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### Tobacco Product Use Among Lesbian, Gay, and Bisexual Adolescents.

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# Tobacco Product Use Among Lesbian, Gay, and Bisexual Adolescents

Hongying Dai, PhD

abstract

**OBJECTIVES:** Sexual minority youth face health disparities and a high risk of substance abuse. This study sought to fully characterize the disparity of tobacco use and risk factors in this high-risk subpopulation.

**METHODS:** Using data from the 2015 Youth Risk Behavior Survey, the current use of various tobacco products (cigarettes, smokeless tobacco, cigars, and e-cigarettes) was compared according to sex and distinct sexual identities (lesbian, gay, bisexual, and unsure). Heterosexual/straight adolescents served as the control group.

**RESULTS:** Of 14 703 respondents, 88.8% were heterosexual/straight, 2.0% were lesbian or gay, 6.0% were bisexual, and 3.2% were unsure about their sexual identity. Sexual minorities had a higher prevalence of tobacco product use than their heterosexual/straight counterparts. Sex had a significant effect on the disparities of tobacco use. Lesbian and bisexual girls had higher odds of reporting current use of any tobacco product, cigarettes, cigars, and e-cigarettes than did straight girls, whereas sexual minority boys had similar smoking behaviors compared with straight boys. Substance use, including marijuana use, drinking, and binge drinking, was significantly associated with any tobacco use.

**CONCLUSIONS:** Tobacco use differs among subgroups of sexual minority youth, with lesbians and bisexual girls having a higher prevalence of tobacco use than their straight peers. Heterogeneity of tobacco use across distinct sexual identity groups underscores the need to develop evidence-based tobacco control strategies for sexual minority youth.

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**WHAT'S KNOWN ON THIS SUBJECT:** Adult studies have shown that lesbian, gay, bisexual, and transgender minorities face health disparities compared with their nonminority counterparts. Few nationally representative surveys have provided information on cigarette and other tobacco product use among sexual minority adolescents.

**WHAT THIS STUDY ADDS:** Sexual minority youth, especially lesbians and bisexual girls, had a higher prevalence of tobacco use than their straight peers. For sexual minorities, high prevalence of tobacco use might start in youth, and the risk behaviors continue to develop into adulthood.

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Evidence suggests that sexual minority adults, including lesbian, gay, bisexual, and transgender (LGBT) individuals, smoke at substantially higher rates than their nonminority counterparts.<sup>1-4</sup> In addition to cigarette smoking, sexual minority adults also use other tobacco products such as hookah, cigars, and e-cigarettes at a higher prevalence than straight populations.<sup>2,5</sup> Furthermore, disparities have been identified among these distinct groups, with sexual minority women and bisexual adults having the highest risk of smoking.<sup>2,3,6</sup> The disparities in tobacco use are driven by certain factors, including stress due to social stigma and discrimination,<sup>7,8</sup> and are further exacerbated by aggressive marketing from the tobacco industry and limited access to effective tobacco treatment.<sup>7,9-11</sup> It is important to identify smoking patterns and social correlates at an early stage of life for this priority population because risky health behaviors are often established during adolescence, with 9 of 10 smokers having tried their first cigarette by age 18 years.<sup>12</sup> Several studies have shown that LGBT youth or young adults had a higher prevalence of cigarette smoking than straight adolescents.<sup>3,13-16</sup> For example, Austin et al<sup>13</sup> found that the odds of smoking among lesbian and bisexual youth were 5.3 times higher than for their straight counterparts. In a Canadian study, Azagba et al<sup>16</sup> reported that LGBT adolescents were 50% to 168% more likely to smoke daily compared with non-LGBT adolescents. These studies have provided evidence for researchers to advocate recognizing sexual minority communities as a priority population for tobacco prevention and cessation services.

Despite progress in addressing health disparities among sexual minorities, the data collection on sexual minority groups from national population-based samples has been limited,<sup>17,18</sup>

especially for adolescents. Most national surveys addressing tobacco use in youth do not collect information on sexual orientation, whereas localized studies, often with small sample sizes and regional differences, can yield results that might not be representative of the nation at large.<sup>4</sup> At the same time, treating adolescent LGB as a unified population, as some current studies have done, might provide inaccurate measurements of LGB tobacco use. A few adult studies have parsed the LGB category to assess smoking prevalence according to distinct sexual identities,<sup>2,6,13</sup> and they have found that female sexual minority adults are at higher risk of smoking than their male counterparts. However, little is known about how patterns of tobacco use differ among distinct groups of LGB adolescents at the national level. In addition, limited studies have examined LGB tobacco use beyond cigarette smoking. Johnson et al<sup>2</sup> reported a higher prevalence of hookah and e-cigarette use among LGB adults than among straight populations. Rath et al<sup>19</sup> reported high rates of ever-use of other tobacco products (ie, cigars, little cigars, e-cigarettes, dissolvable tobacco products, hookah) among LGB young adults (18-34 years of age) than among non-LGB young adults. However, few national studies have explored the use of alternative tobacco products according to sexual identity among adolescents. Such knowledge is critical because cigarette use among youth has declined in recent years, and the decrease in cigarette smoking attained over the last several decades is now offset by the increasing popularity of alternative tobacco products such as e-cigarettes.<sup>20-23</sup> Furthermore, the association between youth cigarette smoking and other substance use, such as marijuana use and drinking,<sup>19,24,25</sup> needs to be evaluated specifically among sexual minority youth.

To address the gaps in knowledge, the present study examined the differences in use of various tobacco products according to sex and sexual identity by using a nationally representative sample from the 2015 Youth Risk Behavior Survey (YRBS). This analysis specifically sought to: (1) assess the prevalence of use of cigarettes, smokeless tobacco (including chewing tobacco, snuff, and dip), cigars (including cigars, cigarillos, and little cigars), and e-cigarettes according to sex and distinct sexual identity groups; and (2) examine factors associated with tobacco use within distinct groups of sexual minorities.

## METHODS

### Data

The data were collected from the 2015 YRBS, a national study conducted biennially in odd-numbered years since 1991. The surveys collect a wide range of priority health-risk behaviors among a nationally representative sample of US students in grades 9 through 12. The national YRBS uses a 3-stage, cluster sample design; a detailed description of the YRBS survey design and data collection can be found on the YRBS Web site.<sup>26,27</sup> YRBS protected student privacy by allowing for anonymous participation and by following local parental permission procedures. Students completed a self-administered questionnaire during 1 class period with no physical test or examination involved.<sup>28</sup> The 2015 national YRBS had a school response rate of 69% and a student response rate of 80%; the overall response rate was 60%. The study included a total of 15 624 respondents.

### Measures

#### *Sexual Minority Populations*

The YRBS includes questions measuring 2 elements of sexual orientation: sexual identity and sex

of sexual contacts. Because there was discordance between sexual identity and sex of sexual contacts,<sup>18</sup> and the sexual identity question yielded a larger sample size compared with the question of sex of sexual contacts,<sup>29</sup> the sexual identity question was used in this study to identify sexual minority youth.

Sexual identity was ascertained by using the following item from the 2015 YRBS: "Which of the following best describe you?" The response options included "Heterosexual (straight)," "Gay or lesbian," "Bisexual," and "Not sure." A total of 921 students were excluded who did not complete this question, resulting in 14 703 respondents in the final study.

### *Tobacco Use*

Current tobacco use was assessed by using the following 4 questions: "During the past 30 days, on how many days did you smoke cigarettes?"; "During the past 30 days, on how many days did you use chewing tobacco, snuff, or dip, such as Red Man, Levi Garrett, Beech-Nut, Skoal, Skoal Bandits, or Copenhagen?"; "During the past 30 days, on how many days did you smoke cigars, cigarillos, or little cigars?"; and "During the past 30 days, on how many days did you use an electronic vapor product?" Response options included "0 days," "1 or 2 days," "3 to 5 days," "6 to 9 days," "10 to 19 days," "20 to 29 days," and "all 30 days." Students who responded >0 days were classified as current cigarette users, current smokeless tobacco users, current cigar users, or current e-cigarette users, respectively. Students who reported using any of these 4 categories of tobacco products in the past 30 days were classified as current any tobacco users.

### *Covariates*

To control for other influences, several covariates were included in the analysis, including sex (male

or female), race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, and non-Hispanic other), age (<15 or ≥15 years), and grade (grades 9–10 and 11–12). Current marijuana users were responders who answered "≥1 time" to the question "During the past 30 days, how many times did you use marijuana?" Current drinking status was defined if responders answered "≥1 day" to the question "During the past 30 days, on how many days did you have at least one drink of alcohol?" Current binge drinking status was defined if responders answered "≥1 day" to the question "During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?"

### *Statistical Methods*

Summary statistics of demographic characteristics and substance use according to sexual identity were reported and compared by using the Rao-Scott  $\chi^2$  test. Sampling weights and survey stratum were included in all analyses to account for the complex survey design. Weighted prevalence estimates of current use of tobacco products, including any tobacco, cigarettes, smokeless tobacco, cigars, and e-cigarettes, were estimated according to sex and sexual identity. Logistic regression models were performed to compare risks of tobacco use according to sex and sexual identity and were adjusted for race, age, and grade in the multivariate analysis. Finally, separate regression analyses were performed among heterosexual, gay/lesbian, bisexual, and unsure groups to assess the associations between sex, race, age, other substance use, and current use of any tobacco products. Statistical analyses were performed by using SAS version 9.4 (SAS Institute, Inc, Cary, NC), and a *P* value <.05 was considered statistically significant.

## **RESULTS**

Among the 14 703 respondents in the analysis, 12 954 (88.8%) were heterosexual/straight, 324 (2.0%) were gay/lesbian, 922 (6.0%) were bisexual, and 503 (3.2%) were not sure about their sexual identity. The distribution of demographic characteristics and other substance use according to sexual identity is listed in Table 1. Bisexual adolescents were much more likely to be female than male (79.6% vs 20.4%) compared with other groups. The distribution of sexual identity varied according to race (*P* = .001), with non-Hispanic black adolescents having a relatively higher proportion of gay/lesbian subjects. Gay/lesbian (33.1%) and bisexual (31.7%) adolescents had a higher prevalence of marijuana use than their straight (20.7%) and unsure (26.0%) peers. Bisexual adolescents had the highest prevalence of drinking (41.8%) among distinct sexual identity groups.

Table 2 presents the prevalence of current use of various tobacco products according to sex and sexual identity. Overall, sexual minority adolescents had a higher prevalence of reporting tobacco use than did their straight counterparts. About 40.5% of gay/lesbian and 38.5% of bisexual adolescents reporting use of any tobacco product in the last 30 days compared with 29.6% of heterosexual/straight students and 32.2% of unsure adolescents (*P* < .0001). Gay/lesbian adolescents and unsure adolescents had a higher prevalence of reporting use of all 4 tobacco products than did straight students. Bisexual adolescents had a higher prevalence of reporting use of cigarettes, cigars, and e-cigarettes but a lower prevalence of reporting use of smokeless tobacco products than did their straight peers.

A strong sex interaction with disparities of tobacco use was observed across sexual identity

**TABLE 1** Sample Characteristics According to Sexual Identity, 2015 YRBS (*N* = 14 703)

Characteristic	Heterosexual/Straight	Gay/Lesbian	Bisexual	Unsure	<i>P</i>
Overall	88.8	2.0	6.0	3.2	
Sex					<.0001
Female	46.2	48.7	79.6	57.6	
Male	53.8	51.3	20.4	42.4	
Age, y					NS
≤15	35.7	36.5	40.4	36.9	
>15	64.3	63.5	59.6	63.1	
Grade					NS
9–10	52.2	51.2	58.4	54.1	
11–12	47.8	48.8	41.6	45.9	
Race					.001
Non-Hispanic white	55.3	43.1	51.6	48.2	
Non-Hispanic black	13.2	22.9	15.6	13.5	
Hispanic	10.1	8.9	8.6	10.5	
Other	21.4	25.0	24.2	27.8	
Prevalence of current substance abuse					
Marijuana	20.7	33.1	31.7	26.0	<.0001
Drinking	32.1	35.9	41.8	34.6	.0006
Binge drinking	17.3	23.7	21.2	17.7	NS

Data are presented as %. NS, not significant.

**TABLE 2** Prevalence of Tobacco Use According to Sex and Sexual Identity, 2015 YRBS

Characteristic	Heterosexual/Straight	Gay/Lesbian	Bisexual	Unsure	<i>P</i>
Any tobacco use	29.6 (28.4–30.7)	40.5 (32.2–48.7)	38.5 (34.2–42.7)	32.2 (26.4–37.9)	<.0001
Female	24.9 (23.3–26.5)	41.4 (30.5–52.3)	39.3 (34.6–44.0)	27.1 (20.3–33.9)	<.0001
Male	33.6 (32.0–35.3)	38.8 (26.6–51.1)	35.6 (25.9–45.4)	39.4 (29.5–49.3)	NS
Cigarette use	9.8 (9.0–10.5)	15.1 (8.7–21.5)	20.4 (16.8–24)	14.7 (10.2–19.1)	<.0001
Female	7.9 (7.0–8.8)	16.2 (7.3–25.2)	21.5 (17.4–25.7)	10.5 (6.3–14.7)	<.0001
Male	11.5 (10.3–12.6)	14.5 (5.0–24.0)	16.2 (8.7–23.8)	20.3 (11.3–29.2)	.047
Smokeless tobacco use	7.2 (6.5–7.8)	10.1 (4.7–15.4)	4.7 (2.8–6.7)	10.0 (6.5–13.6)	.04
Female	1.9 (1.4–2.4)	3.7 (1–6.4)	3.2 (1.2–5.3)	3.7 (1–6.4)	NS
Male	11.6 (10.5–12.7)	14.1 (5–23.2)	10.5 (5.4–15.6)	18.0 (10.5–25.5)	NS
Cigar use	9.8 (9–10.6)	19.0 (11.7–26.3)	11.5 (8.9–14.1)	16.7 (12–21.4)	<.0001
Female	5.4 (4.6–6.1)	16.4 (6.7–26.0)	10.2 (7.5–12.8)	10.2 (6.0–14.5)	<.0001
Male	13.5 (12.3–14.8)	20.0 (9.4–30.6)	16.9 (9.2–24.6)	25.1 (15.9–34.4)	.008
E-cigarette use	23.4 (22.3–24.4)	26.6 (19.3–33.8)	30.0 (26.0–34.0)	26.8 (21.2–32.3)	.007
Female	21.0 (19.5–22.6)	30.7 (20.0–41.4)	31.6 (27.1–36.2)	22.9 (16.3–29.4)	<.0001
Male	25.4 (23.9–26.9)	22.7 (13.2–32.2)	23.7 (15.3–32.1)	31.7 (22–41.4)	NS

Data are presented as weighted estimates of prevalence (% and 95% confidence interval). Any tobacco products include cigarettes, smokeless tobacco, cigars and e-cigarettes. Smokeless tobacco includes chewing tobacco, snuff, and dip. Cigars include cigars, cigarillos, and little cigars. NS, not significant.

groups. Lesbian and bisexual girls had a higher prevalence of reporting current use of any tobacco products, cigarettes, cigars, and e-cigarettes than did straight girls, whereas sexual minority boys had similar smoking behaviors compared with straight boys. For heterosexual/straight and unsure adolescents, boys had a higher prevalence of reporting use of any tobacco and all 4 tobacco products than did girls. For gay/lesbians and bisexual students, girls had a higher prevalence of reporting use of any tobacco product, cigarettes, and

e-cigarettes but a lower prevalence of reporting use of smokeless tobacco and cigars than did boys.

The risks of use of various tobacco products were compared among sexual identity groups (Table 3). For female adolescents, compared with their heterosexual/straight counterparts, lesbians had higher odds of reporting use of any tobacco product (adjusted odds ratio [aOR]: 2.3; *P* = .002), cigarettes (aOR: 2.9; *P* = .004), cigars (aOR: 3.2; *P* = .003), and e-cigarettes (aOR: 1.8;

*P* = .045); bisexual adolescents had higher odds of reporting use of any tobacco product (aOR: 2.2; *P* < .0001), cigarettes (aOR: 3.7; *P* < .0001), cigars (aOR: 2.1; *P* < .0001), and e-cigarettes (aOR: 1.9; *P* < .0001); and unsure adolescents had higher odds of reporting use of cigars (aOR: 1.8; *P* = .028). For male adolescents, gay boys had lower odds of reporting use of smokeless tobacco (aOR: 0.1; *P* = .001) and unsure adolescents had higher odds of reporting use of cigars (aOR: 1.9; *P* = .044) than did their straight counterparts.

**TABLE 3** Multivariable Logistic Regression Comparing Risks of Tobacco Use According to Sex and Sexual Identity

Sex/Sexual Identity	Any Tobacco Use	Cigarette Use	Smokeless Tobacco	Cigar Use	E-cigarette Use
Female					
Heterosexual/straight	Ref	Ref	Ref	Ref	Ref
Lesbian	2.3 (1.4–3.8)**	2.9 (1.4–5.9)**	0.3 (0.1–1.2)	3.2 (1.5–7.1)**	1.8 (1–3.2)*
Bisexual	2.2 (1.7–2.7)†	3.7 (2.8–5)†	1.9 (0.9–4.1)	2.1 (1.5–2.9)†	1.9 (1.5–2.4)†
Unsure	1.2 (0.8–1.7)	1.4 (0.9–2.3)	1.6 (0.6–3.7)	1.8 (1.1–3)*	1.2 (0.8–1.8)
Male					
Gay	0.8 (0.4–1.4)	1 (0.5–2)	0.1 (0–0.4)**	0.9 (0.3–2.4)	0.6 (0.3–1.1)
Bisexual	1 (0.6–1.6)	1.6 (0.9–2.8)	0.6 (0.3–1.2)	1 (0.5–2)	0.9 (0.5–1.5)
Unsure	1.1 (0.7–1.9)	1.7 (0.8–3.3)	1.7 (0.9–3.1)	1.9 (1–3.7)*	1.2 (0.7–2.1)

Ref, reference.

\*  $P < .05$ .\*\*  $P < .01$ .†  $P < .0001$ .**TABLE 4** Multivariable Logistic Regression of Factors Associated With Any Tobacco Use Among Heterosexual and Sexual Minority Populations

Variable	Any Tobacco Use			
	Heterosexual/Straight ( $n = 12\,954$ )	Gay/Lesbian ( $n = 324$ )	Bisexual ( $n = 922$ )	Unsure ( $n = 503$ )
Sex				
Female	Ref	Ref	Ref	Ref
Male	1.6 (1.4–1.9)†	0.3 (0.1–1.1)	0.8 (0.4–1.6)	1.3 (0.6–3.1)
Age				
≤15 y	Ref	Ref	Ref	Ref
>15 y	1.1 (1–1.3)	1.3 (0.5–4)	1.2 (0.7–1.9)	1.5 (0.7–3.2)
Race				
Non-Hispanic white	Ref	Ref	Ref	Ref
Non-Hispanic black	0.6 (0.4–0.7)†	0.6 (0.1–3.2)	0.6 (0.2–1.5)	0.2 (0–1.1)
Hispanic	0.9 (0.7–1.1)	0.4 (0.1–1.6)	0.8 (0.4–2)	1 (0.3–3.7)
Other	0.8 (0.7–1)*	1 (0.3–3.1)	0.7 (0.4–1.2)	0.4 (0.1–0.9)*
Current substance abuse				
Marijuana use (vs no use)	5.1 (4.2–6.2)†	5.9 (2.2–16.4)***	4.7 (2.8–7.7)†	5.9 (2.3–14.7)***
Drinking (vs no drinking)	4.1 (3.4–5.1)†	5 (1.5–17.2)*	3.5 (2–6.3)†	8.9 (3.1–25.7)†
Binge drinking (vs no drinking)	10.5 (8.7–12.7)†	13.6 (4–46.5)†	5.6 (3.1–10.1)†	9.8 (3.4–28.4)†

Ref, reference.

\*  $P < .05$ .\*\*\*  $P < .001$ .†  $P < .0001$  for aORs along with 95% confidence intervals.

Within each sexual identity group, factors associated with any tobacco use were assessed further (Table 4). Boys had higher odds of reporting use of any tobacco product than did girls (aOR: 1.6;  $P < .0001$ ) among straight adolescents, but they were not significantly different from girls among sexual minority groups. Non-Hispanic black adolescents had lower odds of reporting use of any tobacco product than did non-Hispanic white adolescents (aOR: 0.6;  $P < .0001$ ) among straight youth, but they were not significantly different from each other among sexual minorities. Use of marijuana, drinking, and binge drinking increased the odds of any tobacco

use among all groups. However, the effects were different among straight adolescents and distinct sexual minority groups. For example, binge drinking (compared with no drinking) increased the odds of any tobacco use by nearly 13 times (aOR: 13.6;  $P < .0001$ ) for gay/lesbian youth, but the effect dropped by more than one-half for bisexual adolescents (aOR: 5.6;  $P < .0001$ ).

## DISCUSSIONS

The health outcomes of sexual minorities are understudied. The Institute of Medicine called for population-based studies to better

understand LGBT health.<sup>30</sup> The present study used the first wave of the nationally representative sample from YRBS to assess the use of various tobacco products according to sex and distinct sexual identity. The findings confirm the disparities of cigarette smoking among sexual minority youth and further extend our understanding of these disparities to alternative tobacco products. A growing body of literature has examined the association between sexual orientation and smoking cigarettes.<sup>1–4,6,7,13–15,31–34</sup> However, most of the previous studies limited their analyses to cigarette smoking or focused on adults. The present



study examined differences in use of various tobacco products among sexual minority youth. Overall, lesbian/gay adolescents had the highest rate of current use of any tobacco product (40.5%), followed by bisexual adolescents (38.5%) and unsure adolescents (32.2%) compared with their straight peers (29.6%). The association between sexual orientation and tobacco use could be due to social stigma, social isolation, family rejection, discrimination, and emotional abuse.<sup>13</sup> Because sexual minority youth face a wide range of health disparities, the findings in this study could provide evidence for public health agencies and health care organizations to formulate culturally competent tobacco prevention programs and interventions targeting LGBT youth. For instance, the Centers for Disease Control and Prevention's "Tips from Former Smokers" campaign featured real stories from LGBT individuals to advocate smoking cessation among the sexual minority community.<sup>35</sup> The American Lung Association has called on governmental agencies, health care systems, LGBT health advocates, and community members to develop a combination of policy change, prevention messaging campaigns, and tobacco cessation services for this vulnerable population.<sup>4</sup>

As cigarette use among youth has declined in recent years, the tobacco industry has been promoting alternative tobacco products to entice a new generation of young users. The present study found that sexual minority youth have complex patterns of various tobacco use and higher risks of alternative tobacco use than their straight peers. E-cigarettes, in particular, are gaining popularity among youth.<sup>21</sup> To the best of my knowledge, the present study is the first national trial to report a higher prevalence of current use of e-cigarettes among lesbian (30.7%) and bisexual (30.0%)

adolescents compared with straight adolescents (23.4%). Because the use of e-cigarettes has outpaced the use of traditional cigarettes among teenagers,<sup>20-23</sup> these findings have implications in future e-cigarette research to better understand the initiation and frequency of e-cigarette use among sexual minority youth.

Previous studies of sexual minority adults have identified tobacco use disparities according to sex and sexual identity and found that sexual minority women, especially bisexual women, had the highest smoking prevalence compared with other groups.<sup>2,6</sup> The present study assessed tobacco use according to sex and sexual identity among adolescents and similarly found that both lesbian and bisexual girls had higher odds of reporting the current use of any tobacco product, cigarettes, cigars, and e-cigarettes than did straight girls. In contrast, sexual minority boys were far more similar in smoking behaviors compared with straight boys. These findings, taken together with those of previous studies, suggest that a high prevalence of tobacco use starts at an early age among sexual minority girls, and the risk behaviors continue to develop into adulthood. The heterogeneity in tobacco use according to sex and sexual identity underscores the need to identify risk factors that are associated with the disparities of tobacco use among sexual minorities intragroup (lesbian/gay vs bisexual versus unsure) and consider between-sex differences in future studies of LGBT youth.

By analyzing factors associated with any tobacco use within each sexual identity group, substance use was found to be significantly associated with any tobacco use among all 4 sexual identity groups. Disparities in associations were reported between drinking, binge drinking, and any tobacco use among sexual minorities and their straight peers. For example,

binge drinking increased the risk of any tobacco use >2 times higher for gay/lesbian youth than for bisexual youth. These findings again suggest the heterogeneity of factors associated with tobacco use among straight adolescents and distinct sexual minority groups. A one-size-fits-all approach might not work for sexual minority youth, and evidence-based strategy and tailored interventions are needed to counter the high risk of substance use among this population. Parents, health practitioners, and school educators should be aware of these risk factors associated with tobacco use among sexual minority youth and educate them about the danger of tobacco use.

These findings are subject to several limitations. First, the 2015 YRBS data are cross-sectional; thus, causal inferences could not be established. Second, because sexual identity was used as the measurement, and the study was not designed to identify transgender adolescents, the data are not inclusive of all LGBT adolescents. The inclusion of gender measures on national surveys has been limited, and enhancements for measurement methods for identifying transgender adolescents are critically needed. Third, the YRBS data are school-based surveys of representative samples of ninth- through 12th-grade students. Excluding high school dropouts, home-schooled students, and other youth not in school might lead to a sampling bias, which could be more pronounced for sexual minority youth because they are more likely to drop out of school and have poorer school attendance than their straight peers. Future research is needed to further evaluate tobacco use among sexual minority youth who are not represented in a school-based survey. Finally, some estimates of the prevalence of tobacco use also had wide confidence intervals due to the small sample size, and thus these estimates should be interpreted with appropriate caution.

## CONCLUSIONS

Despite these aforementioned limitations, this population study examined differences in use of various tobacco products across LGB sexual minority youth and assessed the factors associated with tobacco use according to sex and sexual identity. Heterogeneity in use of various tobacco products was identified according to sex and sexual identity. Lesbians and bisexual adolescents had higher odds of using cigarettes, cigars, and e-cigarettes than their nonsexual minority counterparts. These findings underscore the need to develop evidence-based tobacco control policies for sexual minority youth that consider the heterogeneity within the sexual minority population.

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## ABBREVIATIONS

aOR: adjusted odds ratio  
LGBT: lesbian, gay, bisexual, and transgender  
YRBS: Youth Risk Behavior Surveys

## REFERENCES

1. Fallin A, Goodin A, Lee YO, Bennett K. Smoking characteristics among lesbian, gay, and bisexual adults. *Prev Med*. 2015;74:123–130
2. Johnson SE, Holder-Hayes E, Tessman GK, King BA, Alexander T, Zhao X. Tobacco product use among sexual minority adults: findings from the 2012-2013 National Adult Tobacco Survey. *Am J Prev Med*. 2016;50(4):e91–e100
3. Lee JG, Griffin GK, Melvin CL. Tobacco use among sexual minorities in the USA, 1987 to May 2007: a systematic review. *Tob Control*. 2009;18(4):275–282
4. American Lung Association. The LGBT community, a priority population for tobacco control. Available at: [www.lung.org/assets/documents/tobacco/lgbt-issue-brief-update.pdf](http://www.lung.org/assets/documents/tobacco/lgbt-issue-brief-update.pdf). Accessed August 22, 2016
5. Huang J, Kim Y, Vera L, Emery SL. Electronic cigarettes among priority populations: role of smoking cessation and tobacco control policies. *Am J Prev Med*. 2016;50(2):199–209
6. Emory K, Kim Y, Buchting F, Vera L, Huang J, Emery SL. Intragroup variance in lesbian, gay, and bisexual tobacco use behaviors: evidence that subgroups matter, notably bisexual women. *Nicotine Tob Res*. 2016;18(6):1494–1501
7. Ryan H, Wortley PM, Easton A, Pederson L, Greenwood G. Smoking among lesbians, gays, and bisexuals: a review of the literature. *Am J Prev Med*. 2001;21(2):142–149
8. Meyer IH, Frost DM. Minority stress and the health of sexual minorities. In: Patterson CJ, D'Augelli AR, eds. *Handbook of Psychology and Sexual Minorities*. New York, NY: Oxford University Press; 2013:252–266
9. Dilley JA, Spigner C, Boysun MJ, Dent CW, Pizacani BA. Does tobacco industry marketing excessively impact lesbian, gay and bisexual communities? *Tob Control*. 2008;17(6):385–390
10. Smith EA, Malone RE. The outing of Philip Morris: advertising tobacco to gay men. *Am J Public Health*. 2003;93(6):988–993
11. Smith EA, Thomson K, Offen N, Malone RE. "If you know you exist, it's just marketing poison": meanings of tobacco industry targeting in the lesbian, gay, bisexual, and transgender community. *Am J Public Health*. 2008;98(6):996–1003
12. US Department of Health and Human Services. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2012
13. Austin SB, Ziyadeh N, Fisher LB, Kahn JA, Colditz GA, Frazier AL. Sexual orientation and tobacco use in a cohort study of US adolescent girls and boys. *Arch Pediatr Adolesc Med*. 2004;158(4):317–322
14. Udry JR, Chantala K. Risk assessment of adolescents with same-sex relationships. *J Adolesc Health*. 2002;31(1):84–92
15. 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(2):198–202
16. Azagba S, Asbridge M, Langille D, Baskerville B. Disparities in tobacco use by sexual orientation among high school students. *Prev Med*. 2014;69:307–311
17. Ward BW, Dahlhamer JM, Galinsky AM, Joestl SS. Sexual orientation and health among US adults: national health interview survey, 2013. *Natl Health Stat Rep*. 2014;(77):1–10
18. Zaza S, Kann L, Barrios LC. Lesbian, gay, and bisexual adolescents: population estimate and prevalence of health behaviors. *JAMA*. 2016;316(22):2355–2356
19. Rath JM, Villanti AC, Rubenstein RA, Vallone DM. Tobacco use by sexual identity among young adults in the United States. *Nicotine Tob Res*. 2013;15(11):1822–1831
20. Wills TA, Knight R, Williams RJ, Pagano I, Sargent JD. Risk factors for exclusive e-cigarette use and dual e-cigarette use and tobacco use in adolescents. *Pediatrics*. 2015;135(1). Available at: [www.pediatrics.org/cgi/content/full/135/1/e43](http://www.pediatrics.org/cgi/content/full/135/1/e43)
21. Singh T, Arrazola RA, Corey CG, et al. Tobacco use among middle and high school students—United States, 2011–2015. *MMWR Morb Mortal Wkly Rep*. 2016;65(14):361–367
22. Miech RA, Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. Most youth using e-cigarettes for novelty and flavors—not to quit smoking. University of Michigan News Service:



- Ann Arbor, MI. Available at: <http://www.ns.umich.edu/new/releases/23371-most-youth-use-e-cigarettes-for-novelty-flavors-not-to-quit-smoking>. Accessed February 11, 2017
23. Barrington-Trimis JL, Berhane K, Unger JB, et al. Psychosocial factors associated with adolescent electronic cigarette and cigarette use. *Pediatrics*. 2015;136(2):308–317
  24. Kandel D. Stages in adolescent involvement in drug use. *Science*. 1975;190(4217):912–914
  25. Leatherdale ST, Hammond D, Ahmed R. Alcohol, marijuana, and tobacco use patterns among youth in Canada. *Cancer Causes Control*. 2008;19(4):361–369
  26. Brener ND, Kann L, Shanklin S, et al; Centers for Disease Control and Prevention (CDC). Methodology of the Youth Risk Behavior Surveillance System—2013. *MMWR Recomm Rep*. 2013;62(RR-1):1–20
  27. Centers for Disease Control and Prevention. 2015 Youth Risk Behavior Survey Data User's Guide, Youth Risk Behavior Surveillance System (YRBSS). Available at: [www.cdc.gov/healthyyouth/data/yrbs/pdf/2015/2015\\_yrbs-data-users-guide.pdf](http://www.cdc.gov/healthyyouth/data/yrbs/pdf/2015/2015_yrbs-data-users-guide.pdf). Accessed February 11, 2017
  28. Centers for Disease Control and Prevention. Youth Risk Behavior Surveillance System frequently asked questions. Available at: <https://www.cdc.gov/healthyyouth/data/yrbs/faq.htm>
  29. Centers for Disease Control and Prevention. How to analyze Youth Risk Behavior Survey sexual minority data, Youth Risk Behavior Surveillance System (YRBSS), June 2016. Available at: [www.cdc.gov/healthyyouth/data/yrbs/pdf/2015/2015\\_analyze\\_sexual\\_minority\\_data.pdf](http://www.cdc.gov/healthyyouth/data/yrbs/pdf/2015/2015_analyze_sexual_minority_data.pdf). Accessed August 27, 2016
  30. Institute of Medicine. *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding*. Washington, DC: 2011
  31. Lee JG, Matthews AK, McCullen CA, Melvin CL. Promotion of tobacco use cessation for lesbian, gay, bisexual, and transgender people: a systematic review. *Am J Prev Med*. 2014;47(6):823–831
  32. Blosnich J, Lee JG, Horn K. A systematic review of the aetiology of tobacco disparities for sexual minorities. *Tob Control*. 2013;22(2):66–73
  33. Blosnich JR, Jarrett T, Horn K. Racial and ethnic differences in current use of cigarettes, cigars, and hookahs among lesbian, gay, and bisexual young adults. *Nicotine Tob Res*. 2011;13(6):487–491
  34. Hughes TL, Johnson TP, Matthews AK. Sexual orientation and smoking: results from a multisite women's health study. *Subst Use Misuse*. 2008;43(8–9):1218–1239
  35. Centers for Disease Control and Prevention. Tips from former smokers. For specific groups: lesbian, gay, bisexual, and transgender (LGBT). Available at: <http://www.cdc.gov/tobacco/campaign/tips/groups/lgbt.html>. Accessed November 22, 2016

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