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April 21, 2022

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Evaluating the Impact of COVID-19 on Substance Use Patterns Among US MSM

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Evaluating the Impact of COVID-19 on Substance Use Patterns Among US MSM

By

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B.S., The University of Texas at Austin, 2020

Thesis Committee Chair: Travis Sanchez, DVM, MPH

An abstract of

A thesis submitted to the Faculty of the  
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## Abstract

### Evaluating the Impact of COVID-19 on Substance Use Patterns Among US MSM

By Sahil Jiwani

**Introduction.** The COVID-19 pandemic has disproportionately impacted vulnerable populations, including men who have sex with men (MSM). Substance use, including the use of drugs and alcohol, is a prevalent public health issue among MSM in the United States (US). Large-scale disasters, such as global pandemics, are also known to significantly impact the lifestyles of individuals. We sought to understand the impact of COVID-19 on substance use patterns among US MSM.

**Methods.** We analyzed American Men's Internet Survey (AMIS) data on MSM across the US. Data from 2019 and 2020 were used to examine how substance use patterns changed due to the COVID-19 pandemic, with AMIS-2019 data standing for the pre-COVID period and AMIS-2020 representing the COVID period. The prevalence of COVID-19 related impacts on marijuana use, other non-injection drug use, alcohol consumption frequency, and binge drinking behavior was calculated overall and stratified by age groups of 15-24 years and 25+ years. We calculated prevalence ratios using individual multivariate logistic regression models for each substance use outcome measure. These models controlled for race/ethnicity, household income, education level, and insurance status.

**Results.** Non-injection drug use, excluding marijuana, increased from 20.8% (2082/10130) in 2019 to 22.5% (2917/12956) in 2020. This change was more evident in younger MSM aged 15-24 years (PR=1.12; CI=1.05-1.19) compared to MSM aged 25+ years (PR=1.03; CI=0.99-1.07). Marijuana use remained constant across the study period (31.2% in 2019 and 31.5% in 2020). The number of binge drinking episodes also increased by 5% during the COVID-19 study period. Consumption of alcohol more than once per week was 11-20% more likely during the COVID period as opposed to pre-COVID.

**Conclusion.** Increased access to mental health resources should be considered a top priority to help mitigate reliance on detrimental health behaviors such as substance use. Disparities, as a result of the transition to digital services, should be met with the implementation of in-person services. Employment opportunities should be introduced for those impacted by job loss. Harm reduction services must be amplified or remain consistent to meet the needs and safety of the public.

**Keywords.** MSM; COVID-19; Substance Use; Alcohol; Drugs; Binge Drinking

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## **Introduction**

The onset of COVID-19 in the United States (US) drastically changed the lifestyles of many individuals in March of 2020. Newly imposed social distance measures resulted in many people feeling lonely, distraught, and anxious - all feelings that serve as risk factors for engaging in unsafe practices such as substance abuse and risky sexual behavior [1]. In addition to social isolation, people across the US experienced unemployment, housing evictions, and food insecurity [2]. There is evidence that many people turned to substance use as a coping mechanism for these stressors [1-3].

Existing research suggests that this is not an unusual occurrence, as large-scale disasters, such as pandemics, often result in higher rates of substance use due to anxiety and post-traumatic stress disorder (PTSD) [4]. Efforts to delineate the widespread emotional distress caused by the ongoing pandemic were made with the development of the COVID-19 Stress Scale [5]. This tool measured factors including fear of exposure, socioeconomic burden, and xenophobia with the overall goal of constructing targeted interventions based on the needs of the population [5]. Individuals who had higher total scores on the COVID Stress Scales were more likely to have engaged in maladaptive coping strategies, such as the consumption of excess drugs or alcohol, with the intention of actively trying to find ways of making self-isolation more tolerable [5]. While COVID-19 has impacted the general population collectively, these unprecedented changes have shed light on health disparities and ongoing issues that exist among the most vulnerable populations.

Men who have sex with men (MSM) are one such vulnerable population that often experiences higher rates of substance use compared to the general population [6, 7]. This is often due to received social stigma and discrimination, resulting in increased rates of mental health problems as well [6, 7]. In a sample of 130,000 heterosexual, gay, and bisexual men, 32% of gay men and 28% of bisexual men received depression diagnoses, while only 13% of heterosexual men received a depression diagnosis [8]. The disproportionate impact of mental health problems among MSM often leads to increased

participation in risky health behaviors such as substance use [6-8]. Substance use is a public health issue of interest among MSM given its high prevalence and association with poor health behavioral choices [1, 6-9]. Data from the 2017-2019 National Survey on Drug Use and Health (NSDUH) suggests that men who identify as gay or bisexual have higher rates of substance use and substance use disorders (SUDs) than men who identify as heterosexual (i.e. nongay or nonbisexual) [1]. The prevalence of marijuana use was nearly two times higher among gay or bisexual men compared to heterosexual men (35.5% vs. 18.9%) according to survey data [1]. Likewise, heroin, methamphetamine, and cocaine use were each two to three times higher among gay or bisexual men [1]. In addition to drug use, alcohol use is also highly prevalent among MSM [1, 9, 10]. Eighty-five percent of MSM enrolled in a 2015 study reported active drinking, of which fifty-nine percent reported binge drinking, described as having five or more drinks in one sitting [11]. Although drug and alcohol use itself is a public health problem among MSM, recent studies have found its association with human immunodeficiency virus (HIV) transmission risk behaviors such as injection drug use, exchange of sex for money or drugs, and condomless anal intercourse (CAI) [1, 9-12]. Substance use was classified as a crisis among MSM well before the pandemic, yet existing studies have failed to investigate the impact of COVID-19 on substance use patterns, particularly in sexual minority populations. What is known, however, is that the COVID-19 pandemic has significantly impacted active substance users and those in recovery, given their reliance on social contacts for purchasing and taking substances and seeking support, respectively [13].

Stressors and other life factors that may influence substance use are also not uniform among MSM, particularly by age group. Previous research has shown that drug use and alcohol consumption tend to decrease over the lifespan [14]. The EXPLORE study found that 58.6% of young MSM (aged 16-25 years) reported marijuana use in the 6 months prior to study entry, compared to just 35.6% of older MSM (aged 46 and older) [14]. Additionally, 13.8% of young MSM reported heavy alcohol use compared to just 8.4% of older MSM [14]. The economic and financial burden experienced by different age groups due to factors such as job loss can also play a role as a predictor of substance use among MSM. At the



start of the pandemic, about half of the 19.3 million workers aged 16 to 24 in the US were employed in service-sector establishments [15]. These included restaurants, hotels, childcare services, and other social establishments, all of which were significantly impacted due to COVID-19 restrictions on social gatherings and face-to-face interactions, putting young workers at considerable risk of losing their jobs [15].

Over the past few decades, the Internet has grown at a tremendous rate, altering the way we live and work, particularly in the realm of research [16]. Web-based surveys have become immensely popular due to their ability to attain large sample sizes, reach geographically isolated individuals, and collect data quickly and inexpensively compared to traditional recruitment methods [16]. Many studies assessing HIV-related behaviors among MSM have utilized venue-based sampling, where participants are recruited at real-world locations such as bars and clubs [17]. However, newer studies, such as the American Men's Internet Survey (AMIS) conducted annually since 2013, have found that an increasing number of MSM are now using the Internet to meet sexual partners, potentially introducing different patterns of sexual risk and HIV testing behaviors [18, 19]. The COVID-19 response caused many real-world venues to close or severely limit attendance and internet-based research was one of the few ways to continue collecting important data from this population, including how COVID-19 was impacting them [20].

COVID-19 related impacts on substance use behavior have been studied across large, general populations. These studies, however, fail to focus on particularly vulnerable groups, such as MSM, among whom substance use was declared a pressing concern well before the COVID-19 pandemic. Therefore, the objectives of this study were to use 2 large nationwide survey samples of MSM, one collected just prior to COVID-19, and another collected during the first year of COVID-19 to explore changes in substance use. We specifically sought to understand whether non-injection drug use and problem drinking changed during COVID-19 overall and by age.

## **Methods**

### *Study Population and Procedures*

The AMIS survey is conducted in annual rounds and aims to receive 10,000 complete surveys each year from eligible MSM [19]. Each year, participants are recruited online and screened for eligibility after clicking on banner ads placed on various websites and social media applications. Previous year's participants who provided email addresses were also contacted to participate again, though they generally make up fewer than 10% of the total sample. Individuals were eligible for participation if they were at least 15 years old, male sex at birth, a resident of the US, had a history of oral or anal sex with a man, and were able to complete the survey in English. Those 15-17 years could also be eligible if they identified as gay or bisexual even if they haven't had sex with a man.

The study was conducted in compliance with federal regulations governing the protection of human subjects and was reviewed and approved by our institution's human subjects research review board. Informed consent was obtained from all individual participants in the survey. Data sets for analyses were stored on secure data servers with access only granted to study staff. The study data are also protected under a federal certificate of confidentiality that prevents legal action to force data release. The survey was not incentivized.

The survey collected information on sexual behavior, HIV and STI testing and diagnosis history, drug and alcohol use, and HIV prevention knowledge from eligible MSM. Two annual rounds are included in this study. AMIS-2019 was conducted September 2019-January 2020 just prior to the first case of COVID-19 being identified in the US [21]. AMIS-2020 was conducted October 2020-January 2021 well into the height of the first phase of the pandemic in the US and before most COVID-19 mitigation requirements were curtailed.

### *Measures*

The survey measured substance use behavior by asking participants to report non-injection drug use, alcohol consumption frequency, and average drinks consumed per sitting in the past 12 months. Non-injection drug use was measured as having used any non-injection drugs other than those that were prescribed in the past year. In the analysis, non-injection drug use was measured as two separate variables - marijuana use and other non-injection drug use. Marijuana use was analyzed separately given its high prevalence compared to other non-injection drugs used [19]. Other non-injection drug use included the use of powdered cocaine, poppers, X or ecstasy, crystal meth, hallucinogens, crack cocaine, heroin, painkillers, special K (ketamine), and other. Specific non-injection drugs used were also reported by participants who acknowledged using non-injection drugs in the past year. Alcohol consumption frequency was measured as drinking less than once a week or at least once per week in the past year. Binge drinking is commonly defined as consuming 5 or more drinks in one sitting for men [22]. To identify binge drinking, average drinks consumed per sitting was measured as having up to 4 drinks versus having 5 or more drinks on a typical day when drinking. Participants were also asked to report injection drug use - the use of needles to shoot up or inject any drugs not prescribed to participants. Injection drug use was measured as having ever used injected drugs during one's lifetime. Participants who reported having ever injected drugs also noted injection drug frequency in the past 12 months. The survey also collected standard demographic data including age, race/ethnicity, annual household income, education level, and health insurance status. In addition, participants were asked whether they experienced homelessness in the past 12 months. The two age groups that are compared in this study are younger MSM (YMSM; 15-24 years) and older MSM (OMSM; 25+ years). See supplemental file for AMIS survey questions.

### *Analytic Methods*

The analytic dataset includes data from all eligible participants who consented to participate. Duplicated responses were removed prior to analysis. This was done by comparing demographic data for near

complete (>70%) survey responses with nonunique internet protocol (IP) addresses. Responses that showed a 100% match for age, race, ethnicity, ever having sex with a women, and email address were deemed duplicate responses, and only the survey with the highest overall completion was retained for analysis. Next, the data set was limited to only those surveys deemed successful, that is, observations with no missing values for the first question of at least two consecutive sections. Finally, the data set was restricted to include participants who reported having oral or anal sex with a male partner in the past 12 months and who provided a valid US ZIP code. These steps are described further in detail in previous AMIS papers [19]. Observations with missing data on all three outcome measures were excluded from the analysis. Individual analyses for each outcome measure were conducted with only those observations with available data.

Differences in participant demographics from 2019 to 2020 were measured using overall chi-squared tests. AMIS-2019 data represented the pre-COVID time period while AMIS-2020 data was collected during the first phase of the COVID-19 pandemic in the US. COVID-19 related impacts were measured as a change in prevalence from 2019 to 2020. Statistical testing was not conducted for drug-type prevalence as it was measured only among individuals who reported non-injection drug use in the past 12 months. The prevalence of COVID-19 related impacts on marijuana use, other non-injection drug use, alcohol consumption frequency, and binge drinking behavior was calculated overall and stratified by age groups of 15-24 years and 25+ years. COVID-19 related impacts on outcome measures by participant age are reported as bivariate prevalence ratios (PR) and 95% confidence intervals (CI). We calculated prevalence ratios using individual multivariate logistic regression models for each substance use outcome measure. These models controlled for race/ethnicity, household income, education level, and insurance status. Analyses were conducted using SAS 9.4 (SAS Institute, Cary, NC).

## **Results**

The 2019 and 2020 AMIS surveys received 10,130 and 13,081 completed responses, respectively. One participant was excluded from the analysis for missing data on all three substance use outcome measures. Most of the participants were 15-24 years, white, non-Hispanic, attended college or another postgraduate school, and were enrolled in a private health insurance plan (Table 1). More than one-third of participants had an annual household income greater than \$75,000. A small percentage had experienced homelessness in the past 12 months. Age, race/ethnicity, annual household income, education level, and health insurance type significantly varied from 2019 to 2020.

**Table 1.** Socio-demographic characteristics of men who have sex with men in the United States, American Men’s Internet Survey, 2019-2020

	2019 Participants (N=10130) N (%)	2020 Participants (N=13080) N (%)	P-value <sup>a</sup>
<b>Age, years</b>			
15-24	4209 (41.6)	5425 (41.5)	<0.0001
25-29	1817 (17.9)	3202 (24.5)	
30-39	1482 (14.6)	1380 (10.5)	
40 +	2622 (25.9)	3073 (23.5)	
<b>Race/ethnicity</b>			
Black, non-Hispanic	1508 (14.9)	1598 (12.2)	<0.0001
Hispanic/Latino	1379 (13.6)	2300 (17.6)	
White, non-Hispanic	6149 (60.7)	7800 (59.6)	
Other	901 (8.9)	1136 (8.7)	
<b>Annual household income, \$</b>			
Less than 20 000	1433 (14.2)	1734 (13.3)	<0.0001
20 000 - 39 999	1935 (19.1)	2611 (20.0)	
40 000 - 74 999	2589 (25.6)	3091 (23.6)	
75 000 or more	3069 (30.3)	4383 (33.5)	
<b>Education level</b>			
Less than high school	77 (0.8)	35 (0.3)	<0.0001
Some high school	525 (5.2)	305 (2.3)	
High school diploma	1624 (16.0)	2356 (18.0)	
Some college/Associate’s	3495 (34.5)	4689 (35.9)	
<b>Degree/Technical Degree</b>			
College/Postgraduate/Professional	4357 (43.0)	5630 (43.0)	
<b>School</b>			
<b>Health insurance</b>			
Private health plan	4328 (42.7)	5163 (39.5)	<0.0001
Medicaid or Medicare	1051 (10.4)	1666 (12.7)	
Other	3629 (35.8)	4511 (34.5)	
No health insurance	853 (8.4)	1289 (9.9)	
<b>Homeless in past 12 months</b>			
No	9731 (96.1)	12481 (95.4)	0.0690
Yes	365 (3.6)	531 (4.1)	

<sup>a</sup> Overall chi-squared test

Categories may not equal 100% due to rounding.

There was no significant change in marijuana use from 2019 to 2020, overall and by age category (Table 2). There was, however, a significant increase in other non-injection drug use from 2019 to 2020 among all study participants. MSM of all ages experienced increased other non-injection drug use from 2019 to 2020, but this finding was only significant among MSM aged 15-24 years. Participants were also more likely to have consumed alcohol more than once per week in 2020 than in 2019. This finding was significant among all participants, regardless of age. Nearly half of participants in both study samples experienced binge drinking behavior on a typical day when drinking. The prevalence of binge drinking was significantly higher among AMIS-2020 participants than among AMIS-2019 participants of all ages, but in stratified analyses, was only significantly higher among those 25+ years.

Among those who used any type of non-injection drug, the use of the most common non-injection drugs, with the exception of marijuana, is slightly higher in 2020 compared to 2019 (Table 3). The three most commonly used non-injection drugs were marijuana, poppers, and powdered cocaine. This finding is consistent among MSM aged 15-24 years and 25+ years during both 2019 and 2020. Hallucinogens were the next most commonly used non-injection drug among participants aged 15-24 years, followed by X or Ecstasy. In contrast, X or Ecstasy use exceeded hallucinogen use among MSM aged 25+ years. Usage of the most commonly used non-injection drugs seems to increase from 2019 to 2020, except for marijuana use which remains constant. This appears to be true for MSM aged 15-24 years and 25+ years.

Ever injecting drugs was reported by 2.6% (267/10097) of AMIS-2019 and 3.2% (416/12993) of AMIS-2020 participants (PR=1.19; 95% CI=1.02-1.39). Among these participants, 19.6% (52/266) and 20.0% (83/416) in 2019 and 2020, respectively, injected at least once per week in the past 12 months.

**Table 2.** Substance use patterns in past 12 months among United States men who have sex with men before and during the COVID-19 pandemic, American Men’s Interest Survey, 2019-2020

	All Participants			15-24 years Participants			25+ years Participants		
	2019 N (%)	2020 N (%)	PR <sup>a</sup> (95% CI)	2019 N (%)	2020 N (%)	PR <sup>a</sup> (95% CI)	2019 N (%)	2020 N (%)	PR <sup>a</sup> (95% CI)
<b>Marijuana use</b>									
No	6885 (68.8)	8872 (68.5)	Ref.	2571 (62.0)	3292 (61.5)	Ref.	4314 (73.6)	5580 (73.4)	Ref.
Yes	3123 (31.2)	4084 (31.5)	1.00 (0.98-1.01)	1579 (38.0)	2058 (38.5)	1.00 (0.98-1.02)	1544 (26.4)	2026 (26.6)	1.00 (0.98-1.03)
<b>Other non-injection drug use</b>									
No	7926 (79.2)	10039 (77.5)	Ref.	3266(78.7)	4057 (75.8)	Ref.	4660 (79.6)	5982 (78.6)	Ref.
Yes	2082 (20.8)	2917 (22.5)	<b>1.07</b> <b>(1.03-1.11)</b>	884 (21.3)	1293 (24.2)	<b>1.12</b> <b>(1.05-1.19)</b>	1198 (20.4)	1624 (21.4)	1.03 (0.99-1.07)
<b>Alcohol consumption</b>									
<= Once a week	7207 (71.2)	8649 (66.2)	Ref.	3251 (77.3)	3802 (70.1)	Ref.	3956 (66.8)	4847 (63.4)	Ref.
> Once a week	2917 (28.8)	4420 (33.8)	<b>1.14</b> <b>(1.09-1.18)</b>	954 (22.7)	1623 (29.9)	<b>1.20</b> <b>(1.11-1.29)</b>	1963 (33.2)	2797 (36.6)	<b>1.11</b> <b>(1.06-1.16)</b>
<b>Binge drinking</b>									
No	5783 (57.3)	7111 (54.6)	Ref.	2162 (51.6)	2587 (47.8)	Ref.	3621 (61.4)	4524 (59.4)	Ref.
Yes	4303 (42.7)	5922 (45.4)	<b>1.05</b> <b>(1.02-1.09)</b>	2030 (48.4)	2828 (52.2)	1.02 (0.98-1.07)	2273 (38.6)	3094 (40.6)	<b>1.05</b> <b>(1.01-1.10)</b>

<sup>a</sup> Prevalence ratios (PR) with 95% confidence intervals (CI) from binomial regression models testing associations between year and outcome, overall and by age category. Bold indicates significant at P < 0.05. Results are controlled for race/ethnicity, household income, education level, and insurance status.



**Table 3.** Non-injection drug usage in past 12 months among United States men who have sex with men before and during the COVID-19 pandemic, American Men’s Interest Survey, 2019-2020

Drug	All Participants		15-24 years Participants		25+ years Participants	
	2019 (N=3432)	2020 (N=4495)	2019 (N=1666)	2020 (N=2174)	2019 (N=1766)	2020 (N=2321)
Marijuana	3123 (91.0)	4084 (90.9)	1579 (94.8)	2058 (94.7)	1544 (87.4)	2026 (87.3)
Poppers	1166 (34.0)	1651 (36.7)	399 (24.0)	618 (28.4)	767 (43.4)	1033 (44.5)
Powdered cocaine	782 (22.8)	1214 (27.0)	336 (20.2)	528 (24.3)	446 (25.3)	686 (29.6)
Hallucinogens	592 (17.3)	1038 (23.1)	373 (22.4)	610 (28.1)	219 (12.4)	428 (18.4)
X or Ecstasy	506 (14.7)	712 (15.8)	215 (12.9)	324 (14.9)	291 (16.5)	388 (16.7)
Painkillers	414 (12.1)	497 (11.1)	186 (11.2)	215 (9.9)	228 (12.9)	282 (12.2)
Downers	356 (10.4)	502 (11.2)	177 (10.6)	238 (11.0)	179 (10.1)	264 (11.4)
Crystal meth	270 (7.9)	375 (8.3)	56 (3.4)	78 (3.6)	214 (12.1)	297 (12.8)
Other	190 (5.5)	223 (5.0)	115 (6.9)	112 (5.2)	75 (4.3)	111 (4.8)
Special K (Ketamine)	119 (3.5)	210 (4.7)	55 (3.3)	89 (4.1)	64 (3.6)	121 (5.2)
Crack cocaine	66 (1.9)	89 (2.0)	16 (1.0)	20 (0.9)	50 (2.8)	69 (3.0)
Heroin	33 (1.0)	53 (1.2)	12 (0.7)	18 (0.8)	21 (1.2)	35 (1.5)

## **Discussion**

The proportion of AMIS participants reporting non-injection drug use, more frequent consumption of alcohol, and binge drinking episodes increased during the COVID-19 study period. These results favor the negative impact of COVID-19, a period of quarantine and isolation, on the social and mental health of US MSM [23]. The specific impacts of COVID-19 on non-injection drug use and problem drinking habits were noticeably different between MSM aged 15-24 years and MSM aged 25+ years.

COVID-19 related impacts were felt disproportionately by MSM aged 15-24 years as indicated by the larger changes in non-injection drug use and alcohol consumption frequency during the study period.

Other studies have also found that the ongoing stress of the COVID-19 pandemic, coupled with changes in employment and educational format, has resulted in increased substance use as a coping mechanism among young adults [24, 25]. This may be due to their financial reliance on service-related jobs which were temporarily suspended during the initial stage of the COVID-19 pandemic [15]. Post-secondary students who were receiving support or treatment services on university campuses prior to their closures were also significantly impacted by public health measures, such as social distancing, which created significant barriers for students with pre-existing mental health and substance use disorders to access support [26]. These barriers led to the implementation of digital health interventions, yet the practicality and accessibility of these services, primarily to vulnerable populations, created additional challenges due to inequities with access to the Internet and mobile devices, as well as disparities in digital literacy [23, 27].

While overall non-injection drug use did increase among all participants during the study period, there are a number of reasons as there may have been a limited increase in usage. Recreational drug use during the early stages of the COVID-19 pandemic is likely to have been influenced by supply chain shortages, impacting both its availability and accessibility [28, 29]. Restrictions placed around social gatherings, parties, and bars or clubs may also suggest decreased access to drugs such as cocaine and ecstasy [30].

Overall, a greater number of participants consumed alcohol more than once per week during 2020 than in 2019. Binge drinking episodes also increased during 2020 but at a much smaller magnitude and mainly among MSM aged 25+ years. The classification of liquor stores as essential businesses may have resulted in greater accessibility to alcohol during the first wave of the COVID-19 pandemic, likely resulting in increased alcohol consumption frequency, as well as an increase in binge drinking episodes among US MSM [31]. Frequent binge drinking between 18 and 25 years is found to be a risk factor for alcohol dependence in adulthood, which can often lead to increased risk of chronic conditions such as liver damage, heart disease, and cancer [32]. Among MSM, heavy drinking patterns are often associated with having a greater number of male sexual partners and engagement in risky sexual behavior, resulting in a greater likelihood for HIV acquisition [1, 7, 9-11, 14, 33].

There are some limitations to this study that should be considered. AMIS data is collected using convenience sampling which may result in non-generalizable results to MSM across the US and online. We utilized 2019 data as a period representing the pre-COVID era and 2020 data as a period representing the COVID era. AMIS-2020 data could cover some of the end of 2019 given that the survey asked to reflect about substance use over the previous 12-month period. The majority of the lookback period is during the COVID-19 era. In addition, survey data is collected through self-reporting. Biases introduced include recall (or response) bias, when participants are unable to remember specific substance use events in the past 12 months, and social desirability bias, when participants under- or over-report past events based on how mannerisms are viewed as favorable by others. It is likely that participants may have underreported drug and alcohol use in this study due to social desirability bias.

The initial wave of COVID-19 significantly altered the lives of many people, especially for those who relied on social encounters regularly [13]. Additional waves of the pandemic were identified in 2020 and 2021 with a rapid surge of cases, followed by a decline [34]. Increased access to mental health resources should be considered a top priority to help mitigate reliance on detrimental health behaviors such as substance use. The transition to digital services has introduced additional disparities with access to care,

especially among populations that lack access to the Internet and mobile devices. To meet the needs of these individuals, in-person services, with proper public health measures in place, should be considered. The challenges faced by individuals who lost their jobs at the onset of the pandemic should be met with the introduction of new employment opportunities. Reduction of social gatherings due to the pandemic has resulted in many individuals using drugs and other substances alone, as opposed to in a group setting. It is imperative that harm reduction services be amplified or remain consistent to meet the needs and safety of the public.

This study utilizes substance use as a measure of the direct impact of the COVID-19 pandemic among US MSM. As the COVID-19 pandemic continues to change, it is likely that substance use patterns among US MSM are also changing, given the vast modifications to social gathering regulations across the US. Future studies will be needed to assess the longer-term implications of COVID-19 on substance use behavior among US MSM.

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