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Changes in drinking days among US adults during the COVID-19 pandemic

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ABSTRACT

Aims: To examine changes in drinking behavior among US adults between March 10 and July 21, 2020, a critical period during the COVID-19 pandemic.

Design: Longitudinal, internet-based panel survey.

Setting: The Understanding America Study (UAS), a nationally-representative panel of US adults aged 18 or older.

Participants: 4,298 US adults who reported alcohol use.

Measurements: Changes in number of reported drinking days from March 11, 2020 through July 21, 2020 in the overall sample and stratified by sex, age, race/ethnicity, household structure, poverty status, and Census region.

Findings: Compared with March 11, the number of drinking days per week was significantly higher on April 1 by an average of 0.36 days (95% confidence interval (CI)=0.30, 0.43), on May 1 by an average of 0.55 days (95% CI=0.47, 0.63), on June 1 by an average of 0.41 days (95% CI=0.33, 0.49), and on July 1 by an average of 0.39 days (95% CI=0.31, 0.48). Males, White participants, and older adults reported sustained increases in drinking days, while female participants and individuals living under the federal poverty line had attenuated drinking days in the latter part of the study period.

Conclusions: Between March and mid-July 2020, adults in the US reported increases in the number of drinking days, with sustained increases observed among males, White participants, and older adults.

Keywords: alcohol use, COVID-19, drinking behavior

INTRODUCTION

The Coronavirus (COVID-19) pandemic is an international emergency that has dramatically changed daily life. This global pandemic is expected to have lasting effects on individual well-being including increased prevalence of psychological distress (1–3). The pandemic has resulted in numerous stressors, including social isolation (4) and historically high unemployment rates (5), which are likely to have ongoing implications for public health in the U.S.

One possible implication of the COVID-19 pandemic is changes in alcohol use in the general population. Alcohol use, including high-risk drinking, has increased in the U.S. over the past decade, particularly among females, older adults, racial/ethnic minorities, sexual minorities, and individuals with lower income (8), highlighting important sociodemographic differences. Because alcohol use is associated with stressful life events (9) and is associated with depression, anxiety, and substance use disorders (11–13), there are particular concerns regarding alcohol consumption during the COVID-19 pandemic. Social distancing protocols and stay-at-home orders may increase alcohol craving, consumption, and risk of relapse (18–20). Indeed, emerging cross-sectional data have indicated increases in alcohol use in the U.S., similar to evidence of increased consumption in Europe (21,22), China (23), and Australia (24). Studies of U.S. adults have found significant increases in the frequency of alcohol consumption (25), including binge drinking (26). Moreover, while some have found evidence of an association between COVID-19-related stress and increased drinking behaviors (27), others have found increases in drinking behavior among individuals living in states with relatively lower COVID-19 disease burden (28), suggesting alcohol use may be sensitive to contextual and psychosocial factors. Finally, there have been increases in alcohol retail sales

as many states closed bars/restaurants and relaxed alcohol sale restrictions by allowing curbside distribution or delivery. While there are expected increases in alcohol sales related to seasonal trends, reported increases in retail sales during the first half of 2020 substantially exceeded similar periods in previous years (29), with online sales increasing 234% compared to 2019 (30).

Collectively, these findings suggest that there may be increases in alcohol consumption during the COVID-19 pandemic, but this evidence has largely been limited to cross-sectional and ecological analyses and it remains unclear whether there are sustained increases in use. Thus, it is important to examine changes in drinking behavior over time and identify sociodemographic subgroups that may be especially at risk for adverse outcomes. To address this gap, the objectives of the current study were (1) to examine changes in number of drinking days from March 10 through July 21, 2020 among a nationally-representative cohort of U.S. adults who reported any alcohol use during the survey period and (2) to determine whether trajectories of drinking behavior differed among key sociodemographic subgroups.

METHODS

Participants

Participants were drawn from the Understanding America Study (UAS), a probability-based, nationally-representative internet-panel of adults (18-years and older). This study used data from nine waves of the UAS; the baseline wave was conducted from March 10 to March 31, 2020, and follow-up waves were conducted thereafter at two-week intervals between April 1 and July 21, 2020. UAS participants were selected using Address Based Sampling (ABS), in which postal records are used to select a random sample from a listing of residential addresses. The recruitment involves several steps, including prepaid and

conditional incentives and several reminders. Potential participants without prior internet access are provided with tablets and broadband internet connections. Once respondents have joined the panel, they are surveyed via computer, mobile device, or tablet. Additional details regarding the UAS methodology can be found at the UAS website (https://UASdata.usc.edu).

The baseline wave of data collection consisted of a tracking survey fielded on March 10; respondents had until March 31 to complete the survey. Starting on April 1, respondents were invited to consent to participate in bi-weekly surveys according to a staggered schedule, whereby one-fourteenth of the sample was invited every day. Because every respondent has 14 days to complete the survey, the waves overlap in calendar time. Only those respondents who consented were then invited to complete a survey on their assigned day. Because not all eligible participants had yet consented at the start of the second wave, the response rate as a percentage of the complete UAS sample was lower in earlier follow-ups.

Overall, there were 8,547 eligible panel members. We restricted our analytic sample to those participants who reported at least one day of alcohol use across the survey period. Additionally, given the low proportion of missing data at each survey (< 7%), we included only complete cases at each time point in our analyses, meaning that data were not missing for any of the identified variables. Altogether, 4,298 unique participants were included; 62.2% completed nine surveys, 15.1% completed eight surveys, 7.2% completed seven surveys, and the remaining 15.5% completed between one and six surveys (see Supplementary Table 1 for number of observations per day). Supplementary Figure 1 details participant inclusion, response rates, and the proportion of complete observations at each survey, and Supplementary Table 2 presents comparisons between participants who completed all surveys to those who completed 8 or fewer surveys. Comparisons between

those who reported any alcohol use and those who reported no use across the study period are displayed in Supplementary Table 3.

Measures

Number of drinking days. The outcome of interest was the number of reported drinking days in the past week at each wave. Participants were provided with a pre-specified list of activities and asked, "Out of the past 7 days, what is your best estimate of the number of days that you did each of the following activities?" From the list of activities, we used responses for the activity, "Consumed alcohol." Responses ranged from 0 (alcohol consumed on none of the past 7 days) to 7 (alcohol consumed on all of the past 7 days). Number of reported drinking days was selected as the outcome of interest because this measure was consistently assessed at each wave during the study period.

Survey Date. We used survey date as the time scale to assess changes over time. Survey date was entered into each model as a continuous variable representing the number of days since March 10, ending on July 21 (range, 0-133). Given evidence of non-linear changes in the number of drinking days over time, we modelled survey date with restricted cubic splines, which generate smoothed curves for the relationship between continuous exposures and outcomes. Cubic splines capture features that may be missed by traditional techniques such as linear models or categorization into bins (31). We generated splines with five knots using the percentiles recommended by Harrell [5, 27.5, 50, 72.5, and 95] to allow for greater variability in modelling and for more flexible interpretation of these non-linear trends (32). The knots corresponded to the following dates: March 12 [day 2], April 22 [day 43], May 20 [day 71], June 17 [day 99], and July 15 [day 127].

Sociodemographic characteristics were measured at baseline as time-fixed variables. These included age (18-29, 30-49, 50-64, or 65+), sex (female or male), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic/Latino of any race, or other [American Indian or Alaskan Native, Asian, Pacific Islander, or Multi-racial]), and state of residence classified according to Census regions (Midwest, South, West, and Northeast). We also included an indicator for whether an individual was living in a household above or below the Federal poverty line (FPL). Data for annual household income were recorded in categories; we calculated the median for each category and divided this by the number of individuals in the household to estimate the income per household member. This was used to classify individuals as living in a household above or below the poverty line according to the 2020 Federal Poverty Guidelines. We also included a variable reflecting household structure. Respondents reported their relationships to other household members, as well as the ages of those members; we used this to classify individuals into five categories of household structure (living alone, living with a partner only, living with a partner and children, living with children only, and other [such as living with parents or other relatives, and living with non-relatives]).

Statistical Analysis

Association of Date and Sociodemographic Characteristics with Drinking Days. We used mixed-effects linear regression models with a random effect for participant to accommodate repeated measures. Analyses were conducted in three stages. First, we estimated a series of models to examine the association of each sociodemographic characteristic with the average number of drinking days across the entire survey period. Second, we estimated a single model with the splines for days since March 10 as covariates

to examine the trajectory of drinking days over time among all US adults. Third, we estimated a series of models with interactions between the splines for days since March 10 and each of the identified sociodemographic characteristics to determine whether trajectories of drinking days over time differed between sociodemographic subgroups. Wald tests were used to determine if interactions were statistically significant. The *margins* and the *xbrcspline* commands in Stata were used to generate linear predictions of drinking days and to estimate differences in the number of drinking days on given survey dates compared to March 11, respectively, in the overall sample and stratified by each sociodemographic subgroup (33). March 11 was used as the reference date instead of March 10 due to a higher number of observations (1,430 versus 240, respectively).

To test the sensitivity of our findings to the exclusion of non-drinkers, we re-estimated our models in the complete sample of drinkers and non-drinkers across the study period.

All analyses incorporated survey weights that account for probabilities of sample selection and survey non-response and are aligned with Current Population Survey benchmarks. Missing observations due to survey non-response were handled with full information maximum likelihood estimation. Statistical significance was assessed at the $p<.05$ level. Analyses were conducted using Stata version 16 (StataCorp Inc., College Station, TX) and R (R studio version 1.2.5042; R version 4.0.0). This analysis was not pre-registered and results presented in this study should be considered exploratory.

RESULTS

Across the study period, the overall average number of drinking days among participants who reported alcohol use was 2.23 days (95% CI=2.19, 2.26) in the past 7 days.

Associations of Sociodemographic Characteristics and Number of Drinking Days

Sample characteristics and differences in the number of drinking days across the study period are reported in Table 1. The number of drinking days was lower among females (β=-0.79; 95% CI=-0.92, -0.67) compared to males; Black (β=-0.78; 95% CI=-0.99, -0.57), Hispanic/Latino (β=-1.11; 95% CI=-1.25, -0.97), and participants in the other race/ethnicity group (β=-0.84; 95% CI=-1.03, -0.64) compared to White respondents; adults living alone (β=-0.42; 95% CI=-0.63, -0.22), with a partner and children (β=-0.65; 95% CI=-0.82, -0.48), with children only (β=-0.86; 95% CI=-1.16, -0.57), and in other household structures (β=-0.89; 95% CI=-1.06, -0.72), compared to adults living with a partner only; and in adults living at or below the FPL (β=-0.74; 95% CI=-0.92, -0.55), compared to above the FPL. The number of drinking days was higher in older age groups (30-49: β=0.48; 95% CI=0.32, 0.63; 50-64: β=0.79; 95% CI=0.62, 0.97; 65+: β=1.41; 95% CI=1.20, 1.63) compared to those ages 18-29. No significant differences in the number of drinking days were observed between US census regions.

Trajectory of Drinking Days Over Time

Differences in the number of drinking days on selected dates, compared to March 11, are reported in Table 2. Compared to March 11, on average, US adults overall reported 0.36 (95% CI=0.30, 0.43) more drinking days on April 1, 0.55 (95% CI=0.47, 0.63) more drinking days on May 1, 0.41 (95% CI=0.33, 0.49) more drinking days on June 1, and 0.39 (95% CI=0.31, 0.48) more drinking days on July 1.

Trajectories of Drinking Days Over Time Among Sociodemographic Subgroups

Results for each sociodemographic subgroup are displayed in Table 2. The predicted number of drinking days and 95% CIs on each day of the survey period, for each sociodemographic subgroup, are displayed in Figure 1. Interactions between survey date and

each covariate (sex, age, race/ethnicity, household structure, FPL, and census region) were statistically significant, indicating that trajectories of drinking days differed between sociodemographic subgroups. Both male and female participants reported more drinking days over time; however, in the latter half of the survey period, increases in drinking days attenuated among female (June 1: β=0.29; 95% CI=0.18, 0.40; July 1: β=0.27; 95% CI=0.16, 0.39), but not male participants (June 1: β=0.52; 95% CI=0.41, 0.63; July 1: β=0.51; 95% CI=0.39, 0.63). All age groups engaged in a greater number of drinking days in the first half of the survey period; by the latter half, adults ages 18-29 no longer engaged in a greater number of drinking days relative to baseline (June 1: β=0.10; 95% CI=-0.17, 0.37; July 1: β=0.18; 95% CI=-0.11, 0.48), whereas a sustained increase was observed among adults ages 65+ (June 1: β=0.53; 95% CI=0.37, 0.69; July 1: β=0.54; 95% CI=0.37, 0.70). For race/ethnicity, increases in drinking days were the largest in magnitude, and sustained over time, among White participants (April 1: β=0.41; 95% CI=0.35, 0.48; May 1: β=0.61; 95% CI=0.52, 0.70; June 1: β=0.48; 95% CI=0.39, 0.57; July 1: β=0.51; 95% CI=0.42, 0.61) compared to Black, Hispanic/Latino, and other racial/ethnic groups. For household structure, sustained increases in drinking days were observed among those living with a partner only, alone, or with a partner and children, whereas drinking days returned to a level comparable to baseline for those living with children only or in other household structures. A sustained increase in drinking days was observed for people living above the FPL, whereas drinking days for those living below the FPL returned to a level comparable to baseline in the latter half of the survey period (June 1: β=0.03; 95% CI=-0.25, 0.32; July 1: β=-0.13; 95% CI=-0.42, 0.17). Increases in drinking days were observed across all regions, with slightly varying magnitudes over time.

Sensitivity Analysis. There were sociodemographic differences observed between those in the full sample compared to those included in the analytic sample with respect to sex, age, race, household structure, and poverty status (see Supplementary Table 3). However, the pattern of results in the complete sample of drinkers and non-drinkers was broadly similar to the main analyses (see Supplementary Table 4), suggesting that our findings were not sensitive to the exclusion of non-drinkers.

DISCUSSION

In this study, we examined longitudinal changes in number of drinking days in the past 7-days among a nationally-representative sample of U.S. adults who reported any alcohol use between March 10 and July 21, 2020. We found that, in the overall sample, the number of drinking days appeared to peak in early May and remained significantly elevated through July 1, compared to March. Although some sociodemographic subgroups experienced decreases in the number of drinking days after an initial increase, other groups – including males; older adults; those living with a partner only, alone, or with a partner and children; those living above the FPL; and White respondents – had sustained increases in drinking days over time. This observed split response in trends of drinking behavior is consistent with evidence from other studies that have found that some sociodemographic subgroups have decreased alcohol consumption, while others have increased (21,22,34–36).

While we observed significant increases in drinking days among the overall sample and multiple sociodemographic subgroups, these observed changes were small in absolute terms, corresponding to differences of less than one drinking day. However, this reflects significant percent increases (from baseline) ranging from 9% - 51%. Furthermore, it is important to note that number of drinking days in isolation may yield an incomplete picture of changes in

alcohol consumption, as we did not have consistent information on quantity of alcohol consumption (e.g., number of drinks per day) which could provide more context to these observed changes.

In previous research, certain sociodemographic characteristics have been associated with alcohol consumption (8,9,37,38). This is reflected in our findings, particularly with respect to increased alcohol consumption among males and older adults (8). In the context of the COVID-19 pandemic, one study showed increases in drinking behavior among males in April compared to February (26). Our study expands upon these findings, showing increases in the number of drinking days among both males and females, but that remained elevated over time for males and attenuated slightly for females. The attenuation in the number of drinking days among females could be a result of differences in coping abilities or strategies between these two groups (39).

While all age groups demonstrated increases in the number of drinking days, this increase was sustained most notably among those aged 65 and older, a particularly vulnerable group related to adverse effects from social isolation (40). Our finding contrasts those in other countries, where older adults were significantly less likely to report an increase in drinking (23,24). Older adults are at high risk for disability, morbidity, and mortality from alcohol-related diseases, the prevalence of which have increased over the last decade (41). Moreover, health risks related to alcohol use, such as suppression of immune functioning, could increase risk of COVID-19 infection or complications from the virus, which is already at high risk of adverse health consequences due to COVID-19.

Finally, there was a sustained increase in drinking days observed for those living above the FPL, while those living below the FPL returned to levels comparable to baseline. This

finding is consistent with other studies who have observed increased alcohol consumption among those in higher income brackets (24). Reductions in alcohol consumption among those with lower income may be due to decreased financial ability, particularly with the high rates of unemployment in the U.S. and delayed government response to provide consistent economic relief. Our findings within this subgroup analysis could also have implications for other observed trends, such as attenuation in drinking behavior among females and non-White participants. The negative effects of the pandemic, including mortality, loss of employment/income, and psychological distress, have disproportionately affected racial/ethnic minorities and women (3,42,43), which could in turn limit access to alcohol due to stress and financial burden.

We recommend public health efforts, such as education, screening and surveillance, to support vulnerable subgroups and to avert both sustained alcohol consumption and potential transitions to problematic drinking. It is important to provide public health warnings about excessive alcohol consumption to prevent adverse effects of problematic alcohol use and to promote alternative positive coping strategies in response to stressful experiences. Although there are various motives for alcohol consumption, research has found that individuals who drink to cope in response to stress are at heightened risk for alcohol-related problems (44–46). Research from prior disasters and other stressful events has observed long-term increases in drinking as a result of distress (47–50). There have been observed increases in mental distress and substance use to cope with the COVID-19 pandemic (14). It is imperative to consider the impact of COVID-19 related stressors among the U.S. population and monitor changes in risk behaviors, such as drinking, in response to these stressors.

It is also important to consider the environment in which individuals engage in alcohol consumption. With the closure of bars and restrictions on social gatherings, it is possible that there could be increased solitary drinking, which has been linked to symptoms of alcohol use disorder and other adverse mental health outcomes (51–53). Our study found sustained increases in alcohol consumption among those who reported living alone and suggests that alcohol consumption within the context of COVID-19 social distancing measures, particularly among those who may engage in solitary drinking, require further attention.

There are limitations of this study that are important to note. First, the survey did not collect data on the total number of standard drinks per drinking day. Thus, we are unable to examine the prevalence of binge drinking and potential changes in the quantity of alcohol consumption. Second, survey dates were not randomly assigned at the first wave of data collection, and differences among participants who responded on earlier dates compared to those who responded on later dates could bias the observed results, though based on our sensitivity analysis, we do not have evidence to suggest that this caused significant bias in our analysis. Third, there were a number of sociodemographic characteristics that are known to be related to drinking behavior that were not examined such as sexual or gender identity, or time-varying covariates like employment status. Future research should examine changes in and trajectories of drinking behavior in these groups. Fourth, there were some sociodemographic differences observed between participants who responded to all surveys compared to those who missed at least one survey. To the extent that participants who missed at least one survey collection period differed in their trajectory of drinking behavior, this may have biased our findings. Fifth, there were sociodemographic differences observed between those included in the analytic sample (i.e., those who reported drinking any alcohol during

the study period) compared to those who reported no alcohol use, which may have affected the representativeness of our sample. Finally, the study used measures of drinking behavior on March 11 as the baseline for comparison and it is possible that some changes in drinking behavior in response to the pandemic had already occurred before that date.

Throughout the COVID-19 pandemic, frequency of drinking among US adults has increased, peaking in early May, and remained at increased levels through mid-July. Increased levels of drinking days were observed in some sociodemographic subgroups, particularly among men, White adults, those above the federal poverty line, and older adults. Supportive efforts and resources to prevent short- and long-term problematic alcohol consumption during and after the COVID-19 pandemic should be targeted at the population at large, as well as selectively at key subgroups who are identified to be at higher risk. As the pandemic continues, monitoring of alcohol consumption, as well as the incidence of problem drinking and alcohol use disorder, will be important priorities for public health surveillance and research.

Contributor and guarantor information

Courtney D. Nordeck led the conceptualization, drafting of the original manuscript, and finalization of the final manuscript. Kira E. Riehm led the data analysis and contributed to the drafting and interpretation of the methods and results. Emily J. Smail and Calliope Holingue contributed to data analysis related to the present manuscript. All listed co-authors contributed to the review and editing of the manuscript. Johannes Thrul contributed to the conceptualization of the manuscript and methodology and provided guidance with the original draft. Johannes Thrul is also the guarantor for the manuscript, accepting responsibility for the published work.

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Table 1. Descriptive statistics of sample characteristics for US adults at the first survey wave and associations with number of reported drinking days across the survey period (n=4,298).

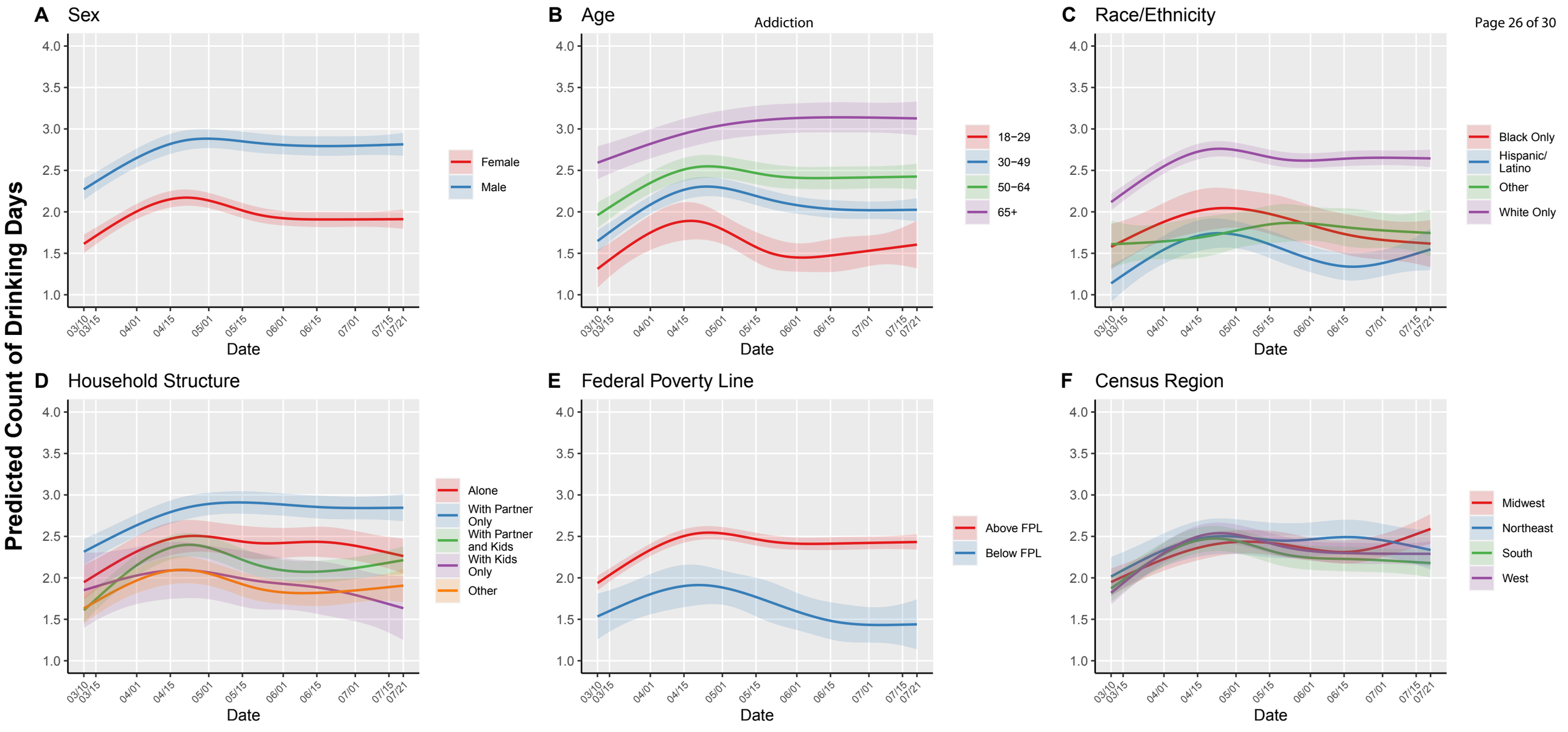
Variable	n (%)	β (95% CI)
Sex		
Male	1,889 (50.6)	ref.
Female	2,409 (49.4)	**-0.79 (-0.92,-0.67)**
Age		
18-29	522 (13.1)	ref.
30-49	1,652 (42.1)	**0.48 (0.32,0.63)**
50-64	1,261 (26.5)	**0.79 (0.62,0.97)**
65+	863 (18.3)	**1.41 (1.20,1.63)**
Race		
White	2,910 (64.5)	ref.
Black	307 (11.3)	**-0.78 (-0.99,-0.57)**
Hispanic/Latino	680 (16.2)	**-1.11 (-1.25,-0.97)**
Other	401 (8.1)	**-0.84 (-1.03,-0.64)**
Household Structure		
With Partner Only	1,324 (29.8)	ref.
Alone	715 (15.6)	**-0.42 (-0.63,-0.22)**
With Partner and Kids	1,077 (26.3)	**-0.65 (-0.82,-0.48)**
With Kids Only	182 (4.2)	**-0.86 (-1.16,-0.57)**
Other	1,000 (23.6)	**-0.89 (-1.06,-0.72)**
Federal Poverty Line		
Above	3,858 (87.2)	ref.
Below	440 (12.8)	**-0.74 (-0.92,-0.55)**
Census Region		
South	1,001 (34.0)	ref.
Midwest	1,053 (22.7)	0.08 (-0.10,0.26)
Northeast	473 (18.6)	0.15 (-0.08,0.37)
West	1,771 (24.8)	0.06 (-0.11,0.22)

Notes: All percentages are weighted. Bold font indicates statistical significance. Parameter estimates represent unstandardized coefficients.

Table 2. Differences in the number of reported drinking days on different dates in the survey period, compared to 03/11/2020, overall and stratified by sociodemographic characteristics, among US adults in the UAS Panel, 2020 (n=4,298).

Population	Mean Number of Drinking Days in the Past Week on March 11	Difference in Number of Drinking Days[a], β (95% CI)				p-value for Interaction[b]
		04/01	05/01	06/01	07/01	
Overall	1.82	**0.36 (0.30,0.43)**	**0.55 (0.47,0.63)**	**0.41 (0.33,0.49)**	**0.39 (0.31,0.48)**	N/A
Sex						
Male	2.16	**0.36 (0.27,0.45)**	**0.59 (0.48,0.71)**	**0.52 (0.41,0.63)**	**0.51 (0.39,0.63)**	**0.005**
Female	1.48	**0.37 (0.29,0.45)**	**0.50 (0.39,0.62)**	**0.29 (0.18,0.40)**	**0.27 (0.16,0.39)**	
Age						
18-29	0.86	**0.41 (0.20,0.61)**	**0.44 (0.19,0.69)**	0.10 (-0.17,0.37)	0.18 (-0.11,0.48)	**< 0.001**
30-49	1.72	**0.42 (0.31,0.52)**	**0.62 (0.47,0.76)**	**0.41 (0.28,0.54)**	**0.35 (0.21,0.49)**	
50-64	1.83	**0.37 (0.26,0.48)**	**0.56 (0.42,0.70)**	**0.43 (0.30,0.56)**	**0.44 (0.29,0.58)**	
65+	2.57	**0.22 (0.12,0.31)**	**0.44 (0.29,0.59)**	**0.53 (0.37,0.69)**	**0.54 (0.37,0.70)**	
Race						
White	1.99	**0.41 (0.35,0.48)**	**0.61 (0.52,0.70)**	**0.48 (0.39,0.57)**	**0.51 (0.42,0.61)**	**< 0.001**
Black	1.83	**0.28 (0.05,0.51)**	**0.44 (0.15,0.73)**	0.24 (-0.02,0.50)	0.06 (-0.24,0.37)	
Hispanic/Latino	1.40	**0.38 (0.20,0.57)**	**0.56 (0.29,0.82)**	0.26 (-0.01,0.53)	0.22 (-0.06,0.49)	
Other	1.22	0.03 (-0.22,0.28)	0.16 (-0.15,0.47)	0.25 (-0.04,0.53)	0.16 (-0.13,0.46)	
Household Structure						
With Partner Only	2.31	**0.30 (0.21,0.40)**	**0.56 (0.43,0.70)**	**0.56 (0.43,0.68)**	**0.51 (0.38,0.65)**	**< 0.001**
Alone	1.84	**0.35 (0.20,0.51)**	**0.53 (0.34,0.72)**	**0.46 (0.28,0.63)**	**0.42 (0.23,0.62)**	
With Partner and Kids	1.55	**0.52 (0.40,0.63)**	**0.73 (0.56,0.89)**	**0.45 (0.30,0.60)**	**0.48 (0.33,0.64)**	
With Kids Only	2.02	0.17 (-0.12,0.46)	0.20 (-0.28,0.69)	0.07 (-0.43,0.56)	-0.07 (-0.58,0.44)	
Other	1.38	**0.32 (0.17,0.46)**	**0.40 (0.21,0.59)**	0.17 (-0.02,0.37)	0.20 (-0.01,0.40)	
Federal Poverty Line						
Above	1.82	**0.38 (0.32,0.44)**	**0.58 (0.49,0.67)**	**0.46 (0.38,0.54)**	**0.47 (0.38,0.55)**	**0.003**
Below	1.86	**0.25 (0.03,0.47)**	**0.32 (0.06,0.59)**	0.03 (-0.25,0.32)	-0.13 (-0.42,0.17)	
Census Region						
South	1.80	**0.40 (0.29,0.51)**	**0.55 (0.41,0.69)**	**0.35 (0.21,0.49)**	**0.32 (0.16,0.48)**	**0.004**
Midwest	1.70	**0.26 (0.15,0.38)**	**0.47 (0.31,0.63)**	**0.39 (0.24,0.53)**	**0.43 (0.28,0.58)**	
Northeast	2.00	**0.30 (0.15,0.46)**	**0.47 (0.24,0.70)**	**0.43 (0.21,0.65)**	**0.42 (0.21,0.64)**	
West	1.83	**0.46 (0.35,0.56)**	**0.68 (0.54,0.82)**	**0.48 (0.34,0.62)**	**0.45 (0.29,0.61)**	

Notes. [a]Reference is the number of drinking days on 03/11/2020. [b]Interaction terms are between the splines for days since 03/10/2020 and each sociodemographic characteristic. Bold font indicates statistical significance.


A Sex
B Age
Addiction
C Race/Ethnicity
D Household Structure
E Federal Poverty Line
F Census Region
Predicted Count of Drinking Days
Date
Female
Male
18−29
30−49
50−64
65+
Black Only
Hispanic/ Latino
Other
White Only
Alone
With Partner Only
With Partner and Kids
With Kids Only
Other
Above FPL
Below FPL
Midwest
Northeast
South
West

Supplementary Table 1. Number of observations for each survey date.

Date	Number of Observations	Date	Number of Observations	Date	Number of Observations
03/10	240	05/01	259	06/22	293
03/11	1,430	05/02	270	06/23	316
03/12	548	05/03	263	06/24	168
03/13	473	05/04	303	06/25	133
03/14	263	05/05	284	06/26	137
03/15	130	05/06	270	06/27	150
03/16	321	05/07	264	06/28	165
03/17	159	05/08	267	06/29	306
03/18	94	05/09	257	06/30	268
03/19	64	05/10	258	07/01	320
03/20	151	05/11	293	07/02	276
03/21	57	05/12	276	07/03	286
03/22	47	05/13	279	07/04	261
03/23	44	05/14	290	07/05	276
03/24	31	05/15	261	07/06	387
03/25	76	05/16	257	07/07	309
03/26	20	05/17	257	07/08	294
03/27	18	05/18	290	07/09	272
03/28	18	05/19	294	07/10	299
03/29	36	05/20	272	07/11	246
03/30	16	05/21	262	07/12	246
03/31	62	05/22	276	07/13	295
04/01	160	05/23	257	07/14	304
04/02	193	05/24	270	07/15	255
04/03	223	05/25	261	07/16	258
04/04	218	05/26	290	07/17	260
04/05	220	05/27	285	07/18	247
04/06	237	05/28	268	07/19	252
04/07	249	05/29	277	07/20	279
04/08	241	05/30	250	07/21	280
04/09	242	05/31	270		
04/10	237	06/01	286		
04/11	253	06/02	268		
04/12	266	06/03	266		
04/13	278	06/04	253		
04/14	272	06/05	292		
04/15	238	06/06	255		
04/16	279	06/07	273		
04/17	278	06/08	284		
04/18	262	06/09	280		
04/19	258	06/10	279		
04/20	299	06/11	268		
04/21	285	06/12	259		
04/22	268	06/13	246		
04/23	278	06/14	246		
04/24	273	06/15	298		
04/25	255	06/16	283		
04/26	276	06/17	260		
04/27	312	06/18	246		
04/28	272	06/19	255		
04/29	274	06/20	248		
04/30	282	06/21	281		

Supplementary Table 2. Pearson's chi-squared comparisons between participants completing all 9 waves (n=2,673) and those completing 8 waves or fewer (n=1,625).

Variable	Completed 8 Waves or Fewer (n=1,625); N (%)	Completed 9 Waves (n=2,673); N (%)	P-value
Sex			
Male	646 (44.6)	1,243 (54.4)	**< 0.01**
Female	979 (55.4)	1,430 (45.6)	
Age			
18-29	283 (19.4)	239 (9.1)	**< 0.01**
30-49	735 (49.4)	917 (37.5)	
50-64	405 (21.0)	856 (30.0)	
65+	202 (10.2)	661 (23.5)	
Race			
White	976 (57.5)	1,934 (68.9)	**< 0.01**
Black	124 (11.9)	183 (10.9)	
Hispanic/Latino	349 (21.7)	331 (12.8)	
Other	176 (9.0)	225 (7.5)	
Household Structure			
With Partner Only	415 (23.2)	909 (34.0)	**< 0.01**
Alone	236 (14.1)	479 (17.1)	
With Partner and Kids	443 (29.3)	634 (24.4)	
With Kids Only	74 (4.9)	108 (3.9)	
Other	457 (28.4)	543 (20.6)	
Federal Poverty Line			
Above	1,438 (84.1)	2,420 (89.2)	**< 0.01**
Below	187 (16.0)	253 (10.8)	
Census Region			
South	370 (34.4)	631 (33.7)	0.46
Midwest	373 (23.2)	680 (22.3)	
Northeast	150 (16.9)	323 (19.6)	
West	732 (25.5)	1,039 (24.3)	

Notes: All percentages are weighted. Bold font indicates statistical significance.

Supplementary Table 3. Comparison of drinkers and non-drinkers on sociodemographic characteristics (n=6,605).

Variable	N (%) Drinkers (n=4,298)	N (%) Non-Drinkers (n=2,307)	P-value for Chi-Square Test
Sex			
Male	1,889 (44.0)	865 (37.5)	**< 0.001**
Female	2,409 (56.0)	1,442 (62.5)	
Age			
18-29	522 (12.2)	217 (9.4)	
30-49	1,652 (38.4)	757 (32.8)	**< 0.001**
50-64	1,261 (29.3)	733 (31.8)	
65+	863 (20.1)	600 (26.0)	
Race			
White	2,910 (67.7)	1,462 (63.4)	
Black	307 (7.1)	193 (8.4)	**< 0.001**
Hispanic/Latino	680 (15.8)	369 (16.0)	
Other	401 (9.3)	283 (12.3)	
Household Structure			
With Partner Only	1,324 (30.8)	422 (18.3)	
Alone	715 (16.6)	655 (28.4)	
With Partner and Kids	1,077 (25.1)	494 (21.4)	**< 0.001**
With Kids Only	182 (4.2)	101 (4.4)	
Other	1,000 (23.3)	635 (27.5)	
Federal Poverty Line			
Above	3,858 (89.8)	1,900 (82.4)	**< 0.001**
Below	440 (10.2)	407 (17.6)	
Census Region			
South	1,001 (23.3)	690 (29.9)	
Midwest	1,053 (24.5)	490 (21.2)	**< 0.001**
Northeast	473 (11.0)	232 (10.1)	
West	1,771 (41.2)	895 (38.8)	

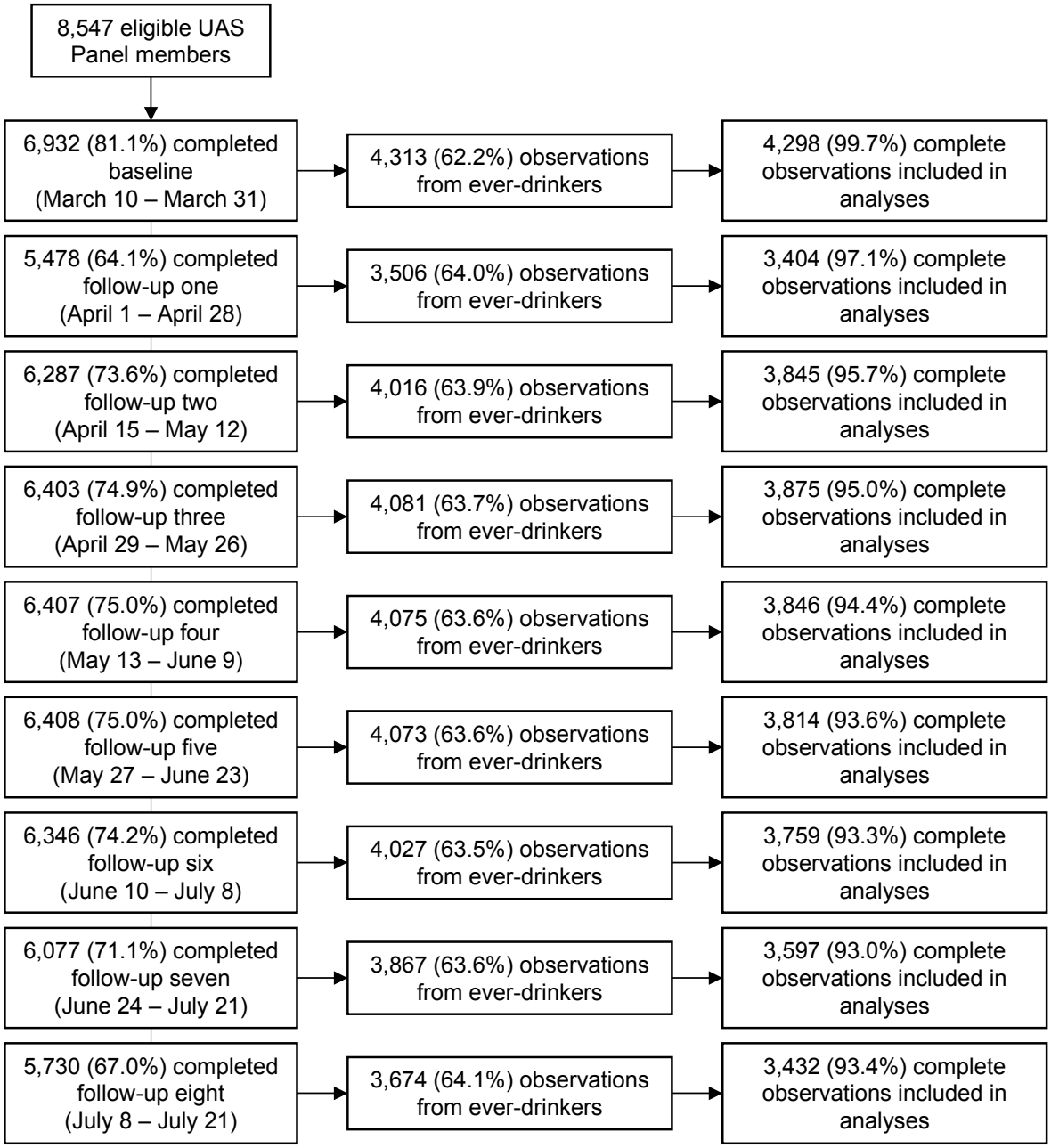
Notes: Bold font indicates statistical significance.

Supplementary Table 4. Differences in the number of drinking days on different dates in the survey period, compared to 03/11/2020, overall and stratified by sociodemographic characteristics, among US adult drinkers and non-drinkers in the UAS Panel, 2020 (n=6,605).

Population	Mean Number of Drinking Days in the Past Week on March 11	Difference in Frequency of Alcohol Consumption[a], β (95% CI)				P-value for Interaction[b]
		04/01	05/01	06/01	07/01	
Overall	1.14	**0.24 (0.20,0.27)**	**0.36 (0.30,0.41)**	**0.26 (0.21,0.32)**	**0.26 (0.20,0.31)**	N/A
Sex						
Male	1.41	**0.24 (0.18,0.30)**	**0.40 (0.32,0.48)**	**0.35 (0.27,0.43)**	**0.34 (0.26,0.42)**	**0.003**
Female	0.89	**0.23 (0.18,0.28)**	**0.31 (0.24,0.39)**	**0.18 (0.11,0.25)**	**0.17 (0.10,0.24)**	
Age						
18-29	0.60	**0.29 (0.15,0.43)**	**0.32 (0.15,0.49)**	0.08 (-0.11,0.27)	0.14 (-0.07,0.34)	
30-49	1.18	**0.28 (0.21,0.35)**	**0.42 (0.32,0.52)**	**0.28 (0.19,0.37)**	**0.24 (0.15,0.33)**	**< 0.001**
50-64	1.08	**0.23 (0.16,0.30)**	**0.35 (0.26,0.45)**	**0.28 (0.19,0.36)**	**0.28 (0.18,0.37)**	
65+	1.41	**0.13 (0.07,0.18)**	**0.26 (0.17,0.35)**	**0.31 (0.21,0.40)**	**0.31 (0.22,0.41)**	
Race						
White	1.27	**0.27 (0.23,0.31)**	**0.40 (0.34,0.46)**	**0.32 (0.26,0.37)**	**0.34 (0.28,0.40)**	
Black	1.13	**0.18 (0.04,0.33)**	**0.29 (0.10,0.47)**	0.16 (-0.01,0.33)	0.05 (-0.14,0.24)	**< 0.001**
Hispanic/Latino	0.91	**0.25 (0.13,0.37)**	**0.37 (0.19,0.54)**	0.18 (0.00,0.35)	0.15 (-0.03,0.32)	
Other	0.65	0.02 (-0.12,0.16)	0.10 (-0.08,0.27)	0.14 (-0.01,0.30)	0.10 (-0.07,0.26)	
Household Structure						
With Partner Only	1.50	**0.20 (0.14,0.27)**	**0.38 (0.29,0.47)**	**0.37 (0.29,0.46)**	**0.34 (0.25,0.43)**	
Alone	1.08	**0.22 (0.12,0.31)**	**0.33 (0.21,0.45)**	**0.29 (0.18,0.40)**	**0.26 (0.14,0.38)**	
With Partner and Kids	1.07	**0.35 (0.27,0.44)**	**0.50 (0.39,0.61)**	**0.31 (0.21,0.42)**	**0.33 (0.23,0.44)**	**< 0.001**
With Kids Only	1.32	0.13 (-0.07,0.32)	0.16 (-0.16,0.47)	0.06 (-0.27,0.39)	-0.03 (-0.37,0.30)	
Other	0.78	**0.19 (0.10,0.27)**	**0.24 (0.13,0.35)**	0.11 (-0.01,0.22)	0.12 (0.00,0.24)	
Federal Poverty Line						
Above	1.16	**0.25 (0.21,0.29)**	**0.39 (0.33,0.44)**	**0.30 (0.25,0.36)**	**0.31 (0.25,0.37)**	**< 0.001**
Below	1.08	**0.14 (0.02,0.26)**	**0.18 (0.04,0.33)**	0.03 (-0.12,0.18)	-0.06 (-0.21,0.10)	
Census Region						
South	1.01	**0.23 (0.17,0.30)**	**0.32 (0.24,0.41)**	**0.20 (0.12,0.29)**	**0.19 (0.09,0.28)**	
Midwest	1.19	**0.19 (0.11,0.27)**	**0.34 (0.23,0.45)**	**0.28 (0.18,0.38)**	**0.30 (0.20,0.41)**	**0.003**
Northeast	1.33	**0.20 (0.10,0.31)**	**0.31 (0.16,0.47)**	**0.29 (0.14,0.44)**	**0.28 (0.14,0.42)**	
West	1.18	**0.31 (0.24,0.38)**	**0.46 (0.36,0.56)**	**0.33 (0.23,0.42)**	**0.30 (0.20,0.41)**	

Notes. [a]Reference is the frequency of alcohol consumption on 03/11/2020. [b]Interaction terms are between the splines for days since 03/10/2020 and each sociodemographic characteristic. Bold font indicates statistical significance.

Supplementary Figure 1. Flow diagram of response rates, proportion of observations from ever drinkers, and proportion of complete observations at each wave.



Note: Complete observation indicates that data was available for all identified covariates at baseline (Wave 1 – March 10 through March 31).