



State Marijuana Laws and Marijuana Use Among Sexual and Gender Minority Youth in the United States

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Abstract

Purpose: The purpose of this study was to explore the association between state-level marijuana policies and marijuana use among sexual and gender minority (SGM) adolescents.

Methods: A secondary analysis was conducted using a nonprobability sample, the 2017 *LGBTQ National Teen Survey*, based on 10,027 youth who reported their marijuana use behaviors and state of residence. Random intercept multilevel models were estimated to account for between- and within-state variability.

Results: State marijuana possession laws were not associated with lifetime use; however, the odds of current marijuana use were 50% greater among youth living in states with legalized marijuana possession for recreational use (adjusted odds ratio [aOR]=1.50; 95% confidence interval [CI]: 1.21–1.86) compared with states that prohibit any possession. Lesbian, gay, bisexual, transgender, and queer victimization was associated with greater odds of lifetime (aOR = 1.98; 95% CI: 1.78–2.20) and current (aOR = 1.99; 95% CI: 1.74–2.27) marijuana use.

Conclusions: State-level policies governing recreational marijuana possession are associated with current marijuana use among SGM youth. Public health approaches to control underage access to legal marijuana and mitigate substance use-related health disparities are needed.

Keywords: adolescents, cannabis, children, homosexuality, illicit drugs

Introduction

MARIJUANA IS THE most commonly used federal illicit substance among adolescents in the United States.¹ In 2019, 22% of U.S. high school students reported current marijuana use.² When disaggregated by sexual orientation, 31% of lesbian, gay, and bisexual youth and 21% of heterosexual youth reported current marijuana use. Findings from other national studies confirm that sexual and gender minority (SGM) youth were more likely to initiate marijuana use at younger ages and persist in their use over time compared with their heterosexual peers.^{3–5}

In addition, specific SGM subgroups have been shown to have greater prevalence of marijuana use, including Black youth, cisgender females, those identified as bisexual, and transgender adolescents.^{3,4,6,7} Collectively, this

body of evidence suggests important nuanced patterns of marijuana use across SGM subgroups.

Early age of first use of marijuana (particularly before age 15) and frequent use are associated with lower cognitive function and poorer academic performance among adolescents.^{8,9} Evidence also suggests that adolescent marijuana use strongly predicts later tobacco use, daily cigarette smoking, and nicotine dependence.¹⁰ This is a particular concern for SGM populations who experience significant tobacco disparities in adolescence and adulthood.^{3,4,11} Thus, efforts are needed to reduce marijuana use among SGM youth.

Over the last two decades, there have been historic shifts in laws regulating the sale, possession, and use of marijuana in the United States.^{12,13} It has been hypothesized that changes in marijuana policies—in particular, legalization of marijuana

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possession—will increase marijuana use among adolescents.¹⁴ Evidence in support of this hypothesis is mixed.^{12,14,15}

In a meta-analysis, legalization of medical marijuana did not significantly increase use among adolescents in studies published up through 2014¹⁴; however, this review only examined medical marijuana legalization and was not able to assess the impact of changes in laws regulating recreational use. A systematic review of the overall impact of marijuana liberalization policies, inclusive of recreational use, identified 10 studies that found increased adolescent marijuana use after legalization; however, 10 additional studies found no effect.¹⁵

In the United States, cannabis use disorder slightly increased among adolescents in states that legalized recreational marijuana use between 2008 and 2016.¹⁶ There is also evidence to suggest that legalization of marijuana affects intermediate outcomes (e.g., perceived risk, normative barriers, perceived availability) that are predictive of later increases in the prevalence of marijuana use.^{17,18}

As a population, SGM youth experience a wide range of psychosocial risk factors for marijuana use; however, the potential impact of marijuana legalization policies on SGM youth has not been fully explored. According to the availability–prone theory, drug abuse is more likely to occur when prone individuals are exposed to high levels of availability.¹⁹ Prone individuals are exposed to chronic stress created by social and structural factors that stigmatize sexual and/or gender identities.^{7,20}

The minority stress model posits that these stress-related processes and events, including exposure to harassment and violence, can result in poor health outcomes and related substance use.²¹ Lesbian, gay, bisexual, transgender, and queer (LGBTQ) victimization (i.e., that which is targeted at a person because of their sexual orientation and/or gender identity) is associated with several substance use behaviors.^{22,23}

In addition, normative influences have also been shown to be important factors in substance use among SGM populations. Perceived substance use norms were found to be higher in SGM (compared with heterosexual) samples and were reliable predictors of use.²⁴

The availability–prone theory was used to guide this secondary data analysis. It has been previously established that LGBTQ victimization increases susceptibility to substance use.^{22,23,25} There is also some evidence to suggest that increased availability of marijuana through liberalization policies may result in increased use among adolescents.¹⁵ However, it is unclear how the state-level policy context governing marijuana availability and subsequent normative use may be associated with marijuana use among SGM youth independent of minority stressors (e.g., any lifetime LGBTQ-related victimization).

The primary aim of this study was to explore the association between state-level marijuana policies and use among SGM adolescents after adjusting for individual differences and specific experiences with minority stress (i.e., LGBTQ victimization). We addressed the following research questions: (1) What is the association between LGBTQ victimization and marijuana use among SGM adolescents? (2) What is the association between state marijuana laws and marijuana use among SGM adolescents, controlling for LGBTQ victimization?

We hypothesized that SGM youth living in states that have enacted permissive marijuana policies (i.e., legal medical or recreational possession) would be (1) more likely to have

ever tried marijuana and (2) more likely to be current users compared with SGM youth living in states where possession of marijuana is illegal. We expected that these associations were independent of individual demographic differences, minority stressors, and normative state-level marijuana use.

Methods

Data for the current study are from the *LGBTQ National Teen Survey*, an anonymous online survey of SGM youth.²⁶ The University of Connecticut, in partnership with the Human Rights Campaign (HRC), collected the data between April and December of 2017. To be eligible to complete the survey, participants were required to be 13–17 years old and living in the United States.

Participants were recruited through social media (e.g., Twitter, Facebook, Snapchat), with assistance from HRC partner organizations and celebrities. Informed assent was received before participants started the survey. A waiver of parental consent and all the other study protocols were approved by the University of Connecticut Institutional Review Board. The Temple University Institutional Review Board determined the secondary analysis reported here was not human subjects research.

A total of 17,082 youth were enrolled in the parent study.²⁶ The final analytic sample for the current study was 10,027 after excluding cases residing outside of the 50 U.S. states or the District of Columbia, in addition to those with missing data on key variables (e.g., substance use and victimization).

Respondents in the analytic sample did not differ from those excluded with regard to state-level marijuana possession policies ($p=0.59$) or age (0.16); however, respondents in the analytic sample were more likely to identify as pansexual, queer, and nonbinary than excluded participants ($p<0.01$).

Sample characteristics are presented in Table 1.

Measures

Sexual orientation and gender identity. Sexual identity was assessed by asking participants the following question: “How do you describe your sexual identity?” Participants could select one of the following response options: “Gay or Lesbian,” “Bisexual,” “Straight, that is, not gay,” or “Something else.” Participants who selected “Something else” were provided with other options (e.g., queer, asexual, pansexual). A full analysis of emerging identities from these data is reported elsewhere.²⁶

To measure gender identity, participants were asked, “What is your current gender identity?” with the following response options: “Male,” “Female,” “Trans male/Trans boy,” “Trans female/Trans girl,” “Nonbinary,” “Gender-queer/Gender nonconforming,” and “Different identity.” A separate item asked participants if they were assigned male or female at birth.

Participants who selected “Trans male/Trans boy” or “Trans female/Trans girl” were categorized as transgender. Participants who selected a sex at birth that was different from their current gender identity (e.g., male sex at birth and female current gender identity) were also categorized as transgender. Participants who selected a sex at birth that was the same as their current gender identity (e.g., male sex at birth and male current gender identity) were categorized as cisgender.

TABLE 1. SAMPLE CHARACTERISTICS AND MARIJUANA USE BEHAVIORS (N= 10,027)

	<i>Marijuana use</i>				
	<i>Total sample</i> N (%)	<i>Lifetime marijuana use</i> n (%)	<i>p</i>	<i>Current marijuana use</i> n (%)	<i>p</i>
Total		2672 (26.7)		1387 (13.8)	
Age, years			<0.001		<0.001
13–14	2201 (22.0)	260 (11.8)		136 (6.2)	
15–16	4725 (47.1)	1234 (26.1)		619 (13.1)	
17	3101 (30.9)	1178 (38.0)		632 (20.4)	
Race/ethnicity			<0.001		0.002
White, non-Hispanic	6675 (66.6)	1694 (25.4)		898 (13.5)	
Black, non-Hispanic	429 (4.3)	130 (30.3)		63 (14.7)	
Asian, non-Hispanic	393 (3.9)	55 (14.0)		32 (8.1)	
Hispanic/Latinx	1007 (10.0)	312 (31.0)		150 (14.9)	
Multiethnic/racial	1361 (13.6)	436 (32.0)		221 (16.2)	
Another race/ethnicity	162 (1.6)	45 (27.8)		23 (14.2)	
Sexual identity			<0.001		<0.001
Gay/lesbian	3673 (36.6)	1015 (27.6)		504 (13.7)	
Bisexual	3374 (33.7)	914 (27.1)		511 (15.2)	
Straight	161 (1.6)	68 (42.2)		35 (21.7)	
Pansexual	1396 (13.9)	378 (27.1)		208 (14.9)	
Other	911 (9.1)	227 (24.9)		103 (11.3)	
Asexual	512 (5.1)	70 (13.7)		26 (5.1)	
Gender identity			<0.001		<0.001
Cisgender	6504 (64.9)	1683 (25.9)		894 (13.8)	
Transgender	978 (9.8)	340 (34.8)		183 (18.7)	
Gender nonbinary	2545 (25.4)	649 (25.5)		310 (12.2)	
Sex at birth			0.007		0.044
Male	2437 (24.3)	701 (28.8)		367 (15.1)	
Female	7590 (75.7)	1971 (26.0)		1020 (13.4)	
Victimization			<0.001		<0.001
Yes	3215 (32.1)	1180 (36.7)		659 (20.5)	
No	6812 (67.9)	1492 (21.9)		728 (10.7)	
Current cigarette use			<0.001		<0.001
Yes	679 (6.8)	570 (84.0)		413 (60.8)	
No	9348 (93.2)	2102 (22.5)		974 (10.4)	

Participants who selected “Nonbinary,” “Genderqueer/Gender nonconforming,” or “Different identity” were categorized as nonbinary regardless of their sex at birth.

Marijuana use. To measure lifetime marijuana use, participants were asked, “During your life, on how many days have you used marijuana?” Response options were “0 days,” “1 or 2 days,” “3 to 9 days,” “10 to 19 days,” “20 to 39 days,” “40 to 99 days,” and “100 or more days.” Responses were coded to compare youth who used marijuana at least once during their lifetime (i.e., lifetime use).

Current use was measured by asking participants the following question: “During the past 30 days, how many times did you use marijuana?” Response options were “0 times,” “1 or 2 times,” “3 to 9 times,” “10 to 19 times,” “20 to 39 times,” and “40 or more times.” Responses were coded to compare youth who used marijuana at least once during the previous 30 days with those who did not use marijuana in the previous 30 days.

Current cigarette use. We assessed current cigarette use by asking participants the following question: “During the

past 30 days, on how many days did you smoke cigarettes?” Ordinal response options were “0 days,” “1–2 days,” “3 to 5 days,” “6 to 9 days,” “10 to 19 days,” “20 to 29 days,” and “All 30 days.” Responses were coded as those who smoked cigarettes at least 1 or 2 days in the previous 30 days compared with those who did not smoke in the previous 30 days.

LGBTQ victimization. A modified version of the Sexual Orientation Victimization Scale was used to measure victimization experiences specific to SGM individuals.²⁷ Participants were asked, “In your lifetime, how often have any of the following things happened to you because of your sexual orientation or gender identity or because people think you are lesbian, gay, bisexual, transgender, or queer?” Response options ranged from “Never” to “Three or more times.”

Participants reporting one or more instances of experiencing “threats of physical violence,” “objects thrown at you,” or “being punched, kicked, or beaten” were coded as experiencing LGBTQ victimization.

Demographic characteristics. To assess ethnoracial identity, participants were asked, “How would you describe yourself? (select all that apply).” Response options included,

“White, non-Hispanic, non-Latino,” “Black or African American,” “American Indian or Alaska Native,” “Asian or Pacific Islander,” “Latino, Hispanic, or Mexican American,” and “Other.” Participants who selected multiple responses were coded as “Multiethnic/racial.”

We also collapsed “American Indian or Alaska Native” with “Other” into the “Another race/ethnicity” category due to low cell sizes. Participants reported their age in years.

State-level marijuana policies. The current study utilized state marijuana possession laws that were enacted when the survey was fielded in 2017. The status and history of marijuana possession laws were assessed through four sources: the National Conference of State Legislatures (NCSL), a nonpartisan website that provides tools to search state legislation by topic²⁸; ProCon, a nonprofit organization that provides unbiased information about controversial issues²⁹; the Prescription Drug Abuse Policy System (PDAPS), a website that tracks state-based laws related to drug abuse³⁰; and the National Organization for the Reform of Marijuana Laws (NORML), a nonprofit organization that advocates for marijuana law reform in the United States.³¹

These sources were used to determine the year the law was enacted and to provide reliability checks across multiple sources.³² Data from all 50 states as well as Washington, DC, were considered for the current study. State marijuana possession laws that were enacted before 2017 were categorized as one of the following: prohibited possession, permitted possession for medical use only, and permitted possession for recreational use (Fig. 1).

Normative state-level marijuana use. Average marijuana use data (past 30 days) among youth 12–17 years of age during the period 2016–2017 were taken from the National Survey on Drug Use and Health and aggregated by state (including the District of Columbia).³³ This variable was di-

chotomized to differentiate states with greater (>6.5%) or equal/less than average marijuana use among youth in the United States.³⁴

Data analyses

SAS, version 9.4, was used to conduct all analyses. First, descriptive statistics were calculated, and the proportions of youth reporting lifetime and current marijuana use were compared across individual-level variables. There was no issue in multicollinearity between predictor variables based on observed values for the condition indices (<30), variance inflation factors (<10), and tolerance (>0.10).³⁵

The data were hierarchical, with individuals (level 1) nested within states (level 2). Random intercept multilevel models (using SAS PROC GLIMMIX) were estimated to account for between- and within-state variability. The Laplace estimation was used for comparison of model fit through deviance testing.

Four types of nested models were estimated: intercept only (model 1), individual-level covariates (model 2), individual covariates and state-level marijuana laws (model 3), and individual covariates and state-level marijuana laws controlling for state-level normative marijuana use among youth (model 4).

Each of the four types of models was estimated separately for marijuana use outcomes: individual lifetime (1) and current (2) marijuana use. Associations are reported as odds ratios (ORs) with 95% confidence intervals (CIs).

Results

The sample was diverse with regard to age, ethnoracial identity, sexual orientation identity, and gender (Table 1). In the overall sample, 26.7% reported ever trying marijuana and 13.8% reported current use. Marijuana use (lifetime and current use) was more common among older youth, youth identifying as transgender, youth assigned male sex at

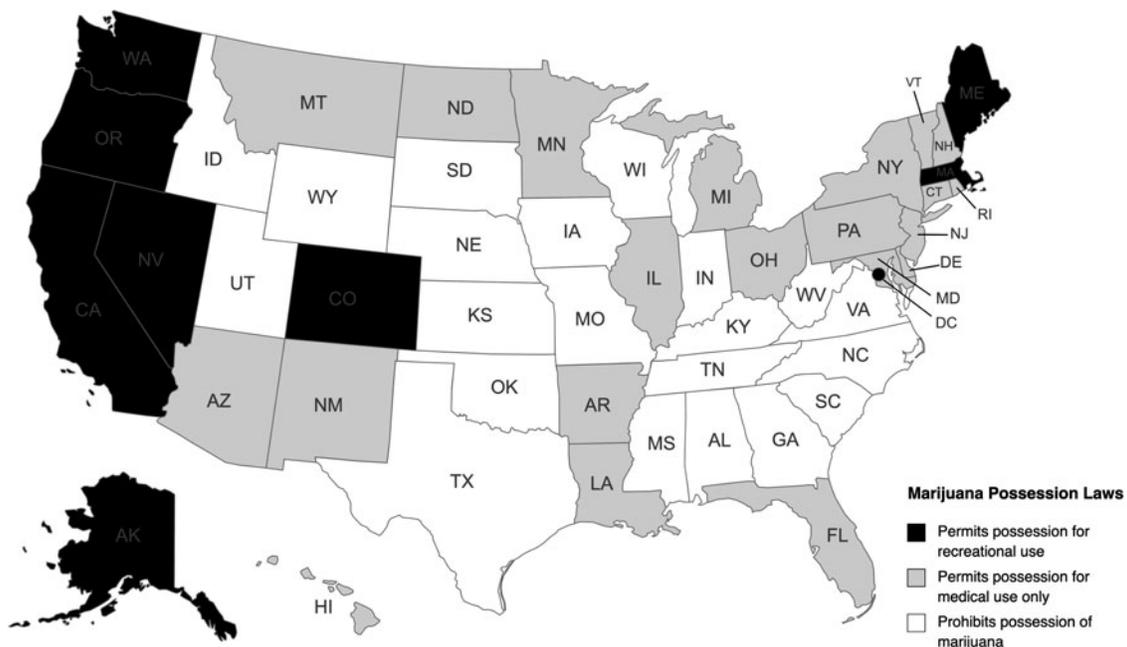


FIG. 1. State marijuana possession laws enacted before 2017.

birth, current tobacco users, and youth experiencing LGBTQ victimization ($p < 0.05$). Use was lower among Asian identified and asexual youth ($p < 0.05$).

Participants were distributed across all of the U.S. states in addition to the District of Columbia ($N = 51$). Of these states, 21 prohibited the possession of marijuana, 21 permitted possession only for medical use, and the remaining 9 allowed possession for recreational use (Fig. 1). Among the participants, 38.4% resided in states that prohibited possession, 40.2% in states that permitted possession for medical use, and 21.4% in states that permitted possession for recreational use.

The variability in the log odds of lifetime and current marijuana use across states (Table 2; Model 1) was statistically significant [$\tau\tau_{00} = 0.02$; $z(50) = 1.63$, $p = 0.05$]; however, the amount of variance explained by state was small ($\sim 1\%$).

Lifetime marijuana use

The individual-level covariate model (Model 2a) fit the data best for lifetime marijuana use. The more complex models, with state-level variables, did not improve fit. Statistically significant individual-level correlates of lifetime marijuana use included age, race/ethnicity, sexual identity, current cigarette use, and LGBTQ victimization. Current cigarette use was the strongest correlate (adjusted OR [aOR] = 16.41; 95% CI: 13.17–20.45).

The odds of lifetime marijuana use were 98% greater among youth experiencing LGBTQ victimization (AOR = 1.98; 95% CI: 1.78–2.20). Contrary to the hypothesis, state marijuana possession laws were not statistically associated with lifetime use (as seen in Model 3a).

Current marijuana use

The combination of individual covariates and state-level marijuana possession laws (Model 3b) provided the best fit for current marijuana use. Adding normative state-level marijuana use did not significantly improve model fit. Statistically significant individual-level correlates of current marijuana use included age, race/ethnicity, sexual identity, gender identity, current cigarette use, state marijuana law, and LGBTQ victimization.

The odds of current marijuana use were 99% greater among youth experiencing LGBTQ victimization (AOR = 1.99; 95% CI: 1.74–2.27). The odds of current marijuana use were 50% greater among youth living in states with legalized marijuana possession for recreational use (AOR = 1.50; 95% CI: 1.21–1.86) compared with states that prohibit any possession. This association remained statistically significant after controlling for normative state-level marijuana use (as seen in Model 4b).

Discussion

The findings reported here provide partial support for the hypothesis that SGM youth living in states with more permissive marijuana regulations are more likely to use marijuana compared with SGM youth living in states with more restrictive regulations. SGM youth living in states that enacted recreational use laws were at higher risk of current marijuana use.

This association was robust after adjusting for normative state-level marijuana use and individual-level demographic

characteristics. However, state marijuana laws permitting possession of marijuana for medical use were not associated with marijuana use for SGM youth. This finding is consistent with previous research showing that medical marijuana laws did not affect adolescent use.¹⁴

Interstate variability in marijuana use was small and likely reflects the complexity of adolescent substance use behaviors. More proximal factors such as individual attitudes toward marijuana use, peer relationships, and parental monitoring are known to be strongly associated with marijuana experimentation and continued use among adolescents.³⁶

For SGM youth, minority stress-related factors are also highly relevant. In the current study, LGBTQ-based victimization was positively associated with lifetime and current use independent of individual and state-level factors. Exposure to LGBTQ-based violence and discrimination may lead to psychological distress, which may mediate the association with substance use behaviors.^{37,38} Policies to combat hate crimes perpetrated against SGM populations may impact substance use disparities among these populations.³⁹

It is also important to highlight the strong association between cigarette and marijuana use among youth in this study. Although the association of recreational marijuana use laws and current marijuana use was independent of cigarette use in the current study, dual tobacco and marijuana use has important implications for future interventions. Marijuana use may increase the risk of nicotine addiction and may be a barrier to tobacco cessation.^{10,40,41} SGM-targeted interventions for tobacco control should consider the role of marijuana co-use behaviors.

Similar to what has been reported in other studies, marijuana use behaviors were not homogeneous across SGM subgroups.^{3,4,6,7} The odds of lifetime marijuana use were higher among Black, Hispanic/Latinx, and multiethnic SGM youth relative to white SGM youth, in addition to those who identify as bisexual compared with gay/lesbian. However, the odds of marijuana experimentation were lower for nonbinary and asexual youth relative to gay/lesbian youth.

More research is needed to understand gender- and sexual identity-based differences in substance use—particularly among youth with diverse emerging identities.²⁶ In addition, this study was underpowered to explore interactions between state-level marijuana policies and SGM subgroups (e.g., by ethnoracial identity). Further research is needed to examine the differential impact of state marijuana policies on SGM subgroups.

These findings have implications for our theoretical understanding of marijuana use among SGM youth and vulnerable populations more broadly. Experiences of minority stress appear to be strong risk factors for experimental and current marijuana use independent of state laws. This provides further support for the use of the minority stress model as an explanatory framework in substance use research with SGM youth.²¹

However, the policy context should be considered as increased availability, through the legalization of recreational marijuana use for adults, may disproportionately impact vulnerable youth.

Limitations

The study design has important limitations. The cross-sectional design precludes causal inferences given that the

TABLE 2. HIERARCHICAL MIXED-EFFECTS MODELS ESTIMATING THE ASSOCIATION OF LIFETIME AND CURRENT MARIJUANA USE WITH INDIVIDUAL-LEVEL AND STATE-LEVEL EFFECTS AMONG SEXUAL AND GENDER MINORITY YOUTH AGED 12–17 YEARS (N=10,027)

	Model 1: Intercept only		Model 2: Individual-level covariates		Model 3: State-level marijuana laws		Model 4: State-level normative marijuana use among youth	
	Model 1a: Lifetime use	Model 1b: Current use	Model 2a: Lifetime use ^a	Model 2b: Current use	Model 3a: Lifetime use	Model 3b: Current use ^b	Model 4a: Lifetime use	Model 4b: Current use
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Age, years								
13–14	0.20 (0.17–0.23)	0.26 (0.21–0.32)	0.20 (0.17–0.23)	0.26 (0.21–0.32)	0.20 (0.17–0.23)	0.26 (0.21–0.32)	0.20 (0.17–0.23)	0.26 (0.21–0.32)
15–16	0.56 (0.50–0.62)	0.59 (0.52–0.68)	0.56 (0.50–0.62)	0.59 (0.52–0.68)	0.56 (0.50–0.62)	0.59 (0.52–0.68)	0.56 (0.50–0.62)	0.59 (0.52–0.68)
17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Race/ethnicity								
White, non-Hispanic	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black, non-Hispanic	1.47 (1.17–1.85)	1.33 (0.99–1.79)	1.48 (1.18–1.86)	1.35 (1.00–1.81)	1.48 (1.18–1.86)	1.35 (1.00–1.81)	1.48 (1.18–1.86)	1.35 (1.00–1.81)
Asian, non-Hispanic	0.53 (0.39–0.73)	0.67 (0.45–0.98)	0.53 (0.39–0.72)	0.65 (0.44–0.96)	0.53 (0.39–0.72)	0.65 (0.44–0.96)	0.53 (0.39–0.73)	0.65 (0.44–0.96)
Hispanic/Latinx	1.45 (1.23–1.71)	1.18 (0.95–1.45)	1.44 (1.23–1.70)	1.16 (0.94–1.43)	1.44 (1.23–1.70)	1.16 (0.94–1.43)	1.44 (1.23–1.70)	1.16 (0.94–1.43)
Multiethnic/racial	1.50 (1.31–1.73)	1.28 (1.07–1.54)	1.50 (1.30–1.73)	1.27 (1.07–1.52)	1.50 (1.30–1.73)	1.27 (1.07–1.52)	1.50 (1.30–1.73)	1.27 (1.07–1.52)
Another race/ethnicity	1.21 (0.82–1.79)	1.06 (0.65–1.75)	1.20 (0.81–1.77)	1.04 (0.63–1.71)	1.20 (0.81–1.77)	1.04 (0.63–1.71)	1.20 (0.81–1.77)	1.04 (0.63–1.71)
Sexual identity								
Gay/lesbian	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bisexual	1.03 (0.91–1.16)	1.22 (1.05–1.42)	1.03 (0.91–1.16)	1.22 (1.05–1.42)	1.03 (0.91–1.16)	1.22 (1.05–1.42)	1.03 (0.91–1.16)	1.22 (1.05–1.42)
Straight	1.50 (1.02–2.20)	1.45 (0.91–2.23)	1.49 (1.02–2.19)	1.43 (0.90–2.26)	1.50 (1.02–2.19)	1.43 (0.90–2.26)	1.50 (1.02–2.19)	1.43 (0.90–2.27)
Pansexual	0.94 (0.80–1.12)	1.13 (0.91–1.39)	0.95 (0.80–1.12)	1.13 (0.92–1.40)	0.95 (0.80–1.12)	1.13 (0.92–1.40)	0.95 (0.80–1.12)	1.13 (0.92–1.40)
Other	0.89 (0.73–1.08)	0.84 (0.65–1.10)	0.88 (0.73–1.07)	0.84 (0.65–1.09)	0.88 (0.73–1.07)	0.84 (0.65–1.09)	0.88 (0.73–1.07)	0.84 (0.65–1.09)
Asexual	0.42 (0.31–0.56)	0.37 (0.24–0.57)	0.42 (0.31–0.56)	0.38 (0.24–0.58)	0.42 (0.31–0.56)	0.38 (0.24–0.58)	0.42 (0.31–0.56)	0.38 (0.24–0.58)
Gender identity								
Cisgender	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Transgender	1.14 (0.95–1.36)	0.95 (0.76–1.19)	1.14 (0.95–1.36)	0.95 (0.76–1.19)	1.14 (0.95–1.36)	0.95 (0.76–1.19)	1.14 (0.95–1.36)	0.95 (0.76–1.19)
Gender nonbinary	0.95 (0.83–1.08)	0.81 (0.68–0.95)	0.95 (0.83–1.08)	0.81 (0.68–0.95)	0.95 (0.83–1.08)	0.81 (0.68–0.95)	0.95 (0.83–1.08)	0.81 (0.68–0.95)
Sex at birth								
Male	0.88 (0.78–1.00)	0.90 (0.77–1.06)	0.88 (0.78–1.00)	0.90 (0.77–1.06)	0.88 (0.78–1.00)	0.90 (0.77–1.06)	0.88 (0.78–1.00)	0.90 (0.77–1.06)
Female	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Victimization								
Yes	1.98 (1.78–2.20)	1.99 (1.74–2.27)	1.98 (1.78–2.20)	1.99 (1.74–2.27)	1.98 (1.78–2.20)	1.99 (1.74–2.27)	1.98 (1.78–2.20)	1.99 (1.74–2.27)
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

(continued)

TABLE 2. (CONTINUED)

	<i>Model 1: Intercept only</i>		<i>Model 2: Individual-level covariates</i>		<i>Model 3: State-level marijuana laws</i>		<i>Model 4: State-level normative marijuana use among youth</i>	
	<i>Model 1a: Lifetime use</i>	<i>Model 1b: Current use</i>	<i>Model 2a: Lifetime use^a</i>	<i>Model 2b: Current use</i>	<i>Model 3a: Lifetime use</i>	<i>Model 3b: Current use^b</i>	<i>Model 4a: Lifetime use</i>	<i>Model 4b: Current use</i>
Current cigarette use								
Yes			16.37 (13.13–20.39)	11.54 (9.66–13.79)	16.40 (13.16–20.43)	11.59 (9.70–13.84)	16.41 (13.17–20.45)	11.59 (9.71–13.85)
No			1.00	1.00	1.00	1.00	1.00	1.00
State marijuana possession laws as of 2017								
Prohibited								
Medical use only					1.00	1.00	1.00	1.00
Recreational use					1.02 (0.87–1.20) 1.21 (0.99–1.47)	1.04 (0.87–1.25) 1.50 (1.21–1.86)	0.98 (0.80–1.20) 1.13 (0.84–1.51)	1.00 (0.79–1.25) 1.39 (1.00–1.92)
State-level marijuana use among 12–17-year-old youth above the national average								
Yes								
No							1.07 (0.86–1.33) 1.00	1.08 (0.85–1.38) 1.00
Error variance								
Level-2 intercept, estimate (SE)		0.02 (0.01)*	0.03 (0.02)*	0.04 (0.02)*	0.02 (0.01)	0.02 (0.01)	0.02 (0.02)	0.02 (0.01)
Model fit								
–2LL	11619.78	8054.52	9828.34*	6798.23*	9824.80	6785.56*	9824.45	6785.19

AORs where *p* values ≤0.05 are bolded.

^aBest-fitting model for lifetime marijuana use.

^bBest-fitting model for current marijuana use.

*Likelihood ratio test, significant (*p* < 0.05).

AOR, adjusted odds ratio; CI, confidence interval; LL, log likelihood; SE, standard error.

temporal relationship between marijuana policy change and individual use behaviors cannot be established. In addition, state-level marijuana laws may be proxies for other causes of marijuana use. These alternative explanations could not be ruled out given the current design. The participants are from a nonprobability sample and are not nationally representative.

There are also limitations to the measures used in this analysis. Public policy governing the use, sale, cultivation, and decriminalization of marijuana is complex and thus introduces measurement errors when making interstate comparisons. In some states, there is a lag between the enactment of a policy and the time that it is legally and practically implemented. Thus, misclassification is possible and may affect the reliability of estimates. Further research is needed to replicate the results of this study.

Conclusions

This study provides evidence that state-level policies governing recreational marijuana possession are associated with marijuana use among SGM youth. Furthermore, current marijuana use was independently associated with ethnoracial, gender, and sexual identities, in addition to dual tobacco use. Public health approaches to control underage access to legal marijuana and mitigate substance use-related health disparities are needed in states that have legalized recreational marijuana use.

Authors' Contributions

C.W.W. conceptualized the article, conducted formal analysis, and contributed to writing—original draft; R.J.W. and J.N.F. conceptualized the primary data collection, conducted project administration, and contributed to writing—review and editing; and C.C. contributed to writing—review and editing.

Disclaimer

The content reported here is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the Centers for Disease Control and Prevention.

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