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Chemsex Drug Use among a National Sample of Sexually Active Men who have Sex with Men, – American Men's Internet Survey, 2017–2020

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Abstract

Background: Chemsex is the intentional use of drugs to enhance sexual activity. Chemsex drug use among men who have sex with men (MSM) is associated with sexual behaviors that increase sexually transmitted infection (STI) risks and adverse mental health outcomes. However, published data are largely based on MSM recruited from STI clinics. There are limited data about use of chemsex drugs among national samples of MSM in the United States. Using data from the American Men's Internet Survey (AMIS), we assessed the prevalence and correlates of use of chemsex drugs among sexually active MSM in the United States.

Methods: We used data from the 2017 to 2020 AMIS cycles to examine the prevalence of chemsex drug use in the past 12 months among MSM. We calculated prevalence ratios (PR) and 95% confidence intervals (CI) to compare chemsex drug use across demographic, behavioral, and mental health factors.

Results: Of 30,294 MSM, 3,113 (10.3%) reported chemsex drug use in the past 12 months. Of the 3,113 MSM who reported chemsex drug use, 65.1% reported ecstasy use, 42.5% reported crystal methamphetamine use, and 21.7% reported GHB use. Factors associated with chemsex drug use included condomless anal sex (PR = 1.93, 95%=1.69–2.20), problem drinking (PR = 2.36, 95% = 2.13–2.61), bacterial STI test (1.84, 95% CI = 1.68–2.02) and probable serious mental illness (PR = 1.92, 95% = 1.76–2.09).

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Disclosure of interest

The authors report no conflict of interest.

Disclaimer

The findings and conclusions in this study are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Conclusion: Chemsex drug use is associated with behaviors that increase STI risk and mental distress among MSM. Health programs that serve MSM can consider screening for chemsex drug use and offering sexual and mental health promotion and risk reduction interventions when necessary.

Keywords

Chemsex; chemsex drug use; STI risk; mental distress; psychosocial distress; risk behaviors; sexually transmitted infections

Introduction

Chemsex is the intentional use of drugs before or during sex to facilitate, enhance, prolong, and sustain sexual activity (Bourne et al., 2015; Khaw et al., 2021; Maxwell et al., 2019). The most common chemsex drugs include crystal methamphetamine, gamma-hydroxybutyrate (GHB), methylenedi-oxymethamphetamine (MDMA)/ecstasy, and mephedrone (Bourne et al., 2015; Khaw et al., 2021; Maxwell et al., 2019). These drugs can heighten sexual sensation and euphoria, enhance cognitive disengagement, affect sexual decision making and may influence persons using these drugs to engage in behaviors that increase their risk of sexually transmitted infections (STIs) (Lafortune et al., 2021; Maxwell et al., 2019; Weatherburn et al., 2017).

Several studies of gay, bisexual, and other men who have sex with men (MSM) attending STI clinics have shown that chemsex is associated with condomless anal sex (CAS) with multiple sexual partners, casual sex, group sex, and non-consensual sex (Bourne et al., 2015; Drückler et al., 2018; Evers et al., 2019; Glynn et al., 2018; Hegazi et al., 2017; Khaw et al., 2021; Maxwell et al., 2019). Chemsex is associated with an elevated risk of bacterial STI diagnosis (Evers et al., 2019; Hegazi et al., 2017; Hibbert et al., 2019; Kohli et al., 2019). Additionally, chemsex has been associated with anxiety, depression, or difficulty maintaining social relationships or employment among MSM (Bohn et al., 2020; Bourne et al., 2015; Hegazi et al., 2017). However, the association with other psychosocial and mental health factors that play a role in the health of MSM such as stigma and discrimination is less known.

Use of the drugs that are commonly associated with chemsex (hereafter referred to as chemsex drug use) appears to be more common among MSM than among men who have sex with women (Hunter et al., 2014), and published estimates of the prevalence of chemsex drug use among convenience samples of MSM range from 3% to 29% (Maxwell et al., 2019). Most of the studies conducted in the United States recruited convenience samples of MSM from STI clinics or substance use disorder clinics and were often limited to one geographic jurisdiction (Maxwell et al., 2019). Prevalence estimates obtained from such samples of MSM might limit their generalizability to a broader sample of MSM. There are few data about the prevalence and correlates of chemsex drug use among a broad sample of MSM in the United States (Maxwell et al., 2019). Understanding the prevalence of sexual and mental health factors associated with chemsex drug use among a national sample of MSM may be useful to informing the design, implementation, and delivery of sexual health,

mental health, and substance use intervention programs that focus on sexually active MSM. The objective of this analysis was to use national data from the American Men's Internet Study (AMIS) to assess the prevalence and correlates of chemsex drug use among sexually active MSM in the United States.

Materials and methods

Data source and eligibility

AMIS is an annual cross-sectional behavioral internet survey of MSM in the United States. Persons who identify as male, are 15 years or older, live in the United States, and report ever having sex with a male partner are eligible to participate in AMIS. Participants are recruited into AMIS through convenience sampling from a variety of social networking websites or applications that have nationwide reach using banner advertisements or e-mail blasts.

We obtained data for this analysis from the 2017, 2018, 2019, and 2020 AMIS data collection cycles. We restricted the analytical sample to men who reported sex with another man in the past 12 months and either reported use of chemsex drugs in the past 12 months or not. For the purpose of this analysis, we categorized crystal methamphetamine, GHB, or ecstasy as chemsex drugs. We asked participants about their use of crystal methamphetamine, GHB, or ecstasy in the past 12 months but did not ask respondents if they specifically used these drugs before or during sexual activity. Although we did not have data about use of these drugs prior to or during sexual activity, Edmundson et al. demonstrated that chemsex drug use can be a direct proxy for chemsex (Edmundson et al., 2018).

Measures

We obtained data about socio-demographic characteristics and condomless anal sex (CAS), HIV pre-exposure prophylaxis (PrEP) use, and self-reported bacterial STI (syphilis, gonorrhea, or chlamydia) testing and diagnosis by a healthcare provider in the past 12 months. We defined CAS as insertive or receptive anal sex without a condom with a male partner in the past 12 months. PrEP use was defined as using HIV PrEP medication at any time in the past 12 months among MSM who reported a negative test for HIV. Respondents who self-reported a positive HIV test at any time were categorized as living with HIV while MSM whose most recent test result was negative were categorized as not living with HIV. Respondents who were unaware of their test result or had never been tested for HIV were categorized as unknown/untested.

We obtained data about problem drinking (persons who have active alcohol use disorders, including alcohol dependence, that put their health and safety at risk) (NIDA, 2020) and psychosocial and mental health. We used the Alcohol Use Disorders Identification Test (AUDIT-C) survey to screen for problem drinking (Bush et al., 1998). AUDIT-C is a brief survey that reliably screens for active alcohol use disorders (Bush et al., 1998; NIDA, 2020). The AUDIT-C has three questions, each with five responses valued from 0 to 4, and is scored on a scale of 0–12 (Bush et al., 1998; NIDA, 2020). A score of ≥4 in males is

considered a positive screening response for problem drinking (Bush et al., 1998; NIDA, 2020).

To assess psychosocial and mental health, we obtained data about verbal harassment and discrimination related to respondents' sexual behavior. To assess verbal harassment, we asked each respondent if he had been called names or insulted in the past 12 months because someone knew or assumed that he was attracted to other men. To assess discrimination, we asked each respondent if he had been treated unfairly at work or at school in the past 12 months because someone knew or assumed that he was attracted to other men. We used the Kessler Psychological Distress Scale (K6) to evaluate mental distress during the previous 30 days among respondents (Kessler et al., 2002; 2003). The six-question K6 questionnaire is a validated screening tool for probable serious mental illness (SMI) (Kessler et al., 2002; 2003). Respondents who responded to all the K6 survey questions and scored ≥ 13 were categorized as having a probable SMI (Kessler et al., 2002; 2003).

Statistical analysis

We calculated frequencies and descriptive statistics of eligible respondents to calculate the prevalence of chemsex drug use in the past 12 months in the sample and describe the socio-demographic, sexual, and mental and psychosocial characteristics of all respondents by chemsex drug use. We estimated unadjusted prevalence ratios (UPR) and adjusted prevalence ratios (APR) and their 95% confidence intervals (95% CI) to determine factors associated with chemsex drug use in the past 12 months using bivariate log-binomial regression analyses. We did a forward stepwise selection procedure to identify variables to be included in the multivariable model. This procedure combines forward selection with backward elimination, checking for entry and removal at predefined statistical significance levels, until no more variables can be added or removed. We set the significance level of the F statistic for a variable to enter the model at $P = 0.25$ and to remain in the model at $P = 0.15$. Variables were added one by one to the model in the stepwise process and the final model was generated when none of the excluded variables had a significant F statistic ($P = 0.25$) to enter the model and every variable that remained in the final model had a significant F statistic ($P = 0.15$) (Bursac et al., 2008).

The final multivariable model included CAS, problem drinking, probable SMI, and bacterial STI testing as independent variables and AMIS data collection cycle year as a covariate. All analyses were conducted using SAS 9.4 (SAS Institute Inc., Cary, NC) and statistical significance was set as $P < 0.05$. The Institutional Review Board of Emory University approved all procedures that were conducted and performed as part of AMIS and involved human participants. Each participant provided informed consent to participate in AMIS. No incentives or compensation were provided to participants.

Results

Of 30,294 eligible MSM who participated in the 2017–2020 AMIS cycles, 3,113 (10.3%) reported chemsex drug use in the past 12 months (Table 1). Of the 3,113 MSM who reported chemsex drug use in the past 12 months, 59.2% were non-Hispanic White, 33.0% were 15–24 years, and 40.2% had at least a college degree. Among MSM who reported chemsex

drug use, nearly 85% reported CAS, 46.4% reported problem drinking, and 56.2% reported a bacterial STI test in the past 12 months. Among those who reported a bacterial STI test (n = 11,704), 43.0% reported a bacterial STI diagnosis. Approximately 17% of MSM who reported chemsex drug use were living with HIV; of those who were not living with HIV, 30.0% reported PrEP use in the past 12 months. Nearly 30% of MSM who reported chemsex drug use reported verbal harassment because someone knew or assumed that they were attracted to men and 12.1% reported discrimination at school or in the workplace because someone knew or assumed that they were attracted to men. Based on responses to the K6 Psychological Distress Scale, 34.7% were categorized as having a probable SMI. Of all respondents who reported chemsex drug use in the past 12 months, 1,322 (42.5%) used crystal methamphetamine, 676 (21.7%) used GHB, and 2,025 (65.1%) used ecstasy.

Hispanic MSM (UPR = 1.28, 95% CI = 1.18–1.40) were more likely to report chemsex drug use than non-Hispanic White MSM; however, there was no difference in chemsex drug use between non-Hispanic Black MSM and non-Hispanic White MSM (Table 2). Compared to MSM aged ≥40 years, younger MSM were more likely to report chemsex drug use (15–24 years, UPR = 1.31, 95% CI = 1.20–1.43; 25–34 years, UPR = 1.96, 95% CI = 1.78–2.15; 35–39 years, UPR = 1.81, 95% CI = 1.63–2.00). MSM with a high school education or less (UPR = 1.13, 95% CI = 1.02–1.25) and those with some college education (UPR = 1.38, 95% CI = 1.28–1.49) were also more likely to report chemsex drug use than MSM with at least a college degree. MSM who reported CAS (UPR = 2.69, 95% CI = 2.45–2.96), problem drinking (UPR = 2.62, 95% CI=2.39–2.87), bacterial STI testing (UPR = 2.03, 95% CI = 1.91–2.18), bacterial STI diagnosis (UPR = 2.13. 95% CI = 1.95–2.31), or PrEP use (UPR = 1.91, 95% CI = 1.76–2.09) in the past 12 months were more likely to report chemsex drug use. MSM living with HIV (UPR = 2.11, 95% CI = 1.94–2.30), who reported verbal harassment (UPR = 1.50, 95%=1.38–1.63) or discrimination (UPR = 1.31, 95% CI = 1.18–1.46) because of their attraction to other men, or MSM who had a probable SMI (UPR = 1.87, 95% CI = 1.74–2.02) were also more likely to report chemsex drug use.

In multivariable analysis, MSM who reported CAS (APR = 1.93, 95%=1.69–2.20), problem drinking (APR = 2.36, 95%=2.13–2.61), or a bacterial STI test (APR = 1.84, 95% CI = 1.68–2.02) in the past 12 months were all more likely to report recent chemsex drug. A probable SMI (APR = 1.92, 95%=1.76–2.09) was also associated with chemsex drug use.

Discussion

The prevalence of reported chemsex drug use in the past 12 months among a national sample of internet-recruited sexually active MSM in this study was 10.3%. Although our prevalence estimate is lower than estimates obtained from MSM recruited from STI clinics (17–35%) (Drückler et al., 2018, Evers et al., 2019; Glynn et al., 2018; Hegazi et al., 2017; Khaw et al., 2021; Maxwell et al., 2019), it is similar to the prevalence of chemsex drug use (5–10%) obtained from other internet-recruited samples of MSM (Barrett et al., 2019; Blomquist et al., 2020; Frankis et al., 2018; Guerras et al., 2021). MSM recruited from STI clinics may engage in behaviors or belong to sexual networks that practice sexual behaviors that increase STI risk (den Daas et al., 2015); these men may be more likely to use chemsex drugs and bias the observed prevalence estimates. Of note, the inclusion of other more commonly

used drugs such as cocaine as chemsex drugs in some studies of STI-clinic-recruited MSM (Drückler et al., 2018, Evers et al., 2019; Glynn et al., 2018; Hegazi et al., 2017; Khaw et al., 2021; Maxwell et al., 2019) may also explain the higher prevalence estimates when contrasted with the more conservative definition of chemsex drug use that was used in this study. Internet-recruited samples of MSM are more likely to include various subgroups of MSM with various risk profiles which might be more representative of the broader MSM population than samples of MSM recruited from STI clinics (Chen et al., 2018).

Chemsex drug use was independently associated with CAS, bacterial STI testing and problem drinking. The association between chemsex and, CAS and bacterial STI testing is consistent with other studies (Bourne et al., 2015; Drückler et al., 2018, Evers et al., 2019; Frankis et al., 2018; Glynn et al., 2018; Maxwell et al., 2019). Drugs used for chemsex can heighten sexual disinhibition and influence sexual decision making, which may lead to STI risk behaviors such as CAS, especially with multiple or anonymous sex partners. MSM who report chemsex drug use or these types of sexual behaviors to their healthcare providers may also be more likely to get tested for (and thus subsequently more likely to be diagnosed with) bacterial STIs (Abara et al., 2021; Maxwell et al., 2019). Problem drinking is associated with sexual disinhibition (Leeman et al., 2007) and can complement the effects of chemsex drug use (Hibbert et al., 2019). This may explain its association with chemsex drug use in this analysis. Other factors associated with chemsex drug use included PrEP use and living with HIV. CAS or a bacterial STI diagnosis in the past 6 months are indications for PrEP use in MSM because they elevate the risk of HIV acquisition (CDC, 2018). Because MSM who report chemsex drug use in this study are more likely to report CAS or a bacterial STI, HIV-negative MSM may be more likely to receive PrEP than those who do not report chemsex drug use. CAS, especially with multiple or anonymous partners, and bacterial STI are risk factors for HIV. This may account for the elevated prevalence of chemsex drug use among MSM living with HIV in this study.

An important yet understudied contribution of this study is the observed association of chemsex drug use with the mental wellbeing of MSM. Chemsex drug use was associated with probable SMI and verbal harassment and discrimination that was related to respondents' attraction to other men. Some MSM may use chemsex drugs as a maladaptive coping mechanism to overcome the psychological distress, anxiety, depression, internalized homonegativity, or social isolation that they may face within social or sexual settings (Hegazi et al., 2017; Lafortune et al., 2021). Conversely, chronic chemsex drug use can also contribute to the onset of anxiety, depression, or psychosis (Akindipe et al., 2014; McCardle et al., 2004).

These findings can inform the design, implementation, and delivery of sexual and mental health interventions that focus on sexually active MSM (Belani et al., 2012; Evers et al., 2020). For example, providers that serve MSM could play an important role in identifying chemsex drug use among MSM and addressing the sexual and mental health risks associated with their use among MSM in a culturally competent and sensitive manner that is stigma-free (Belani et al., 2012; Evers et al., 2020). Inquiring about chemsex drug use during sexual risk assessments, especially GHB (reported by 20% of respondents), during clinical and non-clinical encounters could be beneficial in identifying MSM who report chemsex drug

use and offer opportunities for substance use intervention and treatment (Belani et al., 2012). Chemsex drug use reported by MSM during these encounters could also signal potential mental and psychosocial health issues. Screening for mental or psychosocial distress can identify MSM who may require mental and behavioral health interventions and provide a pathway for referral to these services (Belani et al., 2012; Evers et al., 2020; Hegazi et al., 2017; Lafortune et al., 2021). Mental health and substance use interventions may also benefit from including lesser known chemsex drugs such as GHB in addition to well-known chemsex drugs, such as crystal methamphetamine and ecstasy, in their drug screening protocols as part of their routine intake assessments. These holistic risk screening approaches can identify MSM who report chemsex or polydrug use and also present opportunities for sexual and mental health promotion and risk reduction interventions (Evers et al., 2020; Hegazi et al., 2017).

There are limitations to this analysis. These findings may not be widely generalizable to all MSM. These data were obtained from an internet sample of MSM, thus respondents may be more likely to younger, have access to the internet, and technologically adept. Data on chemsex drug use, sexual behaviors, and mental health were self-reported and might have been under-reported due to social desirability bias. However, it is also possible that the risk of social desirability bias may be decreased by the use of an online survey. Because of the cross-sectional design of this study, we are unable to assess causality between chemsex drug use and the sexual and mental health characteristics of respondents. It is therefore impossible to conclude whether chemsex drug use leads to sexual risk behaviors or affects the mental and psychosocial wellbeing of MSM or if sexual risk behaviors and the mental and psychosocial wellbeing of respondents predispose them to engaging in chemsex drug use. Although the term chemsex is used in this analysis and the studied drugs are commonly used for chemsex, this analysis did not ascertain whether respondents used the studied drugs before or during sex.

In conclusion, the prevalence of chemsex drug use in a national sample of sexually active internet recruited MSM in the past 12 months was 10%. Ecstasy was the most reported drug. Chemsex drug use was associated with sexual risk behaviors and the mental and psychosocial health of MSM. Assessments for chemsex drug use, including lesser known drugs such as GHB, as part of sexual risk, mental health, and drug use assessments may offer opportunities to identify MSM who engage in chemsex drug use and provide early health promotion and wellbeing intervention in this population.

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Table 1.

Characteristics of sexually active men who have sex with men who reported Chemsex drug use in the past 12 months and those who did not – American Men's Internet Survey (Amis), 2017–2020 cycles, (*N* = 30,294).

Variable	Used chemsex drugs in past 12 months	Did not use chemsex drugs in past 12 months	Total
Variable	***n* (column %)**	***n* (column %)**	***N* (column %)**
	3,113 (10.3)	27,181 (89.7)	30,294 (100.0)
Race	3,113 (10.3)	27,181 (89.7)	30,294 (100.0)
Non-Hispanic black	289 (9.3)	2,906 (10.7)	3,195 (10.6)
Hispanic	625 (20.1)	4,435 (16.3)	5,060 (16.7)
Other/multiple/unknown[a]	288 (9.3)	2,002 (7.4)	2,290 (7.6)
Non-Hispanic White	1,842 (59.2)	17,305 (63.7)	19,147 (63.2)
Missing	69 (2.2)	533 (2.0)	602 (2.0)
Age (years)			
15–24	1,027 (33.0)	9,553 (35.2)	10,580 (34.9)
25–34	767 (24.6)	4,527 (16.7)	5,294 (17.5)
35–39	561 (18.0)	3,632 (13.4)	4,193 (13.8)
≥40	758 (24.4)	9,469 (34.8)	10,227 (33.8)
Highest level of education			
≤High school/GeD	494 (15.8)	4,301 (15.8)	4,795 (15.8)
Some college/technical degree	1,134 (36.4)	7,845 (28.9)	8,979 (29.6)
≥College degree	1,250 (40.2)	12,432 (45.8)	13,682 (45.2)
Missing	235 (7.6)	2,603 (9.6)	2,838 (9.4)
Condomless anal sex in the past 12 months			
Yes	2,643 (84.9)	17,841 (65.6)	20,484 (67.6)
No	470 (15.1)	9,340 (34.4)	9,810 (32.4)
Problem drinking in the past 12 months [b]			
Yes	1,444 (46.4)	7,055 (26.0)	8,499 (28.1)
No	586 (18.8)	8,446 (31.0)	9,032 (29.8)
Missing	1,083 (34.8)	11,680 (43.0)	12,763 (42.1)
Tested for a bacterial sexually transmitted infection in the past 12 months [c]			

Variable	Used chemsex drugs in past 12 months	Did not use chemsex drugs in past 12 months	Total
Variable	***n* (column %)**	***n* (column %)**	***N* (column %)**
Yes	1,748 (56.2)	9,956 (36.6)	11,704 (38.6)
No	1,365 (43.9)	17,225 (63.4)	18,590 (61.4)
Bacterial sexually transmitted infection diagnosis in the past 12 months [d] (n = 11,704)			
Yes	751 (43.0)	2,312 (23.2)	8,641 (73.8)
No	997 (57.0)	7,644 (76.8)	3,063 (26.2)
Living with HIV			
Yes	536 (17.2)	1,918 (7.1)	2,454 (8.1)
No	2,094 (67.3)	18,162 (66.8)	20,256 (66.9)
Unknown/Untested[e]	405 (13.0)	6,219 (22.9)	6,624 (21.9)
Missing	78 (2.5)	882 (3.2)	960 (3.1)
HIV pre-exposure prophylaxis use (n = 20,256) [f]			
Yes	628 (30.0)	3,076 (16.9)	3,704 (18.3)
No	1,466 (70.0)	15,086 (83.1)	16,552 (81.7)
Called names or insulted because someone knew or assumed you were attracted to men in past 12 months			
Yes	907 (29.1)	6,190 (22.7)	7,097 (23.4)
No	1,088 (35.0)	11,684 (43.0)	12,772 (42.2)
Other	68 (2.2)	994 (3.7)	1,062 (3.5)
Missing	1,050 (33.7)	8,313 (30.6)	9,363 (30.9)
Treated unfairly at work or school because someone knew or assumed you were attracted to men in past 12 months			
Yes	376 (12.1)	2,673 (9.8)	3,049 (10.1)
No	1,503 (48.3)	14,462 (53.2)	15,965 (52.7)
Other	160 (5.1)	1,378 (5.1)	1,538 (5.1)
Missing	1,074 (34.5)	8,668 (31.9)	9,742 (32.2)
Probable serious mental illness [g]			
Yes	914 (34.7)	4,751 (20.7)	5,665 (22.1)
No	1,719 (65.3)	18,241 (79.4)	19,960 (77.9)
Data collection year			

Variable	Used chemsex drugs in past 12 months	Did not use chemsex drugs in past 12 months	Total
Variable	***n* (column %)**	***n* (column %)**	***N* (column %)**
2017	734 (23.6)	6,293 (23.2)	7,027 (23.2)
2018	609 (19.6)	6,189 (22.8)	6,798 (22.4)
2019	724 (23.3)	6,442 (23.7)	7,166 (23.7)
2020	1,046 (33.6)	857 (30.4)	9,303 (30.7)

[a]American Indian, Alaska Native, Native Hawaiian, Pacific Islander, or multiple race/ethnicities.

[b]≥4 alcoholic drinks on any day when alcohol is consumed.

[c]Tested for gonorrhea, chlamydia, or syphilis by a healthcare provider.

[d]Restricted to respondents who reported a bacterial sexually transmitted infection in the past 12 months.

[e]Includes persons who were untested or are unaware of their HIV status.

[f]Restricted to persons who self-reported a negative HIV test result.

[g]Based on the Kessler Psychological Distress Scale (K6).

Table 2.

Factors associated with Chemsex drug use in the past 12 months among sexually active Msm – American Men's Internet Survey (Amis), 2017–2020 cycles.

Variable	Total	Chemsex drug use in past 12 months	Unadjusted prevalence ratio	95% confidence interval	Adjusted prevalence ratio[a]	95% confidence interval
	N	*n* (row %)				
Race/ethnicity						
non-Hispanic black	3,195	289 (9.1)	0.94	0.84–1.06		
Hispanic	5,060	625 (12.4)	1.28	1.18–1.40		
Other/multiple/unknown[b]	2,290	288 (12.6)	1.31	1.16–1.47		
Non-Hispanic white	19,147	1,842 (9.6)	1.00			
Age (years)						
15–24	10,580	1,027 (9.7)	1.31	1.20–1.43		
25–34	5,294	767 (14.5)	1.96	1.78–2.15		
35–39	4,193	561 (13.4)	1.81	1.63–2.00		
≥40	10,227	758 (7.4)	1.00			
Highest level of education						
≤ high school/General education Development	4,795	494 (10.3)	1.13	1.02–1.25		
Some college/technical degree	8,979	1,134 (12.6)	1.38	1.28–1.49		
≥college degree	13,682	1,250 (9.1)	1.00			
Condomless anal sex in past 12 months						
Yes	20,484	2,643 (12.9)	2.69	2.45–2.96	1.93	1.69–2.20
No	9,810	470 (4.8)	1.00		1.00	
Problem drinking in past 12 months [c]						
Yes	3,066	695 (22.7)	2.62	2.39–2.87	2.36	2.13–2.61
No	14,509	1,340 (9.2)	1.00		1.00	
Tested for a bacterial sexually transmitted infection in past 12 months [d]						
Yes	11,704	1,748 (14.9)	2.03	1.91–2.18	1.84	1.68–2.02
No	18,590	1,365 (7.3)	1.00		1.00	

Variable	Total	Chemsex drug use in past 12 months	Unadjusted prevalence ratio	95% confidence interval	Adjusted prevalence ratio[a]	95% confidence interval
	N	*n* (row %)				
Bacterial sexually transmitted infection diagnosis in past 12 months [e]						
Yes	3,063	751 (24.5)	2.13	1.95–2.31		
No	8,641	997 (11.5)	1.00			
Living with HIV [f]						
Yes	2,454	536 (21.8)	2.11	1.94–2.30		
No	20,256	2,094 (10.3)	1.00			
HIV pre-exposure prophylaxis use [g]						
Yes	3,704	628 (17.0)	1.91	1.76–2.09		
No	16,552	1,466 (8.9)	1.00			
Called names or insulted because someone knew or assumed you were attracted to men in past 12 months						
Yes	7,097	907 (12.8)	1.50	1.38 − 1.63		
No	12,772	1,088 (8.5)	1.00			
Treated unfairly at work or school because someone knew or assumed you were attracted to men in past 12 months						
Yes	3,049	376 (12.3)	1.31	1.18–1.46		
No	15,965	1,503 (9.4)	1.00			
Probable serious mental illness [h]						
Yes	5,665	914 (16.1)	1.87	1.74–2.02	1.92	1.76–2.09
No	19,960	1,719 (8.6)	1.00			
Data collection year						
2017	7,027	734 (10.5)	0.93	0.85–1.02	1.10	0.99–1.21
2018	6,798	609 (9.0)	0.80	0.73–0.88	1.10	0.99–1.21
2019	7,166	724 (10.1)	0.90	0.82–0.98	1.01	0.91–1.13
2020	9,303	1,046 (11.2)	1.00			

[a]Multivariable model includes condomless anal sex, problem drinking, serious mental distress, bacterial STI testing in past 12 months and data collection year.

[b]American Indian, Alaska Native, Native Hawaiian, Pacific Islander, or multiple race/ethnicities.

[c] ≥4 alcoholic drinks on any day when alcohol is consumed.

[d] Tested for gonorrhea, chlamydia, or syphilis by a healthcare provider.

[e] Restricted to respondents who reported a bacterial sexually transmitted infection in the past 12 months.

[f] Among persons who self-reported ever taking an HIV test and ever receiving a positive test result or whose most recent result was a negative result.

[g] Restricted to persons who self-reported a negative HIV test.

[h] Based on the Kessler Psychological Distress Scale (K6).