

# Trends in Alcohol-Related Disparities Between Heterosexual and Sexual Minority Youth from 2007 to 2015: Findings from the Youth Risk Behavior Survey

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## Abstract

**Purpose:** The purpose of this study was to assess trends in alcohol-related disparities between heterosexual and sexual minority adolescents in the United States from 2007 to 2015.

**Methods:** Data were pooled from the 2007, 2009, 2011, 2013, and 2015 Youth Risk Behavior Surveys ( $N=207,367$ ) to estimate trends, disparities, and changes in disparities of four alcohol-related behaviors (i.e., lifetime alcohol use, early onset use (<13 years of age), past 30-day use, and past 30-day heavy episodic drinking [HED]) among heterosexual youth and three subgroups of sexual minority youth (SMY) (i.e., gay/lesbian, bisexual, and unsure). Models were sex stratified and adjusted for age, race/ethnicity, and state of data collection.

**Results:** The prevalence of all alcohol-related behaviors declined from 2007 to 2015 for heterosexual youth, but not as consistently for SMY. Disparities in alcohol-related behaviors between heterosexual youth and SMY largely remained stable or widened from 2007 to 2015. Disparities in lifetime alcohol use and past 30-day use were larger between heterosexual boys and gay boys in 2015 relative to 2007. Disparities in early onset use and past 30-day HED were also larger between heterosexual girls and lesbian girls in 2015 relative to 2007. The disparity in past 30-day use between heterosexual girls and bisexual girls was smaller in 2015 compared with 2007.

**Conclusions:** Despite overall declines in adolescent alcohol use, alcohol-related disparities between heterosexual youth and SMY persist and, for some SMY, they have widened.

**Keywords:** alcohol, health disparities, LGB youth, sexual minority youth

## Introduction

ADOLESCENT ALCOHOL USE continues to be a major public health concern in the United States despite declining prevalence in recent years.<sup>1</sup> Youth are particularly susceptible to alcohol-related injuries and death.<sup>2,3</sup> Furthermore, patterns of heavy drinking during adolescence are related to trajectories of heavy use across the transition to adulthood,<sup>4</sup> which can lead to long-term health consequences (e.g., alcohol use disorders, liver disease, cancer).<sup>5,6</sup> Identifying subpopulations at disproportionate risk for excessive alcohol use represents a major public health effort to reduce alcohol-related disorders, morbidity, and mortality. Sexual minority (e.g., LGB) youth represent a group at risk for alcohol use and misuse during adolescence.<sup>7,8</sup> Sexual minority youth (SMY) are 2.5 times as likely as heterosexual youth to re-

port recent alcohol use and indicate worse outcomes across a variety of alcohol use behaviors, including early initiation, frequency of use, and heavy episodic drinking (HED).<sup>8–11</sup> Alcohol-related disparities between heterosexual youth and SMY also persist and accelerate across the transition to adulthood,<sup>12,13</sup> making sexual minority adults vulnerable to alcohol abuse and dependence.<sup>14</sup>

In line with minority stress theory, LGB-related health disparities are largely attributed to anti-LGB stigma, discrimination, and prejudice.<sup>15,16</sup> A recent meta-analysis on the experiences of discrimination among LGB people found that 55% of LGB youth and adults reported verbal harassment, 41% experienced discrimination, and 28% had been physically assaulted.<sup>17</sup> Importantly, these experiences are linked to alcohol use and alcohol use disorders. McCabe et al.<sup>18</sup> found that LGB adults who reported lifetime

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experiences of sexual identity, racial, and gender discrimination were over four times as likely to meet the criteria for a past-year substance use disorder compared to those who did not encounter these discriminatory experiences. Studies of LGB youth also document elevated rates of alcohol and drug use among those who report bullying and victimization.<sup>19,20</sup>

Along with interpersonal experiences of discrimination, structural stigma—macrosystemic forms of oppression—is also linked to alcohol use and related disorders among LGB populations. Hatzenbuehler et al.,<sup>21</sup> for example, found that LGB adults living in states that instituted anti-LGB legislation were more likely to report a past-year alcohol use disorder compared with LGB adults living in states that did not introduce these laws (or heterosexual adults in either condition). Although this type of investigation has not been done with youth for alcohol-related outcomes, researchers investigating structural stigma (i.e., policies and laws at the local and state level) have found deleterious outcomes for LGB youth living in areas with anti-LGB climates.<sup>22,23</sup>

Since the early 2000s, there have been remarkably swift changes to local, state, and national policies and laws protecting LGB people in the United States. Notable milestones include: the 2003 U.S. Supreme Court decision to overturn sodomy laws in *Lawrence v. Texas*; voter approval of Proposition 8, which legalized same-sex marriage in California in 2008; the repeal of “Don’t Ask, Don’t Tell” in 2011; and the U.S. Supreme Court’s rulings on same-sex partners’ access to federal benefits in 2013, and the unconstitutionality of same-sex marriage bans in 2015.<sup>24</sup> The media’s attention to LGB-related policies also coincided with and contributed to an increase in favorable attitudes toward LGB people.<sup>25–27</sup> In 2001, for example, 57% of U.S. adults were opposed to same-sex marriage, whereas, in 2016, 55% stated their support for same-sex marriage.<sup>25</sup> Considering the association between structural stigma and the health of LGB people,<sup>21,28</sup> it seems plausible to assume that health disparities between heterosexual youth and SMY would decrease as a result of an increased public acceptance of and legalized protections for LGB people.

The current study used a large U.S. national sample of youth to examine trends in alcohol-related disparities between heterosexual youth and SMY from 2007 to 2015. Specifically, we examined trends in the prevalence of lifetime alcohol use, early onset use (<13 years of age), past 30-day use, and past 30-day HED by sexual identity. Next, we estimated disparities in alcohol-related behaviors between heterosexual youth and three subgroups of SMY (i.e., lesbian/gay, bisexual, and unsure) in 2007 and 2015. We then assessed whether the magnitude of the alcohol-related disparities between heterosexual youth and SMY has changed from 2007 to 2015.

## Methods

### Data and sample

Data came from the Centers for Disease Control and Prevention (CDC) national Youth Risk Behavior Survey (YRBS), a biennial school-based survey that examines the prevalence of health risk behaviors among 9th to 12th graders in the United States.<sup>3,29</sup> The national YRBS dataset was compiled from all weighted state surveys from 1991 to 2015,

which affords researchers a larger analytic sample to examine changes in health-related behavior over time. The data in the national YRBS have also been standardized by the CDC across survey years to assist in accurate cross-year comparisons. The inclusion of sexual minority status measures was instituted on a state-by-state basis starting in the mid-2000s, but was automatically included in the national YRBS data collection strategy in 2015. The present study was approved by the University of Texas Institutional Review Board.

For the analytic sample, we included states if they instituted measures of sexual identity and at least one of the measures of alcohol-related behaviors during at least two cycles of the YRBS. States that met these criteria were Connecticut, Delaware, Florida, Illinois, Maine, Maryland, North Carolina, North Dakota, and Rhode Island for the years 2007 through 2015. The total number of participants in these states, for the years 2007–2015 was 267,741. Youth who were not provided with the opportunity to report sexual identity or did not provide a valid response to items measuring sexual identity ( $n=52,273$ ), sex ( $n=2338$ ), age ( $n=906$ ), or race/ethnicity ( $n=8620$ ) were excluded. The number of youth missing on alcohol-related outcomes also varied ( $n$ 's across years range from 7966 to 34,912), given that questions were not asked in all schools in all years.\* Our final analytic sample was 207,367 youth. Table 1 displays the distribution of youth-reported sexual identity by sex across survey years.

### Measures

Sexual identity was assessed by asking, “Which of the following best describes you?” Response options were heterosexual, gay or lesbian, bisexual, and unsure. Unsure youth were included in analyses given that previous findings note unique patterns of health-related risk, including substance use, for unsure and questioning youth.<sup>8,19</sup>

We evaluated four alcohol-related behaviors. For lifetime alcohol use, participants were asked, “During your life, on how many days have you had at least one drink of alcohol?” Similar to previous studies using the YRBS,<sup>8</sup> we dichotomized responses to reflect 0 days (i.e., never) versus 1 or more days (i.e., ever). Early onset of alcohol use was assessed by asking, “How old were you when you had your first drink of alcohol other than a few sips?” Responses were recoded to reflect alcohol use before the age of 13 ( $1=<13$  years of age,  $0=13$  years of age or older).<sup>3</sup> Past 30-day drinking assessed how often youth had “at least one drink of alcohol?” and past 30-day HED asked how often youth “had 5 or more drinks of alcohol in a row, that is, within a couple of hours?” Responses were dichotomized to reflect the presence or absence of past 30-day drinking and past 30-day HED ( $0=no$ ,  $1=yes$ ).

### Analytic approach

All data management and analyses were conducted in Stata 14.2 (StataCorp LP, College Station, TX). Models were survey adjusted to account for the complex sampling design of

\*Values for missing data were assessed for each item independently and do not reflect the number of youth who were missing on more than one of these items. The sum of missing values therefore does not represent the difference between the possible sample ( $n=267,741$ ) and the final analytic sample ( $n=207,367$ ).

TABLE 1. YOUTH-REPORTED SEXUAL IDENTITY BY DATA COLLECTION YEAR AMONG BOYS AND GIRLS: YOUTH RISK BEHAVIOR SURVEY (2007–2015)

	2007		2009		2011		2013		2015	
	(n=5769)		(n=17,739)		(n=21,982)		(n=77,018)		(n=84,859)	
	n	%	n	%	n	%	n	%	n	%
<b>Boys</b>										
Heterosexual	2683	95.14	8134	94.64	10,091	93.88	34,232	92.52	37,291	91.41
Bisexual	59	1.81	162	1.74	221	1.79	1005	2.01	1467	3.10
Gay	50	1.36	162	1.57	225	2.06	950	2.12	1258	2.54
Unsure	46	1.70	202	2.04	316	2.26	1236	3.34	1391	2.94
<b>Girls</b>										
Heterosexual	2661	91.59	8100	91.01	9824	88.43	33,984	86.11	35,610	84.00
Bisexual	174	5.38	598	5.74	777	6.35	3278	8.18	4584	9.36
Lesbian	37	1.12	138	1.05	163	1.54	887	2.45	1154	2.34
Unsure	59	1.91	243	2.20	365	3.69	1446	3.26	2104	4.31

Percentages are weighted, sample sizes are unweighted.

the YRBS and weighted to produce state-representative estimates. First, we examined the prevalence of alcohol-related behaviors by sexual identity across survey years. Next, we conducted a trend analysis using orthogonal polynomial contrasts to test the presence of a significant linear or quadratic change in alcohol-related behaviors across survey years adjusted for age, race/ethnicity, and state of data collection. We then estimated the presence of sexual orientation identity differences in each alcohol-related behavior in 2007 and 2015 using covariate adjusted logistic regression models. Finally, we used adjusted logistic regression with year-by-identity interaction terms to examine whether alcohol-related disparities between heterosexual youth and SMY have statistically widened, narrowed, or remained the same from 2007 to 2015. Comparisons were considered significant at  $p < 0.05$ .

Given that odds ratios (ORs) from unique samples cannot be compared directly, this year-by-sexual-identity product estimates a ratio of ORs and is reflected as an OR which compares the odds of a specific alcohol-related behavior for a particular subgroup in a given year relative to the reference group to the odds of those with the same identity relative to the reference group in the comparison year. Because our reference year is the most recent survey collection (2015), we inverted the estimated adjusted odds ratio (aOR) to reflect changes from past to present. Therefore, an aOR for an interaction term above 1.00 indicates a widening disparity from 2007 to 2015 (our reference year), and below 1.00 indicates a narrowing disparity. This approach also allows us to assess whether the size of the disparity has changed from 2007 to 2015 while adjusting for variability in the sample age distribution as well as the changing racial/ethnic demographic of the United States in the past 15 years—both of which could alter the prevalence of alcohol-related behaviors across survey years. A more detailed explanation of this approach is available elsewhere.<sup>30</sup> Given documented sex differences in alcohol-related disparities between heterosexual youth and SMY, analyses were stratified by sex.<sup>8,11</sup> Models were also adjusted for age, race/ethnicity (White, Other [Black or African American, Hispanic/Latino, and all other races]), and state of data collection.

## Results

### *Prevalence and adjusted trends of alcohol-related behaviors by sexual identity*

Unadjusted prevalence and adjusted trends of alcohol-related behaviors by sexual identity are displayed in Table 2 (see also Fig. 1). A significant  $F$ -value indicates a statistically significant linear (or quadratic) relationship between time and the prevalence of the alcohol-related behavior within each sexual identity subgroup. The results indicated that the prevalence of all four alcohol-related behaviors largely declined from 2007 to 2015, although statistically significant declines in prevalence of alcohol-related behaviors were almost exclusively among heterosexual youth. The declining prevalence of alcohol-related behaviors was less pronounced for SMY; only bisexual boys and girls indicated a decline in the prevalence of lifetime alcohol use and past 30-day use.

### *Disparities in alcohol-related behaviors between heterosexual youth and SMY in 2007 and 2015*

Table 3 displays aORs for disparities in alcohol-related behaviors between heterosexual youth and SMY within survey year for boys and girls. In 2007, bisexual boys had greater odds of lifetime alcohol use, early onset use, and past 30-day use than heterosexual boys, but not past 30-day HED, whereas, in 2015, bisexual boys reported greater odds of lifetime alcohol use and early onset use, and gay boys were more likely to report all alcohol use outcomes, relative to heterosexual boys. Bisexual girls were more likely than heterosexual girls to report engaging in all alcohol-related outcomes in both 2007 and 2015. Lesbian and unsure girls were also more likely than heterosexual girls to report early onset use in 2015.

### *Trends in alcohol-related disparities between 2007 and 2015*

Table 4 displays adjusted logistic regression models testing sexual identity-by-year interactions for boys and girls. Recall, an aOR for an interaction term above 1.00 indicates a widening disparity between heterosexual youth and each

TABLE 2. TRENDS IN PREVALENCE OF LIFETIME ALCOHOL USE, EARLY ONSET USE, PAST 30-DAY USE, AND PAST 30-DAY HEAVY EPISODIC DRINKING, ACROSS YEARS, WITHIN SEXUAL IDENTITY GROUPS: YOUTH RISK BEHAVIOR SURVEY (2007–2015)

	<i>Unadjusted prevalence (%)</i>					<i>Linear trend comparison</i>	
	2007	2009	2011	2013	2015	<i>Change 2007–2015</i>	
						F	p
<b>Boys</b>							
Lifetime alcohol use							
Heterosexual	70.32	68.06	66.40	61.26	52.32	<b>85.28<sup>a</sup></b>	<b>&lt;0.001</b>
Bisexual	89.20	90.99	74.89	83.61	79.85	<b>5.42</b>	<b>0.020</b>
Gay	71.31	85.74	78.31	79.71	77.07	0.04	0.843
Unsure	71.38	36.14	48.93	61.83	57.81	0.12	0.724
Early onset use							
Heterosexual	20.84	23.08	19.32	18.19	15.97	<b>32.74</b>	<b>&lt;0.001</b>
Bisexual	45.79	47.00	32.11	31.66	28.87	1.71	0.191
Gay	39.81	19.76	31.23	28.96	24.71	2.78	0.096
Unsure	36.71	11.60	22.07	27.02	25.99	0.01	0.909
Past 30-day use							
Heterosexual	40.12	39.79	36.81	32.63	27.96	<b>66.18</b>	<b>&lt;0.001</b>
Bisexual	58.37	44.60	55.32	45.64	37.89	<b>6.63</b>	<b>0.010</b>
Gay	36.02	54.30	56.03	46.91	43.16	0.18	0.671
Unsure	55.34	15.03	28.02	43.88	34.21	0.70	0.404
Past 30-day HED							
Heterosexual	25.03	26.65	23.21	18.27	14.06	<b>87.72</b>	<b>&lt;0.001</b>
Bisexual	23.75	23.74	32.48	27.21	19.70	0.18	0.667
Gay	20.45	31.69	38.29	25.89	20.28	0.02	0.886
Unsure	35.07	5.61	26.29	31.71	24.32	0.30	0.582
<b>Girls</b>							
Lifetime alcohol use							
Heterosexual	73.88	70.30	70.47	65.57	60.43	<b>55.74</b>	<b>&lt;0.001</b>
Bisexual	87.89	87.18	85.04	84.55	73.40	<b>9.99</b>	<b>0.002</b>
Lesbian	86.04	87.52	83.57	86.26	66.67	3.50	0.061
Unsure	72.03	71.34	65.50	67.60	58.64	3.86	0.050
Early onset use							
Heterosexual	15.45	15.38	14.17	12.53	11.14	<b>24.08</b>	<b>&lt;0.001</b>
Bisexual	27.32	33.99	30.31	27.77	22.39	2.18	0.134
Lesbian	20.81	30.76	53.04	27.97	24.41	0.23	0.634
Unsure	28.86	16.70	19.83	22.89	15.45	1.19	0.276
Past 30-day use							
Heterosexual	41.49	37.68	37.68	32.93	30.63	<b>35.48</b>	<b>&lt;0.001</b>
Bisexual	66.92	41.97	51.49	52.03	43.58	<b>8.40</b>	<b>0.004</b>
Lesbian	38.53	74.29	47.57	50.81	34.62	2.94	0.086
Unsure	39.25	35.33	40.20	34.83	27.43	2.74	0.098
Past 30-day HED							
Heterosexual	21.57	21.72	19.80	15.00	13.59	<b>34.47</b>	<b>&lt;0.001</b>
Bisexual	35.24	26.15	27.37	22.89	21.47	3.12	0.078
Lesbian	14.53	44.48	17.26	26.96	13.20	0.24	0.625
Unsure	29.87	18.08	18.58	18.91	15.82	2.15	0.143

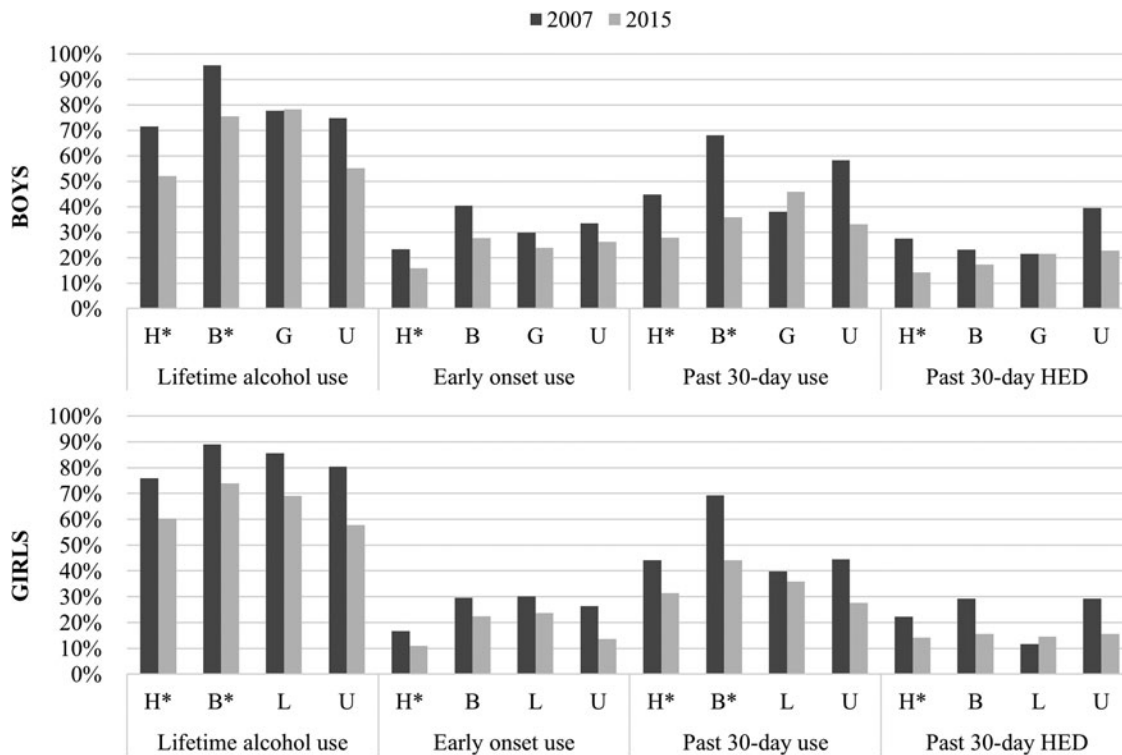
Data were weighted and design adjusted. Linear trend comparisons were adjusted for age, race/ethnicity, and state. *F*-values in bold indicate  $p < 0.05$ .

<sup>a</sup>Quadratic models indicated a significant change from 2007 to 2009, 2011 to 2013, and 2013 to 2015.

HED, heavy episodic drinking.

SMY group from 2007 to 2015, and below 1.00 indicates a narrowing disparity. The results indicate that disparities in lifetime alcohol use and past 30-day use between heterosexual boys and gay boys were larger in 2015 than they were in 2007, aOR = 2.52, 95% CI (1.11–5.70),  $p = 0.027$  and aOR = 2.30, 95% CI (1.10–4.81),  $p = 0.027$ , respec-

tively. Disparities in early onset use and past 30-day HED between heterosexual girls and lesbian girls were also larger in 2015 than in 2007, aOR = 2.49, 95% CI (1.10–5.66),  $p = 0.029$  and aOR = 2.77, 95% CI (1.02–7.55),  $p = 0.047$ , respectively. However, the disparity in past 30-day use between heterosexual girls and bisexual



**FIG. 1.** Adjusted prevalence of lifetime alcohol use, early onset use, past 30-day use, and past 30-day heavy episodic drinking in 2007 and 2015 by sexual identity for boys and girls: Youth Risk Behavior Survey (2007–2015). \*Indicates a statistical decline in alcohol-related behaviors from 2007 to 2015 for sexual identity group at  $p < 0.05$  (noted in the right side of Table 2). Covariates were age, race/ethnicity, and state of data collection. H = heterosexual, G = gay, L = lesbian, B = bisexual, U = unsure.

girls was smaller in 2015 relative to 2007, aOR = 0.62, 95% CI (0.42–0.92),  $p = 0.016$ .

**Discussion**

Using a population-based sample, this study documents trends in alcohol-related disparities between heterosexual youth and SMY in the United States. Generally, our findings show that the prevalence of alcohol-related behaviors declined significantly for heterosexual boys and girls from 2007 to 2015; this overall decline was far less consistent for SMY subgroups. Furthermore, analysis testing the change in sexual identity-related disparities from 2007 to 2015 found that differences were largely stable or had widened, with the exception of past 30-day use for bisexual girls. That is, despite changing social attitudes toward LGB people in the United States, sexual identity disparities in alcohol use remain largely unabated among youth.

Adolescent alcohol use in the general U.S. population has declined steadily in recent decades<sup>1,31</sup> and our results support this trend for heterosexual youth. This pattern of decline, however, was not consistently present across all sexual minority subgroups of boys or girls, suggesting that global efforts to reduce adolescent alcohol use may be less effective for SMY. One of our more prominent findings is the widening of specific alcohol-related disparities for gay and lesbian youth. Although sexual minority boys have historically not evidenced the same alcohol-related risk relative to their sexual minority female peers,<sup>8,11</sup> our findings suggest that sexual minority boys are

at risk, continue to be at risk, and in some cases are at increased risk for alcohol use in 2015 compared with 2007. Interestingly, sexual minority boys and girls showed widening disparities across different outcomes. Disparities for gay boys widened for lifetime alcohol use and past 30-day use, whereas disparities for lesbian girls widened for early onset use and past 30-day HED. These findings encourage future research on the mechanisms that contribute to specific alcohol-related behaviors for sexual minority boys and girls.

We also found that disparities in past 30-day use have narrowed for bisexual girls. Although this was the only narrowing disparity we observed, findings from linear trend analyses also indicated that bisexual males and bisexual females were the only SMY subgroups to indicate statistical declines in specific alcohol-related behaviors. Therefore, there may be systematic differences in the changing prevalence of alcohol use and alcohol use disparities for gay/lesbian youth relative to bisexual youth.

The relative stability and widening of alcohol-related disparities for gay and lesbian youth raises the question: If social attitudes have improved and laws protecting LGB people are more commonplace in the United States, why do sexual-identity-related disparities in alcohol use persist? One possible explanation is that the effect of structural change takes time. There may be a delay in the effects of these changing attitudes and laws on the lived experiences of SMY. Specifically, if experiences of stigma are related to excessive alcohol use among sexual minorities, policies that reduce stigma and discrimination should theoretically lead to less alcohol use. With the

TABLE 3. SEXUAL IDENTITY DIFFERENCES IN LIFETIME ALCOHOL USE, EARLY ONSET USE, PAST 30-DAY USE, AND PAST 30-DAY HEAVY EPISODIC DRINKING, WITHIN YEAR: YOUTH RISK BEHAVIOR SURVEY (2007–2015)

	2007		2015	
	aOR (95% CI)	p	aOR (95% CI)	p
<b>Boys</b>				
Lifetime alcohol use				
Bisexual	<b>3.49 (1.33–9.18)</b>	<b>0.011</b>	<b>3.30 (2.09–5.20)</b>	<b>&lt;0.001</b>
Gay	1.07 (0.48–2.35)	0.873	<b>4.07 (2.47–6.70)</b>	<b>&lt;0.001</b>
Unsure	1.19 (0.53–2.65)	0.675	1.28 (0.69–2.35)	0.431
Early onset use				
Bisexual	<b>2.66 (1.28–5.54)</b>	<b>0.009</b>	<b>2.30 (1.63–3.24)</b>	<b>&lt;0.001</b>
Gay	<b>2.14 (1.25–3.65)</b>	<b>0.005</b>	<b>1.76 (1.23–2.52)</b>	<b>&lt;0.001</b>
Unsure	2.30 (0.90–5.91)	0.083	<b>1.92 (1.41–2.61)</b>	<b>&lt;0.001</b>
Past 30-day use				
Bisexual	<b>2.22 (1.00–4.90)</b>	<b>0.049</b>	1.42 (0.95–2.12)	0.090
Gay	0.79 (0.37–1.68)	0.535	<b>2.07 (1.46–2.93)</b>	<b>&lt;0.001</b>
Unsure	2.17 (0.98–4.82)	0.056	1.31 (0.85–2.03)	0.217
Past 30-day HED				
Bisexual	0.88 (0.36–2.14)	0.773	1.21 (0.82–1.78)	0.331
Gay	0.98 (0.44–2.20)	0.956	<b>1.74 (1.09–2.78)</b>	<b>0.021</b>
Unsure	1.83 (0.88–3.78)	0.104	<b>1.91 (1.18–3.09)</b>	<b>0.009</b>
<b>Girls</b>				
Lifetime alcohol use				
Bisexual	<b>2.81 (1.63–4.83)</b>	<b>&lt;0.001</b>	<b>2.02 (1.52–2.68)</b>	<b>&lt;0.001</b>
Lesbian	2.43 (0.85–6.94)	0.097	1.39 (0.87–2.21)	0.164
Unsure	0.89 (0.40–1.99)	0.778	1.03 (0.70–1.51)	0.900
Early onset use				
Bisexual	<b>2.07 (1.28–3.36)</b>	<b>0.003</b>	<b>2.34 (1.88–2.90)</b>	<b>&lt;0.001</b>
Lesbian	1.19 (0.57–2.48)	0.645	<b>2.64 (1.77–3.94)</b>	<b>&lt;0.001</b>
Unsure	2.15 (0.96–4.81)	0.062	<b>1.36 (1.07–1.74)</b>	<b>0.013</b>
Past 30-day use				
Bisexual	<b>3.07 (2.11–4.46)</b>	<b>&lt;0.001</b>	<b>1.77 (1.47–2.13)</b>	<b>&lt;0.001</b>
Lesbian	0.85 (0.35–2.07)	0.721	1.23 (0.87–1.74)	0.246
Unsure	0.90 (0.48–1.70)	0.748	0.87 (0.68–1.11)	0.262
Past 30-day HED				
Bisexual	<b>2.12 (1.39–3.23)</b>	<b>0.001</b>	<b>1.78 (1.42–2.24)</b>	<b>&lt;0.001</b>
Lesbian	0.55 (0.21–1.48)	0.237	1.01 (0.68–1.49)	0.963
Unsure	1.52 (0.78–2.96)	0.224	1.25 (0.92–1.71)	0.154

Reference group=heterosexual. Data were weighted and odds ratios adjusted for age, race/ethnicity, and state. aOR in bold indicate  $p < 0.05$ .

aOR, adjusted odds ratio; CI, confidence interval.

increased inclusion of sexual identity measures in state and national surveys, future data may offer a better view of the timing between enacted policies and improved health outcomes. It may also be possible that current attitudes and laws have larger (or more immediate) implications for the health and wellbeing of LGB adults, relative to youth. Some have argued, for example, that the fight for marriage equality has diverted attention away from other important efforts<sup>32</sup> that seek more comprehensive protections that impact SMY more directly. Future studies that explore whether these trends in alcohol-related disparities are replicated in adult samples would help to support or refute this claim.

Testing whether specific mechanisms of alcohol-related disparities or if the strength of their association with alcohol use has changed over time may help to illuminate why SMY remain at elevated risk for alcohol use relative to heterosex-

ual peers. Another trend study, for example, found that SMY continue to experience disparities in school bullying and victimization despite a population-level decline in youth reports of these behaviors.<sup>33</sup> A recent meta-analysis also found that the association between sexual minority status and school-based victimization was stronger in more recent studies, implying that bullying may be getting worse for SMY.<sup>34</sup> Alternatively, increased public rhetoric surrounding the health and rights of LGB people may increase SMYs' exposure to positive, but also negative messaging about LGB people, leaving SMY vulnerable to more macro-systemic forms of social stigma. Still further, mechanisms of SMY disparities in alcohol use are complex. For example, perceived drinking norms, drinking to conform, and positive alcohol expectancies are also associated with elevated rates of alcohol use among SMY and adults and, in some cases, mediate sexual orientation

TABLE 4. ADJUSTED TRENDS IN LIFETIME ALCOHOL USE, EARLY ONSET USE, PAST 30-DAY USE, AND PAST 30-DAY HEAVY EPISODIC DRINKING: YOUTH RISK BEHAVIOR SURVEY (2007–2015)

	Lifetime alcohol use		Early onset use		Past 30-day use		Past 30-day HED	
	aOR (95% CI)	p	aOR (95% CI)	p	aOR (95% CI)	p	aOR (95% CI)	p
<b>Boys</b>								
Heterosexual × 2015 <sub>[ref]</sub>	1.00		1.00		1.00		1.00	
Bisexual × 2007	0.83 (0.28–2.40)	0.726	0.74 (0.35–1.57)	0.438	0.65 (0.28–1.50)	0.310	1.40 (0.56–3.54)	0.473
Gay × 2007	<b>2.52 (1.11–5.70)</b>	<b>0.027</b>	0.65 (0.36–1.18)	0.156	<b>2.30 (1.10–4.81)</b>	<b>0.027</b>	1.64 (0.71–3.77)	0.243
Unsure × 2007	0.64 (0.26–1.60)	0.343	0.60 (0.24–1.50)	0.276	0.54 (0.23–1.28)	0.162	0.89 (0.42–1.89)	0.769
<b>Girls</b>								
Heterosexual × 2015 <sub>[ref]</sub>	1.00		1.00		1.00		1.00	
Bisexual × 2007	0.80 (0.46–1.39)	0.431	1.17 (0.74–1.86)	0.498	<b>0.62 (0.42–0.92)</b>	<b>0.016</b>	0.81 (0.53–1.24)	0.337
Lesbian × 2007	0.83 (0.26–2.58)	0.744	<b>2.49 (1.10–5.66)</b>	<b>0.029</b>	2.01 (0.81–4.97)	0.131	<b>2.77 (1.02–7.55)</b>	<b>0.047</b>
Unsure × 2007	1.15 (0.48–2.78)	0.750	0.65 (0.28–1.51)	0.313	1.11 (0.60–2.06)	0.737	0.80 (0.40–1.58)	0.516

Reference category = heterosexual by 2015. Data were weighted. Models included sexual identity, age, race/ethnicity, state, survey year, and identity-by-year interaction; odds ratios above 1.00 indicate a wider disparity between heterosexual youth and the specified sexual minority subgroup in 2015 compared with 2007, whereas odds ratios below 1.00 indicate a narrower disparity between heterosexual youth and sexual minority youth in 2015 compared with 2007. aOR in bold indicate  $p < 0.05$ .

differences in alcohol use.<sup>12,35,36</sup> Ultimately, a focus on the mechanisms that contribute to trends in SMY alcohol use will be critical for understanding ways to improve sexual minority health.

*Limitations*

Despite its contributions, our study has a number of limitations. Although we position our analysis of sexual identity-related disparities in alcohol use in the shifting social context, we are unable to capture youth’s experiences of these secular trends with these data. These data are also geographically limited to the United States and specific states within the United States. Because states could opt in or out of including measures of sexual minority status until 2015, our analysis also includes different states across comparison years. Nationally representative data that measure sexual identity consistently would provide more accurate assessments of change over time. Fortunately, the inclusion of sexual identity measures in the YRBS core survey will afford researchers the opportunity to track national trends in health-related behaviors among SMY and heterosexual youth moving forward. Similarly, the YRBS is a school-based survey and, thus, does not represent youth who were not present or enrolled in school—a group in which SMY are disproportionately overrepresented and that demonstrates increased risk for substance use.<sup>37–39</sup> Finally, despite the utility of our statistical approach to explicitly test changing disparities over time, we must acknowledge that comparisons for earlier years may be underpowered. Inferences should therefore be interpreted with caution. That said, our findings support other emergent studies in this area—that LGB youth, by and large, continue to evidence concerning mental and behavioral health disparities.<sup>30,40,41</sup>

**Conclusions**

These findings suggest that the current pace of changing attitudes and policies in the United States might not be sufficient to counteract the experiences of discrimination that SMY face in day-to-day life. However, more specific research is needed to support this claim. Given the lag between policy change and cultural shifts, we may need to consider intervention and prevention programs that specifically address alcohol-related behaviors among SMY. Programs designed by and for SMY (i.e., Gay-Straight Alliance and LGBT community-based organizations) could integrate alcohol prevention components as a way to address increased risk for SMY. Increasing rates of risk among gay boys and lesbian girls also require further attention, in both research and applied settings. Considering the long-term implications of underage drinking, and the association with related health and mental health comorbidities, efforts to address disparities among SMY have large and longstanding implications for sexual minority health and health disparities across the life course.

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### References

- Centers for Disease Control and Prevention. *Trends in the Prevalence of Alcohol Use: National YRBS: 1991–2015*. 2016. Available at [www.cdc.gov/healthyyouth/data/yrbs/pdf/trends/2015\\_us\\_alcohol\\_trend\\_yrbs.pdf](http://www.cdc.gov/healthyyouth/data/yrbs/pdf/trends/2015_us_alcohol_trend_yrbs.pdf) Accessed December 12, 2017.
- World Health Organization: *Global Status Report on Alcohol and Health 2014*. Geneva, Switzerland: World Health Organization, 2014.
- Kann L, McManus T, Harris WA, et al.: Youth Risk Behavior Surveillance—United States, 2015. *MMWR Surveill Summ* 2016;65:1–174.
- Pitkänen T, Kokko K, Lyyra AL, Pulkkinen L: A developmental approach to alcohol drinking behaviour in adulthood: A follow-up study from age 8 to age 42. *Addiction* 2008;103 Suppl 1:48–68.
- Sloan F, Grossman D, Platt A: Heavy episodic drinking in early adulthood and outcomes in midlife. *J Stud Alcohol Drugs* 2011;72:459–470.
- Rehm J, Gmel GE Sr, Gmel G, et al.: The relationship between different dimensions of alcohol use and the burden of disease—An update. *Addiction* 2017;112:968–1001.
- Talley AE, Gilbert PA, Mitchell J, et al.: Addressing gaps on risk and resilience factors for alcohol use outcomes in sexual and gender minority populations. *Drug Alcohol Rev* 2016;35:484–493.
- Talley AE, Hughes TL, Aranda F, et al.: Exploring alcohol-use behaviors among heterosexual and sexual minority adolescents: Intersections with sex, age, and race/ethnicity. *Am J Public Health* 2014;104:295–303.
- Corliss HL, Rosario M, Wypij D, et al.: Sexual orientation disparities in longitudinal alcohol use patterns among adolescents: Findings from the Growing Up Today Study. *Arch Pediatr Adolesc Med* 2008;162:1071–1078.
- Russell ST, Driscoll AK, Truong N: Adolescent same-sex romantic attractions and relationships: Implications for substance use and abuse. *Am J Public Health* 2002;92:198–202.
- Marshal MP, Friedman MS, Stall R, et al.: Sexual orientation and adolescent substance use: A meta-analysis and methodological review. *Addiction* 2008;103:546–556.
- Hatzenbuehler ML, Corbin WR, Fromme K: Trajectories and determinants of alcohol use among LGB young adults and their heterosexual peers: Results from a prospective study. *Dev Psychol* 2008;44:81–90.
- Marshal MP, Friedman MS, Stall R, Thompson AL: Individual trajectories of substance use in lesbian, gay and bisexual youth and heterosexual youth. *Addiction* 2009;104:974–981.
- McCabe SE, Hughes TL, Bostwick WB, et al.: Sexual orientation, substance use behaviors and substance dependence in the United States. *Addiction* 2009;104:1333–1345.
- Meyer IH: Prejudice as stress: Conceptual and measurement problems. *Am J Public Health* 2003;93:262–265.
- Hatzenbuehler ML: How does sexual minority stigma “get under the skin”? A psychological mediation framework. *Psychol Bull* 2009;135:707–730.
- Katz-Wise SL, Hyde JS: Victimization experiences of lesbian, gay, and bisexual individuals: A meta-analysis. *J Sex Res* 2012;49:142–167.
- McCabe SE, Bostwick WB, Hughes TL, et al.: The relationship between discrimination and substance use disorders among lesbian, gay, and bisexual adults in the United States. *Am J Public Health* 2010;100:1946–1952.
- Birkett M, Espelage DL, Koenig B: LGB and questioning students in schools: The moderating effects of homophobic bullying and school climate on negative outcomes. *J Youth Adolesc* 2009;38:989–1000.
- Goldbach JT, Tanner-Smith EE, Bagwell M, Dunlap S: Minority stress and substance use in sexual minority adolescents: A meta-analysis. *Prev Sci* 2014;15:350–363.
- Hatzenbuehler ML, McLaughlin KA, Keyes KM, Hasin DS: The impact of institutional discrimination on psychiatric disorders in lesbian, gay, and bisexual populations: A prospective study. *Am J Public Health* 2010;100:452–459.
- Hatzenbuehler ML, Jun HJ, Corliss HL, Austin SB: Structural stigma and cigarette smoking in a prospective cohort study of sexual minority and heterosexual youth. *Ann Behav Med* 2014;47:48–56.
- Hatzenbuehler ML: The social environment and suicide attempts in lesbian, gay, and bisexual youth. *Pediatrics* 2011;127:896–903.
- CNN Library: LGBT rights milestones fast facts. CNN. Last updated July 4, 2017. Available at [www.cnn.com/2015/06/19/us/lgbt-rights-milestones-fast-facts/index.html](http://www.cnn.com/2015/06/19/us/lgbt-rights-milestones-fast-facts/index.html) Accessed July 10, 2017.
- Pew Research Center: Changing attitudes on gay marriage. 2017. Available at [www.pewforum.org/2016/05/12/changing-attitudes-on-gay-marriage](http://www.pewforum.org/2016/05/12/changing-attitudes-on-gay-marriage) Accessed March 17, 2017.
- Gallup: Gay and lesbian rights. 2017. Available at [www.gallup.com/poll/1651/Gay-Lesbian-Rights.aspx](http://www.gallup.com/poll/1651/Gay-Lesbian-Rights.aspx) Accessed July 10, 2017.
- Chomsky D, Barclay S: The mass media, public opinion, and lesbian and gay rights. *Ann Rev Law Soc Sci* 2010;6:387–403.
- Raifman J, Moscoe E, Austin SB, McConnell M: Difference-in-differences analysis of the association between state same-sex marriage policies and adolescent suicide attempts. *JAMA Pediatr* 2017;171:350–356.
- Centers for Disease Control and Prevention (CDC), Brener ND, Kann L, et al.: Methodology of the Youth Risk Behavior Surveillance System—2013. *MMWR Recomm Rep* 2013;62:1–20.
- Homma Y, Saewyc E, Zumbo BD: Is it getting better? An analytical method to test trends in health disparities, with tobacco use among sexual minority vs. heterosexual youth as an example. *Int J Equity Health* 2016;15:79.
- Miech RA, Johnston LD, O’Malley PM, et al.: *Monitoring the Future: National Survey Results on Drug Use, 1975–2014: Volume 1, Secondary School Students*. Ann Arbor, MI: Institute for Social Research, The University of Michigan, 2015.
- Pew Research Center: *What LGBT Americans Think of Same-Sex Marriage*. 2015. Available at [www.pewresearch.org/fact-tank/2015/01/27/what-lgbt-americans-think-of-same-sex-marriage](http://www.pewresearch.org/fact-tank/2015/01/27/what-lgbt-americans-think-of-same-sex-marriage) Accessed March 22, 2017.
- Goodenow C, Watson RJ, Adjei J, et al.: Sexual orientation trends and disparities in school bullying and violence-related



- experiences, 1999–2013. *Psychol Sex Orientat Gend Divers* 2016;3:386–396.
34. Toomey RB, Russell ST: The role of sexual orientation in school-based victimization: A meta-analysis. *Youth Soc* 2016;48:176–201.
35. Bos H, van Beusekom G, Sandfort T: Drinking motives, alcohol use, and sexual attraction in youth. *J Sex Res* 2016;53:309–312.
36. Fish JN, Hughes TL: Alcohol expectancies, heavy drinking, and indicators of alcohol use disorders in a community-based sample of lesbian and bisexual women. *LGBT Health* 2018;5:105–111.
37. Baams L, Talmage CA, Russell ST: Economic costs of bias-based bullying. *Sch Psychol Q* 2017;32:422–433.
38. Snapp SD, Hoenig JM, Fields A, Russell ST: Messy, butch, and queer: LGBTQ youth and the school-to-prison pipeline. *J Adolesc Res* 2015;30:57–82.
39. Choi SK, Wilson BDM, Shelton J, Gates G: *Serving Our Youth 2015: The Needs and Experiences of Lesbian, Gay, Bisexual, Transgender, and Questioning Youth Experiencing Homelessness*. Los Angeles: The Williams Institute with True Colors Fund, 2015, pp 1–22.
40. Fish JN, Watson RJ, Porta CM, et al.: Are alcohol-related disparities between sexual minority and heterosexual youth decreasing? *Addiction* 2017;112:1931–1941.
41. Watson RJ, Adjei J, Saewyc E, et al.: Trends and disparities in disordered eating among heterosexual and sexual minority adolescents. *Int J Eat Disord* 2017;50:22–31.

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