Substance Use Among Lesbian, Gay, Bisexual, and Questioning Adolescents in the United States, 2015

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Objectives. To provide current national estimates of lesbian, gay, bisexual, and questioning (LGBQ) adolescents' (grades 9–12) substance use risks.

Methods. The 2015 national Youth Risk Behavior Survey included questions for 19 substance use outcomes covering 15 substances. LGBQ adolescents' substance use was described and their risk relative to heterosexual adolescents was estimated after controlling for sociodemographic confounders.

Results. In controlled analyses, we found that LGBQ adolescents were 1.12 (95% confidence interval [CI] = 1.06, 1.19) times as likely as heterosexual adolescents to report any lifetime and 1.27 (95% CI = 1.14, 1.41) times as likely to report past 30-day substance use. LGBQ adolescents were at significantly greater risk for all but 1 studied substance, including alcohol, cigarettes, cigars, cocaine, ecstasy, electronic vapor usage ("vaping"), hallucinogens, heroin, inhalants, marijuana, methamphetamine, prescription drugs (without physician direction), steroids, and synthetic marijuana.

Conclusions. LGBQ adolescents are at substantially greater risk for substance use.

Public Health Implications. Policymakers should invest in prevention and early intervention resources to address substance use risks among LGBQ adolescents. (*Am J Public Health.* 2018;108:1031–1034. doi:10.2105/AJPH.2018.304446)

Previous studies have suggested that lesbian, gay, bisexual, and questioning (LGBQ) adolescents are at greater risk for tobacco, alcohol, and marijuana use, with many ascribing these differences in risk to minority stressors, such as stigma.[1,2] However, many of the most widely referenced studies have used surveys that have significant variations in quality or generalizability, are outdated (some commonly cited estimates are 15 years old), or present prevalence estimates unadjusted for significant confounders.[3,4] Moreover, LGBQ adolescents' use of some substances (e.g., heroin) remains almost entirely unexplored. Considering how both drug use trends and sentiment surrounding sexual minorities has changed in recent years,[5] contemporary data providing a holistic perspective of LGBQ substance use risk, including a variety of substances, are needed to guide comprehensive public health and policy strategies. We present new risk estimates for 15 types of substances, using data from the 2015 national Youth Risk Behavior Survey (YRBS), the only major, nationally representative survey that has collected data on LGBQ adolescent health in the past decade. (Note that the YRBS does not include gender identity/transgender.)

METHODS

The 2015 YRBS (n = 14 703) uses a 3-stage, cluster sample of counties, schools within counties, and classrooms within schools to obtain a nationally representative sample of high school students (grades 9–12).[6] The YRBS uses standardized questionnaire design and collection practices across the United States. The questionnaire is a 45-minute, self-administered survey; students confidentially record their responses on a computer-scannable questionnaire. The school response rate was 69% and the student response rate was 86%, for an overall response rate of 60% (69%*86%). The Centers for Disease Control and Prevention institutional review board approved the survey, requiring parental consent and participant assent.

Participants were asked about their use of alcohol, cigarettes, cigars (including little cigars and cigarillos), cocaine, ecstasy, electronic vapor usage ("vaping"), hallucinogens, heroin, inhalants, marijuana, methamphetamine, prescription drugs (without physician direction), smokeless tobacco, steroids, and synthetic marijuana. For each substance, participants were asked about their frequency of use within a given timeframe (30-day or lifetime). For all 15 of the substances studied, omission of 30-day use or lifetime use reflects an omission in the design of the survey. Outcome ranges were recoded to any use (using 1 time or more in the given time frame) and no use (using 0 times in the given time frame).

First, we descriptively compared prevalence estimates of substance use among LGBQ (homosexual, gay or lesbian, bisexual,

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This article was accepted March 21, 2018.

doi: 10.2105/AJPH.2018.304446

TABLE 1—Substance Use Prevalence Among Lesbian, Gay, Bisexual, and Questioning Adolescents and Heterosexual Adolescents in the United States: National Youth Risk Behavior Survey (YRBS), 2015

	Heterosexual Adolescents		LGBQ Adolescents		
Substance[a]	Unweighted No.	Weighted Prevalence, %[b] (95% CI)	Unweighted No.	Weighted Prevalence, %[b] (95% CI)	Adjusted RR (95% CI)
Use in past 30 d					
Any substance[c]	11 152	42.2 (39.3, 45.2)	1 373	51.2 (47.4, 55.1)	1.27 (1.14, 1.41)
Alcohol	11 840	32.1 (29.5, 34.6)	1 497	38.9 (35.1, 42.6)	1.21 (1.05, 1.38)
Cigarettes	12 518	9.8 (8.2, 11.4)	1 615	17.9 (14.6, 21.2)	1.83 (1.34, 2.42)
Cigars	12 647	9.8 (8.4, 11.1)	1 705	14.1 (11.1, 17.1)	1.50 (1.13, 1.94)
Cocaine	. . .	. . .	. . .	. . .	. . .
Ecstasy	. . .	. . .	. . .	. . .	. . .
Electronic vapor usage ("vaping")[d]	12 809	23.4 (21.2, 25.6)	1 703	28.5 (25.6, 31.3)	1.22 (1.04, 1.43)
Hallucinogens	. . .	. . .	. . .	. . .	. . .
Heroin	. . .	. . .	. . .	. . .	. . .
Inhalants	. . .	. . .	. . .	. . .	. . .
Marijuana	12 761	20.7 (18.1, 23.2)	1 665	30.2 (27.1, 33.3)	1.49 (1.24, 1.77)
Methamphetamine	. . .	. . .	. . .	. . .	. . .
Prescription drugs[e]	. . .	. . .	. . .	. . .	. . .
Smokeless tobacco	12 620	7.2 (5.9, 8.4)	1 697	6.9 (4.6, 9.2)	0.84 (0.49, 1.35)
Steroids	. . .	. . .	. . .	. . .	. . .
Synthetic marijuana	. . .	. . .	. . .	. . .	. . .
Use in lifetime					
Any substance[c]	9 042	71.1 (67.9, 74.3)	1 143	80.1 (76.8, 83.4)	1.12 (1.06, 1.19)
Alcohol	12 619	62.5 (59.7, 65.3)	1 645	71.6 (67.8, 75.4)	1.15 (1.06, 1.23)
Cigarettes	11 494	30.5 (27.0, 34.1)	1 503	47.3 (42.5, 52.2)	1.63 (1.37, 1.92)
Cigars	. . .	. . .	. . .	. . .	. . .
Cocaine	12 868	4.2 (3.4, 4.9)	1 724	11.0 (7.6, 14.4)	2.28 (1.43, 3.45)
Ecstasy	12 848	4.1 (3.5, 4.7)	1 721	10.8 (8.5, 13.1)	2.62 (1.81, 3.64)
Electronic vapor usage ("vaping")[d]	12 632	44.2 (41, 47.4)	1 659	50.7 (47.3, 54.2)	1.19 (1.05, 1.35)
Hallucinogens	9 506	5.5 (4.5, 6.5)	1 228	12.3 (9.2, 15.3)	2.70 (1.92, 3.65)
Heroin	12 858	1.3 (0.9, 1.7)	1 731	6.6 (3.9, 9.3)	3.14 (1.69, 5.42)
Inhalants	12 631	5.6 (4.9, 6.3)	1 692	16.8 (13.4, 20.2)	2.51 (1.89, 3.29)
Marijuana	12 673	37.5 (34.1, 40.8)	1 650	49.9 (45.6, 54.1)	1.40 (1.22, 1.59)
Methamphetamine	12 377	2.1 (1.6, 2.6)	1 627	8.6 (5.7, 11.6)	3.58 (2.01, 5.88)
Prescription drugs[e]	12 840	15.5 (14.2, 16.9)	1 726	26.2 (23.3, 29.2)	1.63 (1.37, 1.90)
Smokeless tobacco	. . .	. . .	. . .	. . .	. . .
Steroids	12 684	2.6 (2.1, 3.1)	1 703	9.1 (5.9, 12.3)	2.68 (1.54, 4.33)
Synthetic marijuana	12 890	8.6 (7.2, 10.0)	1 735	13.7 (10.6, 16.9)	1.56 (1.04, 2.25)

Note. CI = confidence interval; LGBQ = lesbian, gay, bisexual, or questioning; RR = rate ratio. Asterisks indicate not calculated. The sample size was n = 14 703 (15 624 total 2015 YRBS respondents – 921 respondents who did not report their sexual orientation). Prevalence estimates were drawn from the 2015 National Youth Behavioral Risk Survey after applying survey weights to make the sample nationally representative.

[a]All substance use–related outcomes in the 2015 national YRBS were analyzed.

[b]Represents an affirmative response for using the relevant substance within 30 d of being surveyed or lifetime.

[c]This is a composite for use of any of the listed substances within the given timeframe.

[d]Refers to use of an electronic vapor device.

[e]Refers to a prescription drug that was not prescribed by a physician.

or not sure [questioning]) adolescents with those for heterosexual adolescents in aggregate. Then we computed risk estimates adjusted for appropriate covariates. Risk estimates were computed as risk ratios (RRs), that is, the ratio of LGBQ model-adjusted predicted prevalences and heterosexual predicted prevalences, where 1 indicates equality and 1.50 indicates a 50% greater likelihood. To compute the RR, we first ran separate logistic regressions for substance use outcomes on sexual minority status, controlling for age (years), race (American Indian or Alaska Native, Asian, Black, Hispanic, Native Hawaiian or Pacific Islander, White, multiple

races [non-Hispanic]), sex (male or female), English proficiency (very well, well or not well, not at all), and academic achievement (Bs and higher or Cs and lower). Then, we performed 10 000 simulations of estimated prevalences using random draws of the covariance–variance matrix of the logistic regressions.[7] RR distributions were estimated by dividing the prevalence simulations for LGBQ adolescents by the prevalence simulations for heterosexual adolescents. We report the mean of the simulated RR distribution as a point estimate and then the 2.5 and 97.5 percentiles for the 95% confidence interval (CI). Missing data were deleted listwise after assuming data were missing at random and several confirmatory sensitivity tests showing missing responses for substance use were not predicted by sexual identity. All analyses were computed using R version 3.4.1 (R Foundation for Statistical Computing, Vienna, Austria) with $\alpha = .05$, and all estimates were weighted to match the population, including standard error adjustment for sample clustering using the R survey package.

RESULTS

Just over 11% of adolescents identified as a sexual minority, including 2.0% lesbian or gay, 6.0% bisexual, and 3.2% questioning. Of LGBQ adolescents, 51.2% reported using at least 1 substance in the past 30 days (vs 42.2% of heterosexual adolescents), and 80.1% reported using at least 1 substance in their lives (vs 71.1% of heterosexual adolescents; Table 1). Lifetime substance use rates for LGBQ adolescents ranged from a low of 6.6% (95% CI = 3.9, 9.3) for heroin to a high of 71.6% (95% CI = 67.8, 75.4) for alcohol.

LGBQ adolescents were 1.12 (95% CI = 1.06, 1.19) times as likely to have used any substance in their lifetime relative to their heterosexual peers after controlling for confounders. They were also more likely to report using 2 or more substances (RR = 1.30; 95% CI = 1.19, 1.42) in their lifetime.

Across substances, LGBQ adolescents had significantly greater risk for 14 of the 15 substances and 18 of the 19 substance use outcomes studied. For instance, LGBQ adolescents were more likely than heterosexual adolescents to have ever used alcohol (RR = 1.15; 95% CI = 1.06, 1.23), cigarettes (RR = 1.63; 95% CI = 1.37, 1.92), marijuana (RR = 1.40; 95% CI = 1.22, 1.59), or prescription drugs that were not prescribed by a physician (RR = 1.63; 95% CI = 1.37, 1.90). LGBQ adolescents were at substantially greater risk for using methamphetamine (RR = 3.58; 95% CI = 2.01, 5.88) and heroin (RR = 3.14; 95% CI = 1.69, 5.42). LGBQ adolescents also more commonly used novel or emerging substances, including ever using electronic vapor devices (RR = 1.19; 95% CI = 1.05, 1.35) and synthetic marijuana (RR = 1.58; 95% CI = 1.04, 2.25). Risk estimates were similar for substance use reported in the past 30 days.

DISCUSSION

To our knowledge, these are the first national, multioutcome, confounder-adjusted estimates documenting LGBQ adolescents' risk of substance use in the United States in more than a decade. Although past studies have suggested that LGBQ adolescents are at greater risk for drinking alcohol or cigarette smoking,[8–10] this study is the first to our knowledge to report elevated risk of cocaine, ecstasy, inhalants, heroin, methamphetamine, prescription drugs, steroids, and synthetic marijuana. Previous studies have shown that LGBQ adults are at significantly higher risk for substance use than are heterosexual adults.[11] Our study shows that LGBQ adolescents, like adults, are at significantly higher risk, suggesting that this community's exposure to substance use may occur early in the life course.

We did not explore the etiology of LGBQ adolescents' substance use risk here, but previous research has suggested that minority stressors (e.g., stigma) may be at play.[1,2] Given our findings, exploration of these mechanisms should be an urgent priority.

Because our risk estimates are derived from fully controlled models, they depart from previous unadjusted estimates in such a way as to reduce bias. Moreover, by calculating RRs instead of odds ratios, we make the relative risk of sexual minority adolescents more understandable to lay audiences and directly comparable across outcomes and studies.

Our study is limited in that YRBS captured only sex, not gender identity.[12] Furthermore, we did not evaluate how LGBQ adolescents' substance use risks varied across sexual orientations (i.e., lesbian or gay vs bisexual vs questioning) because analyses were underpowered, especially for rare outcomes. Future studies considering substances with sufficient data can clarify questions regarding intragroup variance. A modest survey response rate may engender some bias, yet the YRBS provides the best available national data.

We note that the YRBS may give different prevalence rates than other surveys estimating youth substance use (e.g., Monitoring the Future, National Survey of Drug Use and Health). However, these other surveys do not capture sexual orientation, so they cannot be used for direct comparison. Moreover, any bias from prevalence estimates is ameliorated by focusing on the comparison of LGBQ and heterosexual adolescents.

PUBLIC HEALTH IMPLICATIONS

Policymakers should invest in adolescent LGBQ substance use research, and youth workers and educators should provide LGBQ adolescents with a supportive environment, including treatment referrals. Our findings are a clarion call for urgent action to address LGBQ adolescents' substance use. AJPH

CONTRIBUTORS

T. L. Caputi and J. W. Ayers conceptualized the study and performed the data analysis. All authors drafted the article, provided constructive edits, and approved the final article.

ACKNOWLEDGMENTS

This work was supported by the Joseph Wharton Scholar program, the George J. Mitchell scholarship program (US-Ireland Alliance), and the National Institute on Drug Abuse (R37 DA019829, K01 DA039767).

HUMAN PARTICIPANT PROTECTION

This study was a secondary analysis of publicly available data that was exempt from human participant protection. This determination was made by the University of Pennsylvania institutional review board.

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