk factors explained between 11% to 28% of the variance in the association between gender identity and age of onset as well as recent substance use. Our identification of modifiable risk factors (i.e., victimization, depressive symptoms, and perceived risk of substance use) that partially mediate the relationship between transgender identity and substance use suggest that targeting these mechanisms in interventions may reduce gender-identity-based disparities in substance use, a possibility that warrants more research using stronger designs (e.g., prospective, intervention studies). At the same time, other structural and psychosocial mechanisms (e.g., community or school policies and programs inclusive of transgender youth) could explain why transgender youth remain at risk for substance use. Future research is therefore needed to identify additional risk and protective factors associated with substance use among transgender youth.

Limitations and Recommendations

There are several notable limitations. Because this was a school-based sample, the data do not include youth who were not attending school. This could bias the sample in ways that underrepresent truant youth or youth pushed out of school settings, factors that are associated with substance use and for which transgender youth are disproportionately at risk. [34–36] The sample is also only representative of students in California, though the state is demographically diverse regarding race and ethnicity, socioeconomic status, and urbanicity and rurality. Additionally, the data were cross-sectional, and we were therefore unable to assess developmental trajectories related to substance use among transgender youth.

The item documenting transgender identity also has limitations. Given that sexual and gender identity were not assessed independently, some youth indicated only a sexual *or* gender identity, which limited our ability to examine how one or the other (or both) are differentially related to substance use outcomes (e.g., for these youth, we were unable to test whether substance use is higher among transgender youth who report being a sexual minority). Further, “unsure” was an ambiguous category that could refer to either sexual or gender identity, making it difficult to determine the characteristics of respondents in this group. Future studies should follow recommendations to employ a two-step method to assess both natal sex and gender identity, in addition to sexual identity, to improve measurement.[37]

Finally, these data are cross-sectional; therefore, we are unable to establish whether the mediating psychosocial factors preceded substance use. Previous longitudinal studies, however, have identified victimization,[7] depression,[8] and perceptions of risk of substance use[9] as predictors of future substance use. Nevertheless, results from the

mediation analyses should be interpreted cautiously, and longitudinal analyses that include a measure of gender identity are needed to clarify mediating factors of substance use for transgender youth.

Conclusion

This study is the first to provide information regarding gender identity-related substance use disparities in a representative population-based sample of youth. Informed by previous studies on community samples, our results provide further evidence of disproportionate substance use among transgender youth relative to non-transgender youth, and underscore the relevance of this topic for public health research and policy. Results also indicate that despite the disproportionate risk, the majority of transgender youth do not engage in substance use; research to identify protective factors in transgender youth may help to illuminate successful strategies for positive youth development for this population. Finally, although we observed substantial reductions in the relationship between gender identity and substance use outcomes when accounting for established risk factors, gender identity remained significantly associated with substance use in mediation models. Research is therefore needed to assess the unique structural and psychosocial pathways that contribute to higher rates of substance use and misuse among transgender youth, and public health efforts are urgently needed to address gender-identity related disparities in substance use.

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Implications and Contribution

This study examines substance use disparities between transgender and non-transgender youth using representative population-based data. Findings indicate that transgender youth are at heightened risk for substance use. Mediating factors that may contribute to gender-identity related disparities in substance use can ultimately be used to inform targeted approaches to reducing these disparities.

Table 1.

Demographic and descriptive statistics stratified by gender identity for substance use and covariates.

	Non-transgender (<i>n</i> = 31,737)			Transgender (<i>n</i> = 335)		
	<i>n</i>	%/Mean (SD)	Range	<i>n</i>	%/Mean (SD)	Range
Heterosexual	25,858	80.32%		136	38.80%	
LGB	1,627	4.74%		163	47.20%	
Unsure	1,727	5.98%		112	31.01%	
Reported sex (male)	15,337	48.78%		189	59.37%	
Race/ethnicity						
American Indian/Alaska Native	1,016	3.15%		16	4.81%	
Asian	4,649	11.70%		35	9.99%	
Black/African American	1,837	7.91%		36	13.53%	
Native Hawaiian/Pacific Islander	824	1.91%		7	2.04%	
White	7,751	28.65%		83	28.73%	
Multiracial (two or more races)	11,471	32.26%		127	31.25%	
No race reported	4,189	14.42%		31	9.64%	
Hispanic	15,381	56.45%		156	54.42%	
Age	31,688	15.40 (.01)	10–18	335	15.62 (.11)	10–18
Lifetime use of alcohol	12,657	38.31%		188	56.32%	
Lifetime use of cigarettes	4,292	12.95%		117	34.75%	
Lifetime use of marijuana	7,054	21.12%		129	40.42%	
Age of first alcohol use	12,657	12.94 (.02)	10–18	188	12.32 (.16)	10–18
Age of first cigarette	4,292	13.00 (.03)	10–18	117	12.07 (.19)	10–18
Age of first marijuana use	7,054	13.58 (.02)	10–18	129	12.74 (.20)	10–18
Past 30-day HED	2,844	8.57%		83	26.96%	
Past 30-day cigarette use	1,234	3.82%		49	15.96%	
Past 30-day marijuana use	3,832	11.56%		98	29.47%	
Past 30-day other drug use	1,693	5.11%		76	24.68%	
Past 30-day polysubstance use	1,379	5.93%		61	23.98%	
Perceived risk of HED (moderate/high)	23,917	74.89%		219	67.87%	
Perceived risk of cigarette use (moderate/high)	25,502	80.30%		237	71.82%	

	Non-transgender (<i>n</i> = 31,737)			Transgender (<i>n</i> = 335)		
	<i>n</i>	Weighted %/Mean (SD)	Range	<i>n</i>	Weighted %/Mean (SD)	Range
Perceived risk of marijuana use (moderate/high)	20,130	64.17%		167	53.16%	
Victimization	31,202	2.20 (.01)	0–9	331	3.82 (.19)	0–9
Depressive symptoms	9,641	30.31%		137	47.33%	

Note. Heterosexual was a dichotomous variable (0 = non-heterosexual, 1 = heterosexual); LGB (lesbian, gay, bisexual; 0 = non-LGB, 1 = LGB); unsure was a dichotomous variable (0 = not unsure; 1 = unsure); reported sex was a dichotomous variable (0 = female, 1 = male); HED (heavy episodic drinking); Lifetime use of alcohol, cigarettes, and marijuana were dichotomous variables (0 = no, 1 = yes) Past 30-day HED, cigarette, marijuana, other drug, and polysubstance use were dichotomous variables (0 = no, 1 = yes); perceived risk of HED, cigarette use, and marijuana use were dichotomous variables (0 = low/no risk, 1 = moderate/high risk).

Multivariate regression results for lifetime use for all youth, and age of onset of substance use among youth, for alcohol, cigarettes, and marijuana use.

Table 2.

	Alcohol			Cigarettes			Marijuana		
	AOR	95% CI	b (s.e.)	Lifetime Use (n = 31,946)	AOR	95% CI	Lifetime Use (n = 31,944)	AOR	95% CI
Transgender	1.45 ^{**}	[1.13–1.86]	-.23 (.18)	1.96 ^{***}	1.73 ^{***}	[1.47–2.59]	1.73 ^{***}	1.73 ^{***}	[1.28–2.34]
LGB	2.10 ^{***}	[1.78–2.47]	.01 (.07)	2.67 ^{***}	2.32 ^{***}	[2.28–3.13]	2.32 ^{***}	2.32 ^{***}	[1.98–2.72]
Unsure	.59 ^{***}	[0.53–0.66]	-.43 (.10)	.72 ^{***}	.50 ^{***}	[0.60–0.87]	.50 ^{***}	.50 ^{***}	[0.43–0.58]
Sex (male)	1.01	[0.96–1.07]	-.25 (.04)	1.40 ^{***}	1.15 ^{***}	[1.29–1.51]	1.15 ^{***}	1.15 ^{***}	[1.08–1.23]
Race/ethnicity									
American Indian/Alaska Native	.95	[0.78–1.16]	-.08 (.15)	1.10	1.00	[0.88–1.38]	1.00	1.00	[0.81–1.23]
Asian	.47 ^{***}	[0.38–0.58]	-.38 (.17) [*]	.43 ^{***}	.36 ^{***}	[0.34–0.55]	.36 ^{***}	.36 ^{***}	[0.26–0.51]
Black/African American	.80	[0.63–1.02]	-.37 (.13) ^{**}	.95	1.27	[0.77–1.18]	1.27	1.27	[0.94–1.70]
Native Hawaiian/Pacific Islander	.96	[0.76–1.21]	.01 (.13)	1.03	.99	[0.79–1.33]	.99	.99	[0.75–1.29]
Multiple races	.84 [*]	[0.72–0.98]	-.18 (.09) [*]	.89	.91	[0.75–1.05]	.91	.91	[0.77–1.09]
No race reported	.81 [*]	[0.67–0.97]	-.30 (.12) [*]	.80 [*]	.82	[0.66–0.97]	.82	.82	[0.67–1.00]
Hispanic	1.41 ^{***}	[1.19–1.68]	-.31 (.10) ^{**}	1.27 ^{***}	1.30 ^{***}	[1.06–1.52]	1.30 ^{***}	1.30 ^{***}	[1.08–1.56]
Perceived risk of HED	.81 ^{***}	[0.72–0.91]	.47 (.07) ^{***}	---	---	---	---	---	---
Perceived risk of cigarette use	---	---	---	.88 [*]	.43 (.09) ^{***}	[0.79–0.98]	---	---	---
Perceived risk of marijuana use	---	---	---	---	---	---	.30 ^{***}	.30 ^{***}	[0.26–0.34]
Victimization	1.06 ^{***}	[1.05–1.08]	-.14 (.01) ^{***}	1.08 ^{***}	1.05 ^{***}	[1.07–1.10]	1.05 ^{***}	1.05 ^{***}	[1.03–1.07]
Depressive symptoms	2.00 ^{***}	[1.88–2.12]	.05 (.04) ^{***}	2.09 ^{***}	1.89 ^{***}	[1.91–2.29]	1.89 ^{***}	1.89 ^{***}	[1.72–2.08]
Constant	---	---	3.42 (.13) ^{***}	---	---	3.31 (.17) ^{***}	---	---	4.36 (.09) ^{***}

Note. AOR = adjusted odds ratio; CI = confidence interval; s.e. = standard errors; heterosexual was a dichotomous variable (0 = non-heterosexual, 1 = heterosexual); LGB (lesbian, gay, bisexual; 0 = non-LGB, 1 = LGB); unsure was a dichotomous variable (0 = not unsure; 1 = unsure); reported sex was a dichotomous variable (0 = female, 1 = male); HED (heavy episodic drinking); Lifetime use of alcohol, cigarettes, and marijuana were dichotomous variables (0 = no, 1 = yes) Past 30-day HED, cigarette, marijuana, other drug, and polysubstance use were dichotomous variables (0 = no, 1 = yes); perceived risk of HED, cigarette use, and marijuana use were dichotomous variables (0 = low/no risk, 1 = moderate/high risk).

$p < .05$
* $p < .01$
** $p < .001$

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Table 3.

Multivariate logistic regression results for substance use in past 30 days.

	HED (<i>n</i> = 31,945)		Cigarette (<i>n</i> = 31,944)		Marijuana (<i>n</i> = 31,946)		Other drugs (<i>n</i> = 31,959)		Polysubstance (<i>n</i> = 25,030)	
	AOR	[95% CI]	AOR	[95% CI]	AOR	[95% CI]	AOR	[95% CI]	AOR	[95% CI]
Transgender	2.33***	[1.63–3.34]	1.79**	[1.22–2.65]	1.93***	[1.35–2.75]	2.70***	[1.90–3.84]	2.35***	[1.57–3.51]
LGB	1.66***	[1.42–1.94]	2.62***	[2.17–3.16]	1.89***	[1.64–2.18]	2.19***	[1.88–2.56]	2.10***	[1.78–2.47]
Unsure	.92	[0.75–1.11]	1.19	[0.91–1.56]	.73**	[0.61–0.89]	1.17	[0.96–1.42]	1.02	[0.77–1.36]
Sex (male)	1.10*	[1.01–1.20]	1.48***	[1.32–1.66]	1.13**	[1.04–1.22]	1.06	[0.94–1.19]	1.45***	[1.30–1.61]
Race/ethnicity										
American Indian/Alaska Native	.89	[0.70–1.13]	.89	[0.61–1.29]	.99	[0.78–1.25]	1.55**	[1.16–2.06]	1.15	[0.80–1.67]
Asian	.29***	[0.21–0.40]	.36***	[0.27–0.48]	.35***	[0.27–0.46]	.51***	[0.42–0.63]	.28***	[0.19–0.40]
Black/African American	.63**	[0.46–0.87]	.78	[0.56–1.09]	1.30*	[1.00–1.70]	1.30*	[1.04–1.63]	1.08	[0.73–1.61]
Native Hawaiian/Pacific Islander	.77	[0.58–1.03]	.97	[0.63–1.48]	1.07	[0.80–1.43]	1.14	[0.81–1.62]	.93	[0.64–1.36]
Multiple races	.83**	[0.72–0.95]	.76**	[0.64–0.91]	1.01	[0.88–1.17]	1.13	[0.94–1.34]	1.06	[0.86–1.30]
No race reported	.76***	[0.65–0.89]	.69**	[0.54–0.90]	.88	[0.75–1.03]	.92	[0.74–1.14]	.78	[0.57–1.07]
Hispanic	1.25*	[1.05–1.49]	1.27*	[1.05–1.54]	1.20*	[1.03–1.40]	1.25*	[1.04–1.50]	1.03	[0.82–1.31]
Age	1.60***	[1.52–1.68]	1.40***	[1.32–1.48]	1.45***	[1.37–1.53]	1.23***	[1.17–1.29]	1.38***	[1.28–1.49]
Perceived risk of HED	.48***	[0.43–0.53]	---	---	---	---	---	---	---	---
Perceived risk of cigarette use	---	---	.50***	[0.42–0.60]	---	---	---	---	---	---
Perceived risk of marijuana use	---	---	---	---	.26***	[0.23–0.29]	---	---	---	---
Victimization	1.15***	[1.12–1.17]	1.17***	[1.14–1.21]	1.13***	[1.11–1.15]	1.23***	[1.20–1.25]	1.20***	[1.17–1.23]
Depressive symptoms	1.60***	[1.45–1.77]	1.80***	[1.53–2.13]	1.52***	[1.39–1.67]	1.98***	[1.73–2.26]	1.48***	[1.24–1.75]

Note. AOR = adjusted odds ratio; CI = confidence interval; heterosexual was a dichotomous variable (0 = non-heterosexual, 1 = heterosexual); LGB (lesbian, gay, bisexual; 0 = non-LGB, 1 = LGB); unsure was a dichotomous variable (0 = not unsure; 1 = unsure); reported sex was a dichotomous variable (0 = female, 1 = male); HED (heavy episodic drinking); Lifetime use of alcohol, cigarettes, and marijuana

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were dichotomous variables (0 = no, 1 = yes) Past 30-day HED, cigarette, marijuana, other drug, and polysubstance use were dichotomous variables (0 = no, 1 = yes), perceived risk of HED, cigarette use, and marijuana use were dichotomous variables (0 = low/no risk, 1 = moderate/high risk).

**
*
 $p < .001$,
 $p < .01$,
 $p < .05$.