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# Alcohol Consumption During the First Year of the COVID-19 Pandemic in the United States: Results From a Nationally Representative Longitudinal Survey

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**Introduction:** Alcohol consumption and risky drinking behavior increased in the early phases of the COVID-19 pandemic in the United States, but it is not known if and for whom those changes were sustained over the longer term. This study analyzes longitudinal data on drinking patterns during the first year of the COVID-19 pandemic in the United States.

**Methods:** A nationally representative longitudinal survey was used to assess alcohol consumption patterns among respondents 21 years and older who reported drinking between February and November 2020 (N = 557) overall and by subgroups.

**Results:** Compared with February, drinks per month in April and November 2020 significantly ( $P \leq 0.01$ ) increased by 36% and 38%, respectively. The proportion exceeding drinking guidelines significantly increased by 27% and 39%, and increases for binge drinking were 26% and 30% (both  $P = 0.01$ ). February to November increases in proportion exceeding drinking guidelines were significantly larger for women (54% increase) than for men (32%), and for Black (508%) than for White respondents (16%). Drinks per month significantly increased more for respondents with children in the household (64%) than for those without children (20%). There also was a significantly larger increase in drinks per month for those who reported drinking to cope (57% increase) and those who reported drinking for enhancement (40%) than for those who did not.

**Conclusions:** Self-reported alcohol consumption and risky drinking patterns increased during the first year of the COVID-19 pandemic. Monitoring alcohol consumption changes, with a focus on marginalized groups, is warranted to plan behavioral health services and inform prevention for future pandemics.

**Key Words:** COVID-19, alcohol consumption, drinking patterns, longitudinal survey

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The coronavirus (COVID-19) pandemic is an ongoing global crisis with lasting effects on medical, psychological, and sociological problems.<sup>1</sup> The COVID-19 pandemic and related policies introduced new life stressors and disrupted daily living for most people in the United States.<sup>2</sup> Individuals often increase alcohol intake to cope with emotional stress, depression, anxiety, and chronic uncertainty,<sup>3–7</sup> and there is a concern that the current pandemic might drive lasting changes in drinking patterns.

Experience with previous outbreaks, natural disasters, and terrorist attacks shows sustained increases in alcohol consumption, binge drinking, and alcohol problems postevent.<sup>3,8,9</sup> The scale and duration of the current pandemic are unmatched by those prior events. If the COVID-19 pandemic is associated with sustained increases in alcohol consumption over time, it could exacerbate the already substantial physical, psychological, and social consequences of excessive alcohol use.<sup>10</sup> The prevalence of alcohol use and risky drinking have increased in the United States over the past decade, particularly in vulnerable populations, including females, older adults, racial/ethnic minorities, sexual minorities, and individuals with lower income.<sup>11</sup> Pandemic-driven increases in alcohol consumption might further exacerbate those disparities.

As reported in 2 recent systematic reviews, studies indicate increases in alcohol consumption in the United States during the early phase of the pandemic, particularly in certain segments of the population.<sup>12,13</sup> Only 2 studies—both published after the systematic reviews—used a longitudinal design, collected data beyond May of 2020, and focused on a representative sample. These 2 studies used a nationally representative panel of US adults 18 years or older, the Understanding America Study, to examine longitudinal changes in number of reported drinking days in the past week from March 11, 2020, through June 8, 2020,<sup>14</sup> or July 21, 2020.<sup>15</sup> Both studies found increases in the number of drinking days, with frequency of drinking peaking in early May and remaining at increased levels

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through mid-July.<sup>14,15</sup> However, the Understanding America Study survey did not collect measures of quantity consumed and thus could not examine changes in the total quantity of alcohol consumed per day or the prevalence of binge drinking or drinking above recommended guidelines.

It is important to understand changes in drinking patterns over a longer period after the beginning of the pandemic and examine if changes were more pronounced in specific demographic subgroups. The current study examines changes in drinks per month, binge drinking, and drinking above recommended guidelines from February 2020 to April, July, and November 2020, and assesses whether changes in drinking varied by (1) sex, (2) age, (3) race/ethnicity, (4) the presence of minor children in the household, (5) mental health problems (depression and anxiety), and (6) drinking to cope or (7) drinking for enhancement.

## METHODS

### Study Sample

We sampled adults 21 years or older from the Ipsos KnowledgePanel, a nationally representative online survey panel comprising more than 55,000 adults. For wave 1, a random sample of 1691 panel members were selected and invited to complete the survey in May 2020. A total of 1017 adults (60.1%) responded to the invitation, and 993 (58.7%) qualified for (ie, were 21 or older) and completed the survey. In December 2020, we conducted a second wave of data collection with respondents from wave 1. At wave 2, 792 respondents (79.8%) completed the survey. Two respondents who reported drinking an average of 60 or more drinks per day were removed, yielding a sample of 790. This study focuses on wave 2 respondents who reported drinking alcohol in at least one of the 4 months for which we collected data (N = 557). More survey details and differences between all wave 2 respondents and the subsample of drinkers selected for analysis are presented in the Appendix, <http://links.lww.com/JAM/A350>. This study received an exempt determination from the RTI International Institutional Review Board.

### Measures

The wave 1 survey collected information on alcohol consumption (quantity and frequency of standard drinks, maximum quantity and frequency, and binge drinking), depression and anxiety, history of alcohol-related problems, and employment status for February and April.<sup>16</sup> We also obtained relevant panel variables including demographic and socioeconomic characteristics. Wave 2 included all wave 1 questions (most reassessed for both July and November) and additional questions including coping and enhancement motives for drinking, other substance use, and experience with COVID-19 (ie, whether the respondent or a loved one had a positive test or was hospitalized for COVID-19 and the impact of the pandemic on daily life).<sup>17</sup>

Across the 2 survey waves, we assessed 3 drinking measures at 4 time points (February, April, July, and November): (1) drinks per month, calculated as quantity times frequency, with an additional factor to account for maximum quantity and the frequency of drinking that amount during the month

(an approach used in other national surveys of drinking behavior)<sup>18</sup>; (2) drinking in excess of recommended guidelines in a given month, a binary measure identifying respondents who drank more than 3 drinks per day or more than 7 drinks per week for women and more than 4 drinks per day or more than 14 drinks per week for men<sup>19</sup>; and (3) binge drinking, a binary measure identifying respondents who engaged in binge drinking, defined as drinking 5 or more drinks in a 2-hour period for men and 4 or more drinks in a 2-hour period for women, at least once during the month.<sup>19</sup>

We measured respondent mental health in February and April (wave 1) and November (wave 2) using the Patient Health Questionnaire-2 (PHQ-2) for depression, and the Generalized Anxiety Disorder 2-item (GAD-2)<sup>20</sup> for anxiety. We assessed drinking motives in February, July, and November using the Drinking Motives Questionnaire-Revised.<sup>21</sup> Several variables were available as panel variables, that is, we did not have to collect that data as they were provided by the panel vendor. Panel variables used in this study include age, sex, race/ethnicity, and prepandemic household composition (used to identify if there were children 17 years or younger living in the respondent's household) and socioeconomic status (ie, marital status, educational attainment, and income). More information on measures, including panel variables, is in the Appendix, <http://links.lww.com/JAM/A350>. Survey questions for both waves are in the Appendix, <http://links.lww.com/JAM/A350>.

### Analysis

First, we computed descriptive statistics for the sample of respondents who reported alcohol use across the study period (N = 557) and subgroup averages of the 3 drinking measures—drinks per month, exceeding drinking guidelines, and binge drinking—for February 2020 (before the pandemic) and for 3 postpandemic months (April, July, and November 2020). Second, we examined changes over time in the 3 drinking measures based on 7 characteristics: (1) sex, (2) age, (3) race/ethnicity, (4) the presence of minor children in the household, (5) any evidence of mental health problems during the study period, and any evidence of (6) drinking to cope or (7) drinking for enhancement motives during the study period. We estimated regression models (described in the Appendix, <http://links.lww.com/JAM/A350>) to assess whether changes in alcohol consumption measures varied *between* subgroups (eg, Was the increase/decrease in alcohol consumption from February to November for women different from the change for men?) or *within* subgroups defined by each characteristic (eg, Did women significantly increase/decrease alcohol consumption from February to November?).

Given the low proportion of missing data at each survey (less than 6%), we included only complete cases at each time point in our analyses, meaning that data were not missing for any of the identified variables. All analyses incorporated survey weights that account for probabilities of sample selection and survey nonresponse and are aligned with Current Population Survey benchmarks (survey weight details are in the Appendix, <http://links.lww.com/JAM/A350>). Statistical significance was assessed at the  $P < 0.05$  level. Analyses were conducted using Stata version 16.1 (StataCorp) and R (R studio version 1.2.5001;

R version 3.6.1). Missing data analysis is in the Appendix, <http://links.lww.com/JAM/A350>.

## RESULTS

The main analytic sample includes 557 adults who reported drinking in at least one of the 4 survey months (Table 1). The average age was 48.0 (SD, 16.6), 51.4% were between ages of 21 and 59 years, and 51.4% were female. The typical respondent was White and non-Hispanic (62.8%), had at least some college education (64.3%), did not have children (73.7%), was married (56.0%), and had an annual income of at least \$50,000 (59.3%). Additional characteristics of the sample, drinker and abstinent status during the study period, and study measures are in the Appendix, <http://links.lww.com/JAM/A350>.

Figure 1 shows the weighted unadjusted means for the 3 outcomes at each time point. The overall trajectory is characterized by a sustained increase in alcohol consumption and risky drinking behavior throughout the pandemic period. As shown in Figure 1, most of the outcomes are significantly higher in all 3 postpandemic months (April, July, and November) relative to February. Overall drinks per month increased from 17 in February to about 23 drinks in April, July, and November 2020 (an increase of 36% in April, 39% in July, and 38% in November relative to February). The percentage of individuals exceeding drinking guidelines increased from 23% in February to 28% in April and July, and 32% in November (an increase of 27% in April, 24% in July, and 39% in November relative to February). The percentage of individuals binge drinking increased from 18% in February to 23% in April, 20% in

July, and 24% in November (an increase of 26% in April, 10% in July, and 30% in November relative to February).

Table 2 presents adjusted predicted values by month of analysis for key respondent groups for each of the 3 outcomes. For sex stratification, for example, the first row in Table 2 indicates that the average female respondent drank 12.0 drinks in February and increased to 17.4 in April. The bold text in that cell indicates that the April value is significantly larger than the February value. In addition, significant differences between groups in changes in outcomes from before to after the start of the pandemic are shaded. For example, the change in percentage exceeding drinking guidelines from February to April was significantly larger for females (30.0%–20.3% = 9.7%) compared with males (26.0%–23.1% = 2.9%). Overall, both females and males significantly increased drinks per month from February to April; this increase was sustained throughout November, and males kept consuming more drinks per month than females. Females showed sustained increases in exceeding drinking guidelines. The percentage of females who exceeded recommended guidelines significantly increased by 48%, 38%, and 54% from February to April, July, and November, respectively, with females surpassing males on this measure for all pandemic months, but not at baseline.

Drinks per month increased significantly for all age groups, except the youngest (ages 21–34), where increases did not achieve statistical significance despite increases in both usual frequency and usual quantity of drinking (albeit with larger variances in November compared with February). However, drinking in excess of recommended guidelines increased significantly for the youngest age group from February (21.7%) to November (34.2%). The change in drinks per month from February to July for the 50-to-64 age group was significantly larger than for the oldest respondents (ages 65 years and more), but that difference was not observed in other pandemic months.

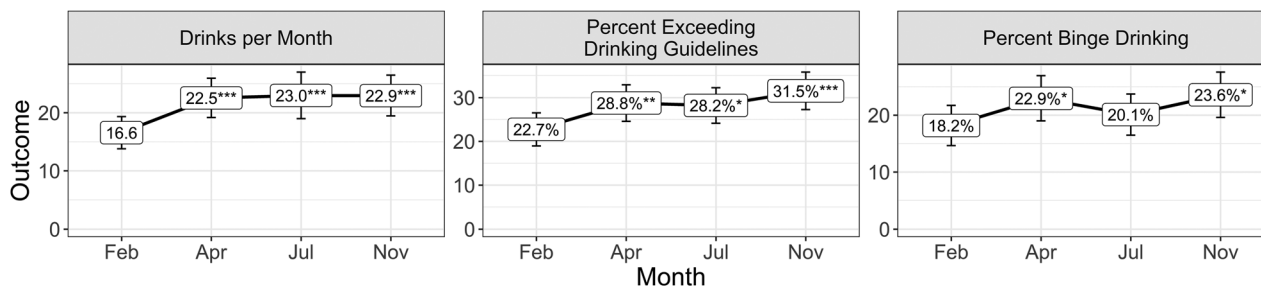
In race/ethnicity stratifications, the percentage of Black respondents who exceeded drinking guidelines increased by 138%, 320%, and 508% from February to April, July, and November. Changes from February to July and November were significantly higher for Black respondents compared with White respondents. Black respondents also showed significantly larger increases in drinks per month and binge drinking from February to November, compared with White respondents. There were no significant differences in changes in drinking outcomes among White or Hispanic respondents, or for respondents who identified as something other than White, Black, or Hispanic.

Stratifying by children in the household, the number of drinks consumed per month increased significantly for respondents with and without children in the household, but the increase was significantly larger for those with children in the household from both February to April and from February to November. Drinks per month among respondents with children in the household increased from 22.4 to 36.8 from February to November (64% increase), with most of the observed increase happening between February and April (from 22.4 to 35.0 drinks per month). The changes in exceeding drinking guidelines and binge drinking were not different across these groups, but the increase in exceeding drinking guidelines after the

**TABLE 1.** Sample Characteristics—Unweighted n (557), and US Population—Weighted Percentages

Characteristic	n (%)
Female	51.4%
Mean (SD) age*	48.0 (16.6)
Age groups*	
21–34	95, 25.6%
35–49	132, 25.8%
50–64	176, 28.3%
65+	154, 20.3%
Race/ethnicity*	
White, non-Hispanic	397, 62.8%
Black, non-Hispanic	47, 9.7%
Other, non-Hispanic	38, 7.9%
Hispanic (any race)	75, 19.6%
Educational attainment*	
No college	167, 35.7%
Some college	153, 29.9%
4-Year degree	237, 34.4%
Household income*	
<\$50,000	207, 40.7%
\$50,000–\$100,000	232, 37.5%
>\$100,000	118, 21.8%
Married*	346, 56.0%
Children in the Household*	126, 26.3%
Positive score on the PHQ-2 or the GAD-2 in any month	133, 28.3%
Reported drinking to cope in any month	235, 45.6%
Reported drinking for enhancement in any month	434, 79.1%

\*Measured before the first wave (May 2020) as panel variable.



**FIGURE 1.** Changes in alcohol consumption outcomes: February to November 2020. Asterisks denote significant differences relative to February: \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

beginning of the pandemic was significant only among respondents without children.

Stratifying by a positive screen for anxiety or depression, increases in drinks per month from February to November were significantly larger for those with a positive screen for anxiety or depression compared with those without. Respondents with a positive screen increased drinks per month by 46%, 68%, and 88%, in April, July, and November compared with February.

Those who reported drinking to cope showed significantly higher increases in drinks per month from February to all postpandemic months, compared with those who did not. Respondents who drink to cope increased drinks per month by 38%, 58%, and 56% in April, July, and November compared with February. Respondents who reported drinking for enhance-

ment during the study period also had significantly larger increases in drinks per month from February to July and November, as well as significantly larger increases in drinking more than recommended guidelines (February to July and November) and binge drinking (February to July) than those who did not report drinking for enhancement. Respondents who drink for enhancement increased drinks per month by 30%, 39%, and 40% in April, July, and November compared with February.

We compared baseline characteristics of those with lower average drinks per month across April, July, and November than in February (ie, decreased drinking) with those who did not decrease drinking. Those who did not decrease drinking consumed an average of 23.8 drinks per month across April, July, and

**TABLE 2.** Estimated Outcomes for Respondent Groups

	Drinks Consumed				Percentage Exceeding Drinking Guidelines				Percentage Binge Drinking			
	Feb	Apr	Jul	Nov	Feb	Apr	Jul	Nov	Feb	Apr	Jul	Nov
<b>All</b>												
Sex												
Female	12.0	<b>17.4</b>	16.5	<b>16.8</b>	20.3%	<b>30.0%</b>	<b>28.1%</b>	<b>31.3%</b>	15.3%	<b>22.1%</b>	17.4%	<b>21.8%</b>
Male	21.8	<b>27.5</b>	<b>28.7</b>	<b>29.1</b>	23.1%	26.0%	27.1%	<b>30.6%</b>	16.7%	19.1%	19.1%	<b>22.1%</b>
Age												
21–34	15.3	18.7	20.2	21.9	21.7%	28.8%	29.0%	<b>34.2%</b>	17.9%	23.0%	17.9%	27.2%
35–49	17.6	<b>23.3</b>	<b>21.8</b>	<b>23.0</b>	24.1%	<b>31.2%</b>	30.7%	<b>33.5%</b>	22.7%	28.3%	26.9%	27.0%
50–64	17.0	<b>24.4</b>	<b>26.8</b>	<b>22.9</b>	21.1%	25.8%	27.3%	26.4%	17.1%	18.9%	22.1%	21.4%
64+	17.1	<b>22.5</b>	19.8	<b>23.3</b>	19.3%	<b>26.2%</b>	22.8%	<b>30.2%</b>	7.9%	<b>13.3%</b>	8.3%	<b>13.2%</b>
Race/ethnicity												
White, non-Hispanic	19.8	<b>24.3</b>	22.2	<b>23.2</b>	26.7%	29.9%	30.7%	31.0%	19.6%	22.7%	21.1%	22.7%
Black, non-Hispanic	8.2	11.4	<b>23.2</b>	<b>23.1</b>	6.0%	<b>14.3%</b>	<b>25.2%</b>	<b>36.5%</b>	5.1%	9.5%	<b>16.6%</b>	<b>29.0%</b>
Other race, non-Hispanic	12.9	<b>21.2</b>	35.3	25.3	13.3%	21.1%	19.0%	19.9%	8.3%	11.4%	14.6%	14.0%
Hispanic	12.8	<b>21.6</b>	<b>17.6</b>	20.0	23.1%	<b>34.0%</b>	23.4%	33.2%	18.3%	27.2%	12.8%	20.3%
Children in household												
No	14.7	<b>17.6</b>	<b>17.7</b>	17.6	18.2%	<b>24.2%</b>	<b>23.7%</b>	<b>27.6%</b>	13.6%	<b>17.4%</b>	15.0%	<b>18.9%</b>
Yes	22.4	<b>35.0</b>	<b>35.2</b>	<b>36.8</b>	31.4%	38.7%	38.8%	40.2%	23.1%	30.4%	28.3%	31.0%
Ever PHQ+ or GAD+												
No	17.3	<b>22.2</b>	<b>20.8</b>	19.8	20.2%	<b>27.3%</b>	<b>27.8%</b>	<b>26.4%</b>	15.5%	<b>20.2%</b>	17.5%	17.8%
Yes	15.8	<b>23.1</b>	<b>26.6</b>	<b>29.7</b>	25.3%	30.3%	27.9%	<b>42.8%</b>	18.2%	22.0%	19.8%	<b>32.1%</b>
Ever drinking to cope												
No	12.4	<b>15.5</b>	12.0	12.9	12.7%	<b>18.3%</b>	16.7%	<b>18.9%</b>	8.5%	<b>12.1%</b>	9.5%	11.0%
Yes	21.9	<b>30.3</b>	<b>34.8</b>	<b>34.3</b>	32.8%	<b>39.8%</b>	<b>41.0%</b>	<b>45.6%</b>	25.8%	31.6%	29.5%	<b>36.0%</b>
Ever drinking for enhancement												
No	6.9	<b>11.0</b>	4.5	5.9	8.4%	9.9%	5.0%	6.3%	5.6%	8.3%	2.6%	4.0%
Yes	19.3	<b>25.2</b>	<b>27.0</b>	<b>27.1</b>	25.2%	<b>32.8%</b>	<b>33.7%</b>	<b>37.4%</b>	18.9%	<b>24.1%</b>	22.8%	<b>27.0%</b>

Values in the table are adjusted predictions at the means of other coefficients. Regression models used to produce these estimates control for demographic characteristics and baseline socioeconomic status. Bold text indicates significant ( $P < 0.05$ ) differences within a row (eg, among females) relative to February. Shaded cells represent significant ( $P < 0.05$ ) differences between groups (eg, between females and males) relative to February. For race/ethnicity, all shaded cells represent significant differences between Black, non-Hispanic respondents, and other groups. There are no significant differences among White, non-Hispanic respondents; other, non-Hispanic respondents; and Hispanic respondents. Table A3 in Appendix, <http://links.lww.com/JAM/A350>, presents corresponding relative changes and confidence intervals.

November and 11.4 drinks in February. Those who decreased drinking consumed an average of 19.5 drinks per month across April, July, and November and 28.4 drinks in February. We found that the group with postpandemic decrease in consumption ( $n = 175$  [31%]; average decrease of 39%) consumed more drinks on average and included more binge drinkers and more individuals exceeding drinking guidelines in February compared with the group that did not decrease consumption (28.4 vs 11.4 drinks; 34% vs 12% binge drinking, and 40% drinking above recommended guidelines vs 15%, all  $P < 0.001$ ). We did not find statistically significant differences in sociodemographic variables between the 2 groups.

We also examined differences by other respondent characteristics (see Appendix Table A4, <http://links.lww.com/JAM/A350>). We did not find differential changes in drinking by whether respondents reported unemployment during the study period, pandemic-related reductions in income, or other impacts of COVID-19 on loved ones. We found significantly larger increases in consumption from February to November 2020—but not for exceeding drinking guidelines or binge drinking—among those reporting a direct impact of COVID-19 (eg, having to quarantine or becoming infected) and for those reporting a significant impact of COVID-19 on daily life compared with respondents who did not report such experiences.

## DISCUSSION

Analyses of the first wave of this national panel survey showed overall increases in alcohol consumption and that women, people with minor children in the home, and Black Americans differentially increased their drinking in the short term after the COVID-19 pandemic started (comparing February and April 2020).<sup>16</sup> The current study resurveyed respondents to the first survey and analyzed 2 waves of data, providing unique longitudinal data to address whether and for whom early patterns of increased alcohol consumption were sustained through November 2020. These unique longitudinal data suggest that, on average, the patterns of increased alcohol consumption, including increased excessive drinking and binge drinking, observed in the early phases of the pandemic were sustained. This aligns with 2 recent nationally representative surveys that reported frequency of drinking among US adults increased during the pandemic period, peaking in early May, and remaining at increased levels through mid-July.<sup>14,15</sup> However, those 2 studies only reported alcohol use frequency and were unable to describe the full spectrum of changes in drinking patterns. Individuals might increase drinking frequency yet still reduce average consumption if the amount consumed in each occasion decreases, or they might increase consumption to the point of placing themselves and others at increased risk of harm.

Compared with February 2020, we found that average drinks per month in April and November 2020 increased by 36% and 38%, respectively. Corresponding increases for the proportion exceeding drinking guidelines were 27% and 39%, and increases for binge drinking were 26% and 30%. Applied to the almost 133 million Americans 21 years or older who drank in 2020,<sup>22,23</sup> these changes translate to an increase of 840 million more drinks per month, with 11.7 million more people exceeding drinking guidelines, and 7.1 million more people

binge drinking in November 2020 compared with February 2020. An increase in drinking of this magnitude will add to the known disease burden associated with alcohol.<sup>10</sup>

The strategies put in place to reduce the public health impact of the virus had an impact on the psychological well-being of all, especially those most susceptible to the negative effects of decreased social interactions and disruptions to work, school, and leisure activities. These factors led to pandemic-related stress<sup>2</sup> and worsening mental health,<sup>24,25</sup> which may have contributed to increased alcohol intake to cope with emotional stress and chronic uncertainty, particularly in more vulnerable groups. We found differential increases in alcohol consumption during the first year of the COVID-19 pandemic by sex, race/ethnicity, and children in the home. Previous studies, although cross-sectional and/or not nationally representative, have also found disproportionate impacts on alcohol consumption for women, Black people, and those with children in the household during the early phase of the pandemic in the United States.<sup>12,13</sup>

In our study, sex differences in sustained changes in alcohol consumption were notable and warrant specific attention. The proportion exceeding drinking guidelines between February and November 2020 increased by 54% for women and by 32% for men, with more women than men exceeding recommended drinking guidelines between April and November 2020. Women are more likely to use alcohol to cope with stress, depression, and anxiety.<sup>26</sup> In the past 2 decades, alcohol consumption and alcohol-related emergency department visits, hospitalizations, and deaths have increased markedly among women.<sup>27</sup> The pandemic may continue to exacerbate these troubling trends. We also found alcohol consumption increased more for individuals with children in the household (64% increase between February and November 2020) than for those without children. Many parents had to “home-school” their children while continuing to work at home during the first year of the pandemic, which might have led to increased stress. Other studies have also found that having children in the household was related to increased alcohol consumption during the early phases of the pandemic,<sup>28</sup> and we show that those relationships were sustained over the longer term.

The percentage of Black respondents who exceeded drinking guidelines or engaged in binge drinking increased about 500% from February to November, and increases in the proportion of drinking more than the recommended guidelines were higher for Black respondents than for White respondents. This very large increase in risky drinking behavior in a historically marginalized group highlights the disproportionate effects of COVID-19 in African American communities and reflects the racial inequality and social exclusion that existed before the COVID-19 crisis.<sup>29,30</sup> In light of the drinking patterns observed for Black individuals, future studies should investigate the role of systemic racism and other types of discrimination on changes in alcohol use before and after the pandemic period to identify unique and synergistic effects of these stressors in marginalized communities and to identify resilience factors that may be strengthened in future interventions.

We found a larger increase in drinks per month for those who reported drinking to cope (57% increase between February and November 2020). These results extend findings of recent

studies showing a relationship between drinking to cope and alcohol consumption during the first months of the pandemic.<sup>28,31,32</sup> There is a concern that drinking to cope with stressful and negative emotions during the pandemic might increase the risk for alcohol use disorders.<sup>35</sup> Future research is needed to investigate whether elevations in drinking observed persisted beyond November and whether there have been parallel changes in the incidence and prevalence of alcohol use disorders.

Decreases in postpandemic consumption were observed in 31% of our sample, and those decreasing drinking reported higher prepandemic consumption and riskier baseline drinking patterns. This shows that average increases in consumption were predominantly from those drinking less—and within recommended guidelines—at baseline. This is a cause for concern, as those individuals previously drinking within guidelines were responsible for larger increases during the pandemic period. However, it also should be noted that during the postpandemic months of April, July, and November, those who reduced their drinking still were drinking at higher levels than the baseline levels for those who did not reduce consumption.

Key strengths of our study include longitudinal data collection of detailed drinking patterns collected up to November 2020 and the use of a nationally representative panel of US adults. Some limitations should be noted. First, our estimates of alcohol consumption may underestimate total consumption, which is a well-known limitation of collecting self-reported survey data on substance use.<sup>34</sup> This underestimation may be concentrated among people who drink at a low frequency.<sup>35</sup> Recall bias might be larger for self-reported July consumption, as respondents look back to consumption 5 months before the survey. However, we reminded respondents of major holidays (eg, fourth of July) to help mitigate potential recall bias. Calendar-based methods might more accurately measure alcohol consumption, but these intensive measures were not within the scope of our Web-based survey. Second, the survey data are representative of the US civilian, noninstitutionalized population; as such, we did not reach some specialized populations disproportionately impacted by the pandemic (eg, prison and homeless populations). This is an area to be addressed through targeted research. Third, our analyses focused on those 21 years or older. Although our surveys included respondents aged 18 to 20 years at wave 1 (25 individuals), we excluded those individuals from these analyses as transitioning to legal drinking age during the study period could confound the impacts of the pandemic. However, future studies should analyze changes in drinking for underage individuals considering changes in social patterns and changes in access to alcohol, which included an increase in alcohol home deliveries. Fourth, we did not adjust for seasonality. Retail sales for April increased by 14% from 2019 to 2020, and the 4 months after February 2020 represent the 4 largest year-over-year increases for monthly sales on record (since 1993).<sup>36</sup> However, even though there is a correlation between sales and consumption, changes in alcohol sales do not translate to the same changes in alcohol consumption, and they also do not provide information on changes in alcohol drinking patterns. Usually, both February and April are months where self-reported consumption is low and self-reported consumption tends to be higher in November, December, January, and July.

Two studies<sup>37,38</sup> that reported monthly changes in self-reported alcohol consumption showed that there were no significant changes in self-reported consumption between February and April in those samples. This is when we see the largest change: from right before the pandemic to after restrictions were put in place. However, the same level of consumption should not be expected in all months, and future analyses should adjust for seasonality. Alcohol consumption usually increases during national holidays, when events and celebrations promote social gatherings. Adjusted results, however, will need to be interpreted carefully, because seasonal conditions that lead to higher or lower consumption may have been altered during the pandemic, particularly in the first 6 months when large get-togethers were discouraged and drinking at home increased. Fifth, results for respondents who are Black non-Hispanic (n = 54) or other non-Hispanic (n = 44) should be interpreted with caution because of small sample sizes.

## POLICY IMPLICATIONS

In response to the pandemic, policies affecting availability of alcohol substantially changed. In particular, there were substantial changes in alcohol retail policies for on-premise establishments (ie, restaurants and bars), allowing curbside pickup and relaxing home delivery restrictions, and off-premise establishments (ie, grocery and liquor stores) relaxing home delivery restrictions.<sup>39</sup> Although these policy changes initially were temporary, many states have moved to make them permanent.<sup>40–42</sup> Thus, further research should understand the impacts of changes in alcohol-related policies during the COVID-19 pandemic so policymakers can make informed decisions about alcohol control regulation.

Further epidemiologic surveillance, with a focus on marginalized groups, is needed to ascertain whether increases in alcohol consumption observed in this study are maintained over a longer horizon, including after pandemic conditions recede. This information is crucial to better plan behavioral health services and inform models of prevention for future pandemics. It is also important to provide public health warnings about excessive alcohol consumption to prevent adverse consequences for individuals and families, and additional costs to societies and health systems, and to promote alternative coping strategies in response to stressful experiences.

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