

# Depression, Anxiety, and Alcohol Use Among LGBTQ+ People During the COVID-19 Pandemic

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🔗 See also Bowleg and Landers, p. 1604.

**Objectives.** To describe disparities in depression, anxiety, and problem drinking by sexual orientation, sexual behavior, and gender identity during the COVID-19 pandemic.

**Methods.** Data were collected May 21 to July 15, 2020, from 3245 adults living in 5 major US metropolitan areas (Atlanta, Georgia; Chicago, Illinois; New Orleans, Louisiana; New York, New York; and Los Angeles, California). Participants were characterized as cisgender straight or LGBTQ+ (i.e., lesbian, gay, bisexual, and transgender people, and men who have sex with men, and women who have sex with women not identifying as lesbian, gay, bisexual, or transgender).

**Results.** Cisgender straight participants had the lowest levels of depression, anxiety, and problem drinking compared with all other sexual orientation, sexual behavior, and gender identity groups, and, in general, LGBTQ+ participants were more likely to report that these health problems were “more than usual” during the COVID-19 pandemic.

**Conclusions.** LGBTQ+ communities experienced worse mental health and problem drinking than their cisgender straight counterparts during the COVID-19 pandemic. Future research should assess the impact of the pandemic on health inequities. Policymakers should consider resources to support LGBTQ+ mental health and substance use prevention in COVID-19 recovery efforts. (*Am J Public Health.* 2021;111(9): 1610–1619. <https://doi.org/10.2105/AJPH.2021.306394>)

Public health strategies to combat COVID-19 transmission have focused on reducing exposure by encouraging mask wearing or through policies promoting physical distancing. Such efforts may have unique health ramifications for lesbian, gay, bisexual, transgender, queer, and other people of diverse sexual identities and sexual behaviors (herein referred to as LGBTQ+). For example, stay-at-home orders that aim to address COVID-19 transmission may not adequately consider whether they are feasible or possibly even unhealthy or unsafe for some segments of LGBTQ+ communities.

LGBTQ+ people make up between 20% and 40% of the homeless population,<sup>1</sup> and many LGBTQ+ college students were forced to return to unsupportive family situations.<sup>2,3</sup> The COVID-19 mitigation strategies may also have more severe unintended consequences experienced by LGBTQ+ people, such as heightened loneliness and social isolation.<sup>4</sup>

LGBTQ+ populations experience disproportionately high poor mental health outcomes. Previous research has found that general life stressors (e.g., work, finances) as well as qualitatively unique LGBTQ+ specific stressors, such as

discrimination, result in mental health tolls.<sup>5–8</sup> A recent study found that the impact of these stressors may accumulate, resulting in a greater risk of negative affect (i.e., propensity for negative emotions) and poor self-identity among LGBTQ+ people. Moreover, greater experiences of identity-related stressors exacerbated the impact of general stress on negative affect.<sup>8</sup> Alcohol use and misuse are also more prevalent among LGBTQ+ populations.<sup>9</sup> These substance use disparities may be driven by challenging psychosocial experiences, which have been shown to increase the risk of engaging in maladaptive

coping behaviors, particularly when such stressors are appraised as being severe and outside of one's control.<sup>10</sup> There is strong evidence that structural and social inequities contribute to mental health and substance use disparities experienced by LGBTQ+ people.<sup>5,11,12</sup> However, there are no empirical studies to our knowledge that have explicitly examined potentially widening disparities among sexual orientation, sexual behavior, and gender identity groups during the COVID-19 pandemic. The LGBTQ+ population is a diverse group of people whose races, nationalities, genders, sexualities, ages, abilities, and other social identities shape the social inequalities that they experience.<sup>13</sup> The unique lived experiences and vulnerabilities that LGBTQ+ people contend with may put them at higher risk for depression, anxiety, and high alcohol use during the COVID-19 pandemic.

The current literature on the COVID-19 pandemic has not yet characterized differences in health by sexual orientation, sexual behavior, and gender identity.<sup>14</sup> It is imperative to monitor the mental health and substance use of LGBTQ+ communities during the pandemic to establish points of intervention and prevent potential widening health inequities, including in depression, anxiety, and problem alcohol use experienced by LGBTQ+ persons versus their cisgender straight counterparts.<sup>3</sup> This study aimed to examine mental health and alcohol use patterns among LGBTQ+ and cisgender straight adults during the COVID-19 pandemic.

## METHODS

We used data from the Uncovering COVID-19 Experiences and Realities (UnCOVER) Study, which consisted of a large sample of adults from 5 major

metropolitan statistical areas in the United States: Atlanta, Georgia; Chicago, Illinois; New Orleans, Louisiana; New York, New York; and Los Angeles, California (n = 3245). Data were collected from May 21, 2020, to July 15, 2020. Participants were recruited through distribution lists from panel providers via Qualtrics Research Services. Panel providers identified and randomly selected participants who matched the specified target criteria. Inclusion criteria for this study included current residence in 1 of the designated market areas of the 5 metropolitan areas of interest, age 18 years or older, ability to read and understand English, and self-identification as Asian, Black, Hispanic/Latinx, or White. Participants who consented to participation completed the study questionnaire online through the Qualtrics survey platform. Quota sampling by race/ethnicity and geographic area was employed to ensure more equal representation across these demographics. Identical recruitment caps were set for each metropolitan area and racial/ethnic group within the metropolitan area. Because of recruitment difficulties, caps were increased to reach the target sample size (n = 3200).

## Measures

The main variable of interest was self-reported sexual orientation identity, sexual behavior, and gender identity. To ascertain sexual identity, respondents were asked, "Which of the following best describes your sexual orientation?" The responses were heterosexual or straight, gay or lesbian, or bisexual. To obtain sexual behavior respondents were asked, "In your lifetime, who have you had sex with?" Responses were men only, women only, both men and women, and I have not had sex. Gender

identity was derived from 2 questions. First, respondents were asked, "What is your gender?" Responses were man/male or woman/female. The respondents were asked, "What sex were you assigned at birth?" We combined each of these into a single explanatory variable to categorize respondents by both gender identity and sexual orientation. First, those who identified as women and were assigned male at birth and those who identified as men and were assigned female at birth were considered transgender. Otherwise, if gender and sex were congruent, participants were categorized as cisgender. We then defined sexual orientation with the gender identity as follows: (1) participants who identified as gay or lesbian were categorized as cisgender gay or lesbian, (2) participants who identified as bisexual as cisgender bisexual, (3) participants who ever engaged in any same-sex sexual behaviors but were not lesbian, gay, bisexual, or transgender were considered to be cisgender, non-LGBT-identified men who have sex with men and women who have sex with women (cisgender MSM/WSW) and (4) cisgender straight people identified as straight, were not transgender, and reported no same-sex sexual behavior. Because of the low sample size of transgender participants (n = 19), we were unable to create subgroups of sexual orientation for transgender participants.

## Outcomes Variables

We used Patient-Reported Outcomes Measurement Information System (PROMIS) measures to assess depression, anxiety, and problem drinking during the COVID-19 pandemic. These instruments were developed and validated by the National Institutes of

Health. PROMIS scales are scored by summing responses across items to obtain a raw composite score. Raw scores are then converted to a US standardized T-score to assist with the interpretation of findings. The US mean is 50 with a standard deviation of 10.<sup>15</sup>

The short version of the PROMIS depression and anxiety measures each consisted of 4 items. The stem of each measure was modified to ask participants how often they had experienced each item specifically “during the COVID-19 or coronavirus pandemic.” The PROMIS depression scale assessed the extent to which participants felt hopeless, worthless, helpless, and depressed. The PROMIS anxiety scale assessed how often participants felt fearful, found it hard to focus on anything other than their anxiety, felt their worries overwhelmed them, and felt uneasy. Participants scored each of the items using a 5-point Likert-type scale with response choices of never, rarely, sometimes, often, and always. Greater scores indicate elevated depression and anxiety symptoms with a maximum score of 20.

We used the PROMIS Alcohol Use Negative Consequences 7-item short-form scale to assess problem drinking.<sup>16</sup> A screening item assessed whether the participant drank any type of alcoholic beverage during the COVID-19 pandemic. Participants who reported that they did not drink were considered not to experience any problem drinking during the COVID-19 pandemic. Participants were asked to report the extent that they felt the following “during the COVID-19 or coronavirus pandemic”: they spent too much time drinking, drank heavily at a single sitting, drank too much, drank more than planned, had trouble controlling drinking, had difficulty stopping drinking after 1 or 2 drinks, and had difficulty getting the

thought of drinking off their mind. Items were scored on a 5-point Likert-type scale with responses of never, rarely, sometimes, often, and always. Higher scores indicate elevated alcohol use problems.

## Changes in Mental Health and Alcohol Use

To examine whether levels of depression, anxiety, and problem drinking reported by participants were different from those before the COVID-19 pandemic, we included 3 single-item questions. To assess changes in depression or anxiety, participants were asked if “during the COVID-19 or coronavirus pandemic” they experienced “more, less, or about the same level” of (1) feeling anxious or worried and (2) feeling depressed. To create a binary outcome variable, we dichotomized the responses (i.e., [1] more or [2] less or about the same level). Participants who reported any alcohol consumption during the COVID-19 pandemic were asked if “compared to before the COVID-19 or coronavirus pandemic,” their alcohol use “decreased,” “stayed the same,” or “increased.” Participants were classified as greater drinking during the COVID-19 pandemic versus the same, less, or no drinking. We created a binary outcome variable for this measure by dichotomizing the responses (i.e., [1] increased or [2] decreased or stayed the same).

## Covariates

Covariates included the following: age group (18–26, 27–49, 50–64, and  $\geq 65$  years), sex assigned at birth (male and female), race/ethnicity (African American/Black, Asian, Hispanic/Latinx, and White), educational attainment (less than high school, high-school degree,

some college or an associate’s or technical degree, and bachelor’s degree or higher), household income in relation to the federal poverty level (FPL; according to the US Department of Health and Human Services: <https://aspe.hhs.gov/prior-hhs-poverty-guidelines-and-federal-register-references>) based on household size and number of children younger than 18 years (< 100% of the FPL, 100%–138% of the FPL, 139%–400% of the FPL, and > 400% of the FPL); relationship status (married or partnered; in a romantic relationship; widowed; and single, divorced, or separated); health insurance (uninsured, private, public, and other); and city of residence (Atlanta, Chicago, Los Angeles, New Orleans, and New York City).

## Statistical Analysis

We describe differences in demographic and socioeconomic characteristics of the sample by sexual identity, sexual behavior, and gender identity. We specified multivariable linear regression models examining each outcome variable (anxiety, depression, and problem drinking). We conducted all analyses using Stata/MP version 16.1 (StataCorp LP, College Station, TX). We reported *P* values and 95% confidence intervals and considered findings statistically significant at a *P* value of .05 or less. We used an a priori Bonferroni correction to adjust for multiple comparisons significance level of 0.0125. To ensure that there were not issues of collinearity in the multivariate regression models, we used the variance inflation factor (vif) and tolerance (1/vf) to test for multicollinearity in each of the models. The average vif was 1.82 and all 1/vf were greater than 0.10. There were no issues with multicollinearity in any of the models.

## RESULTS

The distribution of participant characteristics by sexual orientation, sexual behavior, and gender identity is presented in Table 1. LGBTQ+ respondents were more likely to report “more than usual” depression, anxiety, and drinking during the pandemic compared with cisgender straight respondents (Table 2). LGBTQ+ respondents had higher depression scores during the pandemic compared with cisgender straight respondents: 42.5% of lesbian or gay, 53.5% of bisexual, 46.7% of MSM/WSW, and 47.4% of transgender respondents reported feeling depression “more than usual,” as compared with 36.3% of cisgender straight respondents ( $\chi^2 = 32.3$ ;  $P < .001$ ).

LGBTQ+ respondents had higher anxiety scores during the pandemic compared with cisgender straight respondents. We found that 63.3% of lesbian or gay, 69.7% of bisexual, 63.1% of MSM/WSW, and 57.9% of transgender respondents reported feeling depressed “more than usual” compared with 57.8% of cisgender straight respondents ( $\chi^2 = 14.4$ ;  $P < .01$ ). LGBTQ+ respondents had higher problem drinking scores during the pandemic compared with cisgender straight respondents. Compared with 13% of cisgender straight respondents, 8.3% of lesbian or gay, 17.1% of bisexual, 22.1% of MSM/WSW, and 10.5% of transgender respondents reported that their “alcohol use increased” ( $\chi^2 = 12.9$ ;  $P < .01$ ). Overall, multivariable linear regression analyses revealed that LGBTQ+ respondents had higher levels of depression, anxiety, and problem drinking during the pandemic (Tables 3 and 4). In models controlling for socio-demographic (e.g., age, sex, race,

income, education, insurance, and relationship status) covariates, some statistically significant associations emerged: cisgender lesbian and gay participants had higher levels of depression ( $b = 2.10$ ; 95% confidence interval [CI] = 0.36, 3.84) and anxiety ( $b = 1.52$ ; 95% CI = -0.29, 3.32), and problem alcohol use ( $b = 2.20$ ; 95% CI = 0.82, 3.58) compared with cisgender straight adults (Table 4). Cisgender bisexual participants reported higher rates of depression ( $b = 4.09$ ; 95% CI = 2.76, 5.43), anxiety ( $b = 3.52$ ; 95% CI = 2.13, 4.90), and problem alcohol use ( $b = 1.37$ ; 95% CI = 0.32, 2.43) compared with cisgender straight participants. Cisgender MSM/WSW also had higher levels of depression ( $b = 3.31$ ; 95% CI = 1.58, 5.04), anxiety ( $b = 3.05$ ; 95% CI = 1.25, 4.84), and problem drinking ( $b = 3.80$ ; 95% CI = 2.42, 5.17) compared with cisgender straight participants. Transgender respondents also had higher levels of depression, anxiety, and problem drinking than cisgender straight participants, but associations were not statistically significant.

## DISCUSSION

Our findings suggest that certain LGBTQ+ subgroup populations had higher levels of anxiety, depression, and problem drinking during the COVID-19 pandemic compared with their cisgender straight counterparts. Inequities in these outcomes may have been exacerbated during the COVID-19 pandemic. In general, we found that cisgender bisexual participants reported the highest levels of depression and anxiety and were more likely to report that their depression and anxiety were greater during the pandemic compared with other sexual orientation, sexual

behavior, and gender identity groups. Social support and relationships are important dimensions that can support the mental health of LGBTQ+ people. Stress and coping frameworks posit that social resources positively influence mental health and can serve as buffers under conditions of stress.<sup>17</sup> Social support can include emotional support (e.g., expressions of love), informational support (e.g., providing beneficial information), and instrumental support (i.e., providing a helping hand).<sup>18</sup> Previous research suggests that biphobia, including bisexual invisibility within the LGBTQ+ contexts, may lead to the social exclusion of bisexual people<sup>19</sup> and may result in psychological tolls, such as poorer self-concept (lower positive attributes associated with one’s sexual identity), lack of integration between sexual identity and other social identities, and more incongruent self-identities.<sup>20</sup> The psychosocial resources and buffers may have been further diminished, particularly for bisexual people, during the COVID-19 pandemic, magnifying depression and anxiety during this period.

More broadly, LGBTQ+ people have historically faced barriers to accessing health care services and more limited provider understanding of their health needs. In tandem with experiences of exclusion within LGBTQ+ contexts, these experiences contribute to poor mental health and substance use outcomes in this population.<sup>21</sup> A recent report that documents the experiences of LGBTQ+ people during the COVID-19 pandemic demonstrates that they are experiencing higher rates of job loss, lost wages, food insecurity, and difficulty accessing health care.<sup>22</sup> These experiences of reduced resources and economic instability can be contributing to

**TABLE 1— Demographic, Socioeconomic, and Mental Health Characteristics of Study Participants From the UnCOVER Study in 5 US Metropolitan Areas During the COVID-19 Pandemic by Sexual Orientation, Sexual Behavior, and Gender Identity: May 21, 2020–June 15, 2020**

	<b>Cisgender Straight (n = 2753), No. (%)</b>	<b>Cisgender Gay or Lesbian (n = 120), No. (%)</b>	<b>Cisgender Bisexual (n = 228), No. (%)</b>	<b>Cisgender MSM/WSW (n = 122), No. (%)</b>	<b>Transgender Person (n = 19), No. (%)</b>	<b>Total (n = 3242), No. (%)</b>
<b>Age, y</b>						
18–26	571 (20.7)	33 (27.5)	135 (59.2)	22 (18.0)	5 (26.3)	766 (23.6)
27–49	854 (31.0)	38 (31.7)	65 (28.5)	55 (45.1)	9 (47.4)	1021 (31.5)
50–64	607 (22.0)	22 (18.3)	16 (7.0)	27 (22.1)	2 (10.5)	674 (20.8)
≥ 65	721 (26.2)	27 (22.5)	12 (5.3)	18 (14.8)	3 (15.8)	781 (24.1)
<b>Sex at birth</b>						
Male	954 (34.7)	63 (52.5)	37 (16.2)	41 (33.6)	5 (26.3)	1100 (33.9)
Female	1799 (65.3)	57 (47.5)	191 (83.8)	81 (66.4)	14 (73.7)	2142 (66.1)
<b>Race/ethnicity</b>						
Black	697 (25.3)	32 (26.7)	71 (31.1)	42 (34.4)	4 (21.1)	846 (26.1)
Asian	531 (19.3)	16 (13.3)	41 (18.0)	13 (10.7)	6 (31.6)	607 (18.7)
Hispanic/Latinx	391 (14.2)	23 (19.2)	57 (25.0)	17 (13.9)	3 (15.8)	491 (15.1)
White	1134 (41.2)	49 (40.8)	59 (25.9)	50 (41.0)	6 (31.6)	1298 (40.0)
<b>Education</b>						
< high school	555 (20.2)	21 (17.5)	70 (30.7)	18 (14.8)	5 (26.3)	669 (20.6)
High-school degree	853 (31.0)	39 (32.5)	90 (39.5)	49 (40.2)	7 (36.8)	1038 (32.0)
Some college or associate's or technical degree	839 (30.5)	33 (27.5)	43 (18.9)	26 (21.3)	5 (26.3)	946 (29.2)
≥ bachelor's degree	506 (18.4)	27 (22.5)	25 (11.0)	29 (23.8)	2 (10.5)	589 (18.2)
<b>Household income, % FPL<sup>a</sup></b>						
0–99	343 (12.5)	25 (20.8)	80 (35.2)	16 (13.2)	5 (27.8)	469 (14.5)
100–138	183 (6.7)	9 (7.5)	27 (11.9)	12 (9.9)	1 (5.6)	232 (7.2)
139–400	1120 (40.8)	44 (36.7)	74 (32.6)	50 (41.3)	8 (44.4)	1296 (40.1)
> 400	1101 (40.1)	42 (35.0)	46 (20.3)	43 (35.5)	4 (22.2)	1236 (38.2)
<b>Relationship status</b>						
Married, marriage-like, or partnered	1195 (43.4)	37 (30.8)	36 (15.8)	54 (44.3)	8 (42.1)	1330 (41.0)
Romantic relationship	243 (8.8)	16 (13.3)	43 (18.9)	20 (16.4)	2 (10.5)	324 (10.0)
Widowed	914 (33.2)	60 (50.0)	126 (55.3)	36 (29.5)	5 (26.3)	1141 (35.2)
Single, divorced, or separated	401 (14.6)	7 (5.8)	23 (10.1)	12 (9.8)	4 (21.1)	447 (13.8)
<b>Health insurance type</b>						
Uninsured	296 (10.8)	14 (11.7)	35 (15.4)	13 (10.7)	3 (15.8)	361 (11.1)
Private	1207 (43.8)	52 (43.3)	71 (31.1)	45 (36.9)	9 (47.4)	1384 (42.7)
Public	1197 (43.5)	51 (42.5)	112 (49.1)	57 (46.7)	7 (36.8)	1424 (43.9)
Other	53 (1.9)	3 (2.5)	10 (4.4)	7 (5.7)	0 (0)	73 (2.3)

*Continued*

**TABLE 1— Continued**

	<b>Cisgender Straight (n = 2753), No. (%)</b>	<b>Cisgender Gay or Lesbian (n = 120), No. (%)</b>	<b>Cisgender Bisexual (n = 228), No. (%)</b>	<b>Cisgender MSM/WSW (n = 122), No. (%)</b>	<b>Transgender Person (n = 19), No. (%)</b>	<b>Total (n = 3242), No. (%)</b>
City						
Atlanta, GA	625 (22.7)	27 (22.5)	46 (20.2)	20 (16.4)	2 (10.5)	720 (22.2)
Chicago, IL	586 (21.3)	19 (15.8)	47 (20.6)	27 (22.1)	4 (21.1)	683 (21.1)
Los Angeles, CA	673 (24.4)	29 (24.2)	53 (23.2)	26 (21.3)	7 (36.8)	788 (24.3)
New Orleans, LA	224 (8.1)	7 (5.8)	20 (8.8)	12 (9.8)	2 (10.5)	265 (8.2)
New York, NY	645 (23.4)	38 (31.7)	62 (27.2)	37 (30.3)	4 (21.1)	786 (24.2)

Note. FPL = federal poverty level; MSM = men who have sex with men; UnCOVER = Uncovering COVID-19 Experiences and Realities; WSW = women who have sex with women.

Source. UnCOVER data 2020.

<sup>a</sup>FPL according to the US Department of Health and Human Services (<https://aspe.hhs.gov/prior-hhs-poverty-guidelines-and-federal-register-references>).

**TABLE 2— Estimated Prevalence of Self-Reported Increases in Depression, Anxiety, and Alcohol Use and Mean PROMIS Score for Mental Health and Problem Drinking for Participants in the UnCOVER Study During the COVID-19 Pandemic Stratified by Sexual Identity, Sexual Behavior, and Gender Identity: 5 US Metropolitan Areas, May 21, 2020–July 15, 2020**

	<b>Cisgender Straight (n = 2753), % or Mean (SD)</b>	<b>Cisgender Gay or Lesbian (n = 120), % or Mean (SD)</b>	<b>Cisgender Bisexual (n = 228), % or Mean (SD)</b>	<b>Cisgender MSM/WSW (n = 122), % or Mean (SD)</b>	<b>Transgender Person (n = 19), % or Mean (SD)</b>	<b>Total (N = 3245), % or Mean (SD)</b>
Depression***						
Less or same	63.7	57.5	46.5	53.3	52.6	61.8
More	36.3	42.5	53.5	46.7	47.4	38.2
Anxiety**						
Less or same	42.2	36.7	30.3	36.9	42.1	41.0
More	57.8	63.3	69.7	63.1	57.9	59.0
Alcohol**						
Less or same	87.0	81.7	82.9	77.9	89.5	86.2
More	13.0	18.3	17.1	22.1	10.5	13.8
Depression	53.5 (10.29)	56.36 (11.23)	61.67 (10.12)	57.91 (9.98)	55.93 (11.30)	54.36 (10.54)
Anxiety	56.74 (10.71)	58.74 (11.75)	64.37 (10.11)	60.95 (10.11)	59.96 (11.82)	54.36 (10.55)
Alcohol	42.87 (7.48)	45.52 (9.20)	44.31 (8.54)	47.64 (10.58)	42.97 (8.77)	43.25 (7.84)

Note. MSM = men who have sex with men; PROMIS = Patient-Reported Outcomes Measurement Information System; UnCOVER = Uncovering COVID-19 Experiences and Realities; WSW = women who have sex with women. The 5 metropolitan areas were Atlanta, GA; Chicago, IL; Los Angeles, CA; New Orleans, LA; and New York, NY.

Source. UnCOVER data set 2020.

\**P* < .05; \*\**P* < .01; \*\*\**P* < .001.

disparities in mental health outcomes and increased alcohol use found in the study. To address health disparities between LGBTQ+ and cisgender and straight populations, as well as within

LGBTQ+ communities, health care providers and pandemic response teams must ensure that there are not only sufficient resources but also tailored public health strategies. There is a

dearth of identity-affirmative and culturally competent mental health care for LGBTQ+ people, with only 13% of mental health facilities offering LGBTQ+ services according to the 2016 National

**TABLE 3— Unadjusted Linear Regressions Predicting PROMIS Scores for Depression, Anxiety, and Problem Alcohol Use in UnCOVER Study Participants: 5 US Metropolitan Areas, 2020**

	Depression, b (95% CI)	Anxiety, b (95% CI)	Alcohol Use, b (95% CI)
Intercept	53.50 (53.10, 53.90)	56.74 (56.30, 57.10)	42.87 (42.60, 43.20)
Sexual orientation, sexual behavior, and gender identity			
Cisgender straight (Ref)	1	1	1
Cisgender gay or lesbian	2.86 (0.97, 4.74)	2.00 (0.042, 3.95)	2.64 (1.22, 4.07)
Cisgender bisexual	8.17 (6.78, 9.56)	7.63 (6.19, 9.08)	1.44 (0.39, 2.49)
Cisgender MSM/WSW	4.41 (2.54, 6.28)	4.21 (2.27, 6.15)	4.77 (3.36, 6.18)
Transgender person	2.43 (-2.23, 7.08)	3.23 (-1.60, 8.05)	0.10 (-3.41, 3.61)

Note CI = confidence interval; MSM = men who have sex with men; PROMIS = Patient-Reported Outcomes Measurement Information System; UnCOVER = Uncovering COVID-19 Experiences and Realities; WSW = women who have sex with women. Sample size was n = 3242. The 5 metropolitan areas were Atlanta, GA; Chicago, IL; Los Angeles, CA; New Orleans, LA; and New York, NY.

Source. UnCOVER data set 2020.

**TABLE 4— Adjusted Linear Regressions Predicting PROMIS Scores for Depression, Anxiety, and Problem Alcohol Use in the Participants: UnCOVER Study, 5 US Metropolitan Areas, 2020**

	b (95% CI)	b (95% CI)	b (95% CI)
Intercept	55.46 (53.6, 57.3)	56.84 (55.0, 58.70)	42.58 (41.1, 44.00)
Sexual orientation, sexual behavior, and gender identity			
Cisgender straight (Ref)	1	1	1
Cisgender gay or lesbian	2.10 (0.36, 3.84)	1.52 (-0.29, 3.32)	2.20 (0.82, 3.58)
Cisgender bisexual	4.09 (2.76, 5.43)	3.52 (2.13, 4.90)	1.37 (0.32, 2.43)
Cisgender MSM/WSW	3.31 (1.58, 5.04)	3.05 (1.25, 4.84)	3.80 (2.42, 5.17)
Transgender person	0.74 (-3.63, 5.12)	1.25 (-3.29, 5.79)	0.19 (-3.28, 3.67)
Age, y			
18-26 (Ref)	1	1	1
27-49	-2.59 (-3.58, -1.60)	-2.53 (-3.55, -1.50)	1.50 (0.71, 2.29)
50-64	-6.60 (-7.78, -5.41)	-6.29 (-7.52, -5.07)	-0.94 (-1.88, 0.001)
≥ 65	-10.05 (-11.40, -8.65)	-10.32 (-11.8, -8.88)	-4.04 (-5.15, -2.93)
Sex at birth			
Male (Ref)	1	1	1
Female	1.73 (1.02, 2.44)	3.06 (2.32, 3.80)	-1.55 (-2.11, -0.98)
Race/ethnicity			
Black (Ref)	1	1	1
Asian	0.89 (-0.15, 1.93)	1.13 (0.05, 2.20)	-2.19 (-3.01, -1.36)
Hispanic/Latinx	1.31 (0.21, 2.41)	1.56 (0.42, 2.70)	-0.10 (-0.97, 0.77)
White	2.89 (1.99, 3.79)	2.89 (1.96, 3.82)	0.70 (-0.01, 1.42)
Education			
< high school (Ref)	1	1	1
High-school degree	1.57 (0.63, 2.50)	1.54 (0.57, 2.51)	1.05 (0.31, 1.80)
Some college or associate's or technical degree	1.01 (-0.007, 2.03)	1.44 (0.38, 2.49)	1.07 (0.26, 1.88)
≥ Bachelor's degree	1.79 (0.63, 2.95)	1.86 (0.66, 3.07)	1.23 (0.31, 2.15)

Continued

**TABLE 4— Continued**

	<b>b (95% CI)</b>	<b>b (95% CI)</b>	<b>b (95% CI)</b>
<b>Household income, % FPL<sup>a</sup></b>			
0–99 (Ref)	1	1	1
100–138	–0.05 (–1.54, 1.45)	0.00 (–1.54, 1.55)	0.94 (–0.24, 2.13)
139–400	–0.51 (–1.58, 0.57)	–0.14 (–1.25, 0.97)	1.64 (0.79, 2.49)
> 400	–1.63 (–2.83, –0.43)	–1.06 (–2.31, 0.18)	2.38 (1.43, 3.34)
<b>Health insurance type</b>			
Uninsured (Ref)	1	1	1
Private	–2.65 (–3.82, –1.49)	–2.14 (–3.35, –0.94)	–1.43 (–2.36, –0.51)
Public	–1.73 (–2.92, –0.54)	–1.06 (–2.29, 0.18)	–0.48 (–1.42, 0.47)
Other	–3.39 (–5.78, –0.99)	–3.66 (–6.14, –1.18)	–3.08 (–4.97, –1.18)
<b>Relationship status</b>			
Married, marriage-like, or partnered (Ref)	1	1	1
Romantic relationship	2.71 (1.45, 3.96)	2.89 (1.59, 4.19)	1.42 (0.42, 2.41)
Widowed	1.16 (0.27, 2.05)	0.65 (–0.27, 1.58)	–0.04 (–0.74, 0.67)
Single, divorced, or separated	0.69 (–0.38, 1.75)	0.05 (–1.05, 1.15)	0.07 (–0.77, 0.91)
<b>City</b>			
Atlanta, GA (Ref)	1	1	1
Chicago, IL	1.37 (0.36, 2.38)	1.58 (0.53, 2.63)	0.66 (–0.15, 1.46)
Los Angeles, CA	1.93 (0.92, 2.94)	1.70 (0.66, 2.75)	0.84 (0.040, 1.64)
New Orleans, LA	1.17 (–0.19, 2.53)	0.77 (–0.64, 2.18)	0.90 (–0.18, 1.97)
New York, NY	1.65 (0.64, 2.66)	2.31 (1.27, 3.36)	0.15 (–0.65, 0.95)

Note. CI = confidence interval; FPL = federal poverty level; MSM = men who have sex with men; PROMIS = Patient-Reported Outcomes Measurement Information System; UNCOVER = Uncovering COVID-19 Experiences and Realities; WSW = women who have sex with women. Sample size was  $n = 3242$ .

Source. UNCOVER data set 2020.

<sup>a</sup>FPL according to the US Department of Health and Human Services (<https://aspe.hhs.gov/prior-hhs-poverty-guidelines-and-federal-register-references>).

Mental Health Services Survey.<sup>23</sup> There is also a known lack of culturally competent mental health care providers for LGBTQ+ people.<sup>24</sup> It is essential that providers get the necessary training to provide affirming and supportive care for this population during the pandemic.

In addition, as many LGBTQ+ people have reported difficulty accessing health care during the pandemic,<sup>22</sup> implementing nontraditional modalities for providing services may be necessary. It is imperative that services, such as telehealth, be strengthened to better reach LGBTQ+ communities to address mental health and substance use during the pandemic. Online and application-based social interaction, support, and

networking have been receiving particular attention and interest over the years, particularly during the COVID-19 pandemic.<sup>25,26</sup> Mobile health applications and other virtual services may also be leveraged to further support the mental health of LGBTQ+ people, especially during this period. Delivery of mental health assessments are feasible and acceptable through both short messaging system and mobile-based applications.<sup>27,28</sup>

### Limitations

The primary limitation of this study was the nonprobabilistic sampling design. Our findings may be sensitive to

selection bias resulting in systematic errors as survey respondents may differ from nonrespondents in ways that matter for measuring the impact of the pandemic on mental health among LGBTQ+ populations. Another limitation is that the study did not ascertain whether people had nonbinary gender identities, were genderqueer, or had agender identities. Furthermore, the survey did not inquire about other possible sexual orientation identities. The characteristics of those participating in survey panels and who are included in provider distribution lists are potentially different from those of the general US population. An additional limitation of the study was the small number of



transgender participants in the survey ( $n = 19$ ). We recognize that the small number of respondents may result in spurious findings, wide confidence intervals, and results that are not generalizable. When weighing the option of whether to include transgender respondents in the analysis, we determined that we would prefer to include their findings with caution rather than exclude them from the analysis.

With that being said, a strength of the current study is the recruitment of a relatively large sample without the use of sexual orientation, sexual behavior, and gender identity criteria, thus reducing the potential for systematic response bias along this dimension compared with research utilizing more targeted sampling methods. Moreover, the large number of participants we recruited enabled us to disaggregate LGBTQ+ participants, allowing us to provide a more nuanced portrait of this population. Although the number of transgender participants in our study was small ( $n = 19$ ; 0.59%), their representation in our study is similar to that of the US population estimate (0.60%).<sup>29</sup> While these specific analyses were underpowered and combined all transgender persons into 1 group eliding potential differences across gender and sexual orientation, we are aware of no other studies that have described mental health and substance use among transgender people during the COVID-19 pandemic. Moreover, the average scores of depression, anxiety, and alcohol use in our study sample are similar to national estimates and scores in other studies of the same scale in similar groups.<sup>30-32</sup> We recommend that future studies oversample transgender participants to permit more robust analysis.

Another limitation is the cross-sectional design of this study, which only

allowed us to assess mental health during a single period during the pandemic. Moreover, the study was limited to an urban US sample and may not be generalizable to rural LGBTQ+ populations. In addition, as the survey asked questions about past experiences, responses may be subject to participant recall bias. In particular, the questions assessing depression, anxiety, and alcohol use before the pandemic did not have a specific time frame (e.g., past 12 months or lifetime). Still, we were able to infer whether the snapshots we obtained represent a change from levels before the pandemic through self-report. Regardless, deducing causality was not the aim of this observational study.

## Conclusions

Our study contributes to the COVID-19 literature by characterizing disparities in mental health and alcohol use during the pandemic between cisgender LGBTQ+ and cisgender straight people. By using self-identification and behavioral dimensions of LGBTQ+ identity, our study characterizes mental health and alcohol use among LGBTQ+ people during the pandemic in a way that most epidemiological surveillance data have not yet done. Our findings highlight the need for future health research to disaggregate data on LGBTQ+ populations. Future research needs to expand surveillance efforts to include assessment of sexual identity, sexual behavior, and gender identity to better understand the concurrent and long-term impact of the COVID-19 pandemic on health inequities experienced by LGBTQ+ people.<sup>33</sup> Such research may also inform strategies to support LGBTQ+ mental health and substance use prevention. Sexual orientation and gender identity data should be routinely

collected during the COVID-19 pandemic and beyond. National collection of sexual orientation and gender identity data will allow for future research to explicitly examine LGBTQ+ people's experiences during the COVID-19 pandemic contributing to the understanding of how and why inequities in mental health and substance use outcomes occur among sexual identity, sexual behavior, and gender identity groups. **AJPH**

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## PUBLICATION INFORMATION

Full Citation: Akré E-R, Anderson A, Stojanovski K, Chung KW, VanKim NA, Chae DH. Depression, anxiety, and alcohol use among LGBTQ+ people during the COVID-19 pandemic. *Am J Public Health*. 2021;111(9):1610-1619.

Acceptance Date: May 12, 2021.

DOI: <https://doi.org/10.2105/AJPH.2021.306394>

## CONTRIBUTORS

E. R. Akré and A. Anderson conceptualized the presented idea. D. H. Chae supported the development of the theory, and E. R. Akré and A. Anderson performed the analysis. E. R. Akré and N. A. VanKim verified the analytical methods. K. W. Chung designed the tables. E. R. Akré, A. Anderson, K. Stojanovski, and D. H. Chae contributed to the interpretation of the results. E. R. Akré took the lead in writing the article. All authors provided critical feedback, helped shape the research, and

commented on the article. D. H. Chae supervised the findings of this work.

## ACKNOWLEDGMENTS

N. A. VanKim's efforts were supported by the National Institute of Diabetes and Digestive and Kidney Diseases (award K01 DK123193).

We offer our deep appreciation and gratitude to all of the survey respondents for sharing their personal mental health experiences with us.

**Note.** The content is solely the responsibility of the authors and does not reflect the views of the funder.

## CONFLICTS OF INTEREST

The authors have no conflict of interest to declare.

## HUMAN PARTICIPANT PROTECTION

The Tulane Institutional Review Board and Human Protection Resource Office deemed this study to be exempt from human participant review because the research conducted only included interactions involving survey procedures, and (a) the information collected cannot be used to readily identify participants, and (b) any disclosure of responses outside would not reasonably place participants at risk.

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