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## Characteristics associated with buying alcohol to-go and for delivery during the first year of the COVID-19 pandemic among a national sample of US adults

Pamela J. Trangenstein, PhD<sup>1,\*</sup>, Katherine J. Karriker-Jaffe, PhD<sup>2</sup>, Thomas K. Greenfield, PhD<sup>1</sup>, William C. Kerr, PhD<sup>1</sup>

<sup>1</sup>Alcohol Research Group, Public Health Institute, Emeryville, CA

<sup>2</sup>Center for Behavioral Health Epidemiology, Implementation & Evaluation Research, RTI International, Berkeley, CA

### Abstract

**Introduction:** This study 1) determined the population coverage of alcohol delivery and to-go/carryout policies (i.e., policies permitting bars/restaurants to sell individual drinks for off-site consumption) in 2019 and 2020 and 2) identified characteristics associated with alcohol delivery and to-go purchases.

**Methods:** Data are from the National Alcohol Survey and Alcohol Policy Information System (n=1,677 adults, 52.1% female). Population coverage models summed state populations across state-level bar/restaurant delivery and to-go/carryout policies by beverage. Regression outcomes were past-year: 1) alcohol delivery and 2) to-go purchases. Independent variables included demographics, excessive drinking, COVID-19 impacts, and state COVID-19 bar/restaurant alcohol laws. Chi-squared tests and logistic regression models tested associations between delivery/to-go purchases and independent variables.

**Results:** Overall, 7.5% of adults had alcohol delivered, and 14.5% bought alcohol to-go. From December 2019 to December 2020, the number of people living in states allowing beer/wine/spirits delivery (284%) and to-go sales (627%) rose steeply. People who were Black (vs. White; *aOR*=2.92, *p*<0.001), excessive drinkers (vs. non-excessive drinkers; *aOR*=2.06, *p*<0.001), or lived in states allowing beer/wine/spirits to-go sales (*aOR*=2.20, *p*=0.01) had higher odds of buying alcohol to-go. Conversely, older people had lower odds of buying alcohol to-go (*aOR*=0.97, *p*<0.001). People with some college or more (vs. high school degree or less, *aOR*=2.21, *p*<0.001)

\*Corresponding author Pamela J. Trangenstein, Alcohol Research Group, 6001 Shellmound Street, Suite 450, Emeryville, CA 94608, ptrangenstein@arg.org.

#### AUTHOR CONTRIBUTIONS

PT and WK conceptualized the study, and PT conducted the analyses with guidance from TG, KJJ, and WK. PT and KJJ wrote the manuscript, and all authors read the final draft and provided substantive comments.

#### DECLARATION OF COMPETING INTERESTS

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and a higher economic burden (vs. fewer COVID-19 impacts,  $aOR=2.32$ ,  $p=0.05$ ) had higher odds of alcohol delivery.

**Discussion and conclusions:** A select sub-population defined by socioeconomic status, race, excessive drinking, and state policies bought alcohol for delivery or to-go in the US.

### Keywords

Alcohol; home delivery; to-go sales; alcohol policy; COVID-19; pandemic; retail sales; availability

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## INTRODUCTION

The COVID-19 pandemic forced cities, counties, and states to consider the role of alcohol availability regulations in the speed of virus transmission. In bars/restaurants, customers remove their masks to drink alcohol, and “alcohol myopia” (i.e., intoxicated drinkers’ inability to process similar amounts of information as sober people, resulting in a focus on present (vs. future) costs and benefits) may reduce their adherence to physical distancing and hygiene recommendations (1-3). Jurisdictions across the United States (US) temporarily reduced bar/restaurant hours or required them to close (4) to limit the spread of COVID-19. As these and other restrictions remained in place, a narrative emerged that framed public health policy as a threat to the hospitality sector’s economic viability (5, 6). Partly to reduce COVID-19 transmission risk in bars/restaurants (7-9) and protect hospitality sector revenues (10, 11), states increasingly allowed establishments to sell alcohol to-go and by delivery. By the end of 2020, two-thirds of states had expanded access to alcohol home delivery and to-go/carryout services, primarily via bars/restaurants (4, 12). Many of these changes were codified in permanent laws.

It is unknown what percentage of US drinkers buy alcohol to-go, and there are no nationally representative prevalence estimates of alcohol delivery purchases. A convenience sample from May 2020 found 20.0% of past 30-day drinkers had alcohol delivered during the past month, and 17.0% of adults from New Brunswick and Nova Scotia, Canada had alcohol delivered between March and June 2020 (13). The International Wines and Spirits Record reported 43% of US drinkers who got alcohol delivered in 2020 had never received such a delivery previously (14). However, their report omitted the underlying prevalence of alcohol delivery purchases. Prevalence rates are essential to understanding new phenomena, including whether and how these purchases affect public health and the hospitality industry’s revenues.

Prior to the COVID-19 pandemic, alcohol delivery was largely confined to off-premise alcohol outlets, such as liquor and grocery stores, in the US. These laws often were designed to facilitate the sale of large volumes of alcohol (e.g., kegs of beer). During the COVID-19 pandemic, 6 states granted off-premise outlets the ability to deliver spirits for the first time (15). States de-regulated bar/restaurant alcohol delivery far more rapidly. During the first year of the pandemic, 29 states permitted bars/restaurants to begin delivering beer, wine, and spirits (15).

To the best of our knowledge, no studies have assessed demographic profiles of drinkers who buy alcohol to-go. Few studies have examined characteristics of those who got alcohol delivered (13, 16-19), and two of the three analyses from the US are more than two decades old (20, 21). Piecing together findings from these studies, it appears some sub-populations, such as men and those with more education, tend to use delivery services (13, 22). Alcohol delivery is also more common among heavier drinkers (16, 17, 19, 20, 22), including those who drank more during the pandemic (13, 18, 22). A clearer understanding of the sub-population(s) who purchase alcohol for delivery and to-go in the US may assist researchers in refining important questions about alcohol access by considering relevant sub-populations.

To directly address these gaps, the present study: 1) determined the population coverage of alcohol delivery and to-go/carryout policies during December 2019 and December 2020, 2) compared alcohol consumption patterns among persons who order alcohol for delivery (vs. not) and who purchased alcohol to-go (vs. not) in bivariate models, and 3) identified demographic and behavioral characteristics associated with alcohol delivery and to-go purchases in adjusted models.

## METHODS

### Sampling and data collection procedures

This study used data from the US National Alcohol Survey (NAS), a population-based survey that includes adult (age 18+) respondents from the 50 states and the District of Columbia. NAS conducted two interviews approximately one year apart, corresponding approximately with the year before and the first year of the COVID-19 pandemic. We conducted a complete case analysis using data from the second survey because the alcohol delivery and to-go questions were only asked during follow up. However, we briefly summarize the first data collection to describe the how our analytic sample was initially recruited and contextualize our sample within the larger data collection. All study protocols were approved by the institution's IRB.

The main study ("baseline") probability sample of respondents were recruited via random-digit dialing (RDD) and address-based sampling (ABS). Regardless of the recruitment method, counties (RDD) or census block groups (ABS) with 40% of the population identified as Black or Hispanic/Latinx were oversampled to increase representation from these communities. The target percentages were 23% Black and 22% Hispanic/Latinx. Interviewers administered the survey over the phone to the RDD sample. The ABS mail push-to-web sample was recruited using three successive contacts: an invitation letter with a \$1 pre-payment, a reminder postcard, and a final reminder letter. The ABS sample completed the survey online. All respondents could complete the survey in English or Spanish, and they received a \$15 to \$25 Amazon gift card, depending on whether the respondent lived in an oversampled location.

Of the 6,510 baseline respondents, 3,146 agreed to be re-contacted. The COVID-19 follow-up survey was administered from January to March 2021. Follow-up procedures were similar to the baseline ABS sample. All 3,146 baseline respondents with a valid address

were mailed an invitation letter with \$1 pre-payment and the URL for the online follow-up survey. Reminders were sent via postcards, email, or text messages. Respondents received a \$10 Amazon gift code after completing the survey online. There were 1,819 completed follow-up surveys (58% follow-up response rate and 29.4% overall response rate).

## Measures

**Alcohol policies**—The Alcohol Policy Information System (APIS) provided data on *statewide policies allowing bars/restaurants to deliver alcoholic beverages* directly or via a third-party carrier as of December 1, 2019 (pre-pandemic) and December 1, 2020 (pandemic) (4). APIS coded COVID-19 policies quarterly, so dates in the supplementary files were used to determine policy conditions as of December 1 of each year (15). Using December 1, 2020 (one to three months before the follow-up survey) ensured the policies preceded reported purchases, assuming respondents may be more likely to consider recent policy conditions when responding to the survey (23). Similarly, we used supplementary files (15) and state laws to disaggregate policies by beverage type. The delivery variable had three categories: banned from delivering alcohol (0), beer/wine delivery only (1), or beer/wine/spirits delivery (2). For consistency with APIS, cider and hard seltzer were classified as beer (24). We confirmed our coding using the supplemental appendix from a 2021 systematic review of US state alcohol delivery laws and executive orders (12).

The to-go policy variable was constructed using an analogous process. It measured whether a *statewide policy allowed to-go, carryout, or curbside sales at bars/restaurants* as of December 1, 2019 and December 1, 2020. In the population coverage analyses, the to-go policy variable was coded using three categories: banned from to-go/carryout sales (0), beer/wine to-go/carryout sales only (1), or beer/wine/spirits to-go/carryout sales (2). In the regression analyses, we combined bans and beer/wine only (0, reference group) and compared these to beer/wine/spirits to-go/carryout policies (1) because very few states only allowed bars/restaurants to sell beer/wine to-go in December 2020.

The final policy variable measured the *percent of time that bars were open* during the first year of the COVID-19 pandemic. This covariate summed the number of days bars were open from March 2020 through February 2021 then divided by 365. APIS provided these data (4, 15).

**Alcohol delivery and to-go sales purchases**—The past-year alcohol delivery indicator dichotomized responses from the question: “*Since April 1, 2020, how frequently have you had alcoholic beverages delivered to your home?*” The to-go sales question asked: “*Since April 1, 2020, how often have you purchased alcoholic ‘to-go’ drinks from restaurants or bars?*” Respondents reported answers using a five-point Likert scale ranging from “Never since April 1, 2020” to “Once a week or more often.” We categorized responses of never since April 1, 2020 as “no” (reference group) and all others as “yes.”

**Alcohol consumption**—In the bivariate analyses of alcohol consumption and purchasing behaviors, we included five past-year alcohol-related behaviors: 1) *alcohol consumption* (yes/no), 2) *exceed daily guidelines* (i.e., 4 drinks in any day for persons identified as female at birth or 5 drinks for persons identified as male at birth; yes/no), 3) *exceed*

*weekly guidelines* (i.e., 7 drinks per week for persons identified as female or >14 drinks for persons identified as male; yes/no), 4) *DSM-5 alcohol use disorder (AUD) severity* (none, mild, moderate or severe) (25), and 5) *exceed National Institute on Alcohol Abuse and Alcoholism (NIAAA) low-risk guidelines*, defined by either daily binge or weekly heavy drinking (yes to either/no to both).

**Demographics**—Regression analyses assessing predictors of purchasing behaviors used the following self-reported demographic and behavioral variables: *age* (continuous, measured in years and centered at the mean), *sex identified at birth* (male vs. female [reference group]), *race and ethnicity* (Black, Latinx, other racial groups [combined American Indian or Alaska Native and “Something else” due to small sub-sample sizes], and White [reference group]), *educational attainment* (high school or less vs. some college or more [reference group]), *total annual household income* ( \$20,000; \$20,001 to \$80,000 or missing; or >\$80,000 [reference group]), and *marital status* (married or living with a partner vs. not married [reference group]). The final demographic variable was *geographic region*, measured as Midwest, Mountain, Northeast (reference group), Pacific, or South, as drinking patterns (26, 27), alcohol sales during COVID-19 (28), and alcohol delivery/to-go policies (12) each show geographic patterning.

**COVID-19 impacts**—Three variables measured how COVID-19 affected the respondent because economic and social conditions may affect where people drink and how they purchase alcohol (29). The first was a self-reported *average household economic burden score*. This variable averaged four binary (yes/no) survey questions, which asked whether any of the following applied to someone in the respondent’s household since April 1, 2020: 1) lost their job, 2) applied for unemployment, or 3) had reduced pay or hours at work, and 4) had difficulty paying the rent/mortgage. The second COVID-19 impact variable measured *change in access to family/friends* during COVID-19; it was measured as no/mild changes (reference group) vs. moderate/severe changes. The third COVID-19 impact variable indicated whether the respondent had two or more immediate family members who were diagnosed with COVID-19 (no [reference group] vs. yes).

## Sample

Once weighted, NAS data are representative of US non-institutionalized adults 18 years of age or older from the 50 US states and the District of Columbia. We restricted the analytic sample to those with complete data for everything but income (n=1,677).

## Statistical analyses

We estimated population coverage of policies by beverage type. To do this, we summed the state populations that fell in each policy condition on December 1, 2019 and December 1, 2020. Rao Scott chi-squared tests of association investigated bivariate associations between indicators of drinking patterns and alcohol delivery and to-go purchasing behaviors (separately). Logistic regression models tested which demographic, behavioral, COVID-19 impacts, and policies were associated with the odds of reporting alcohol delivery and to-go purchases. We applied weights to adjust for unequal selection probabilities, oversampling, non-response, and attrition (i.e., loss to follow-up) as well as to align the follow-up sample

to the US population on key demographics, such as age, gender, race, and ethnicity using the “svy” commands in Stata. All analyses were performed in Stata v.16.1 (30), and the survey weights are explained in further detail in Kerr et al. (2022).

## RESULTS

The weighted analytic sample was approximately half female (52.1%), with 38.4% of respondents aged 18 to 39 years (Table 1). More than 60% of the sample were White (63.3%), employed (55.1%), had less than a college degree (67.9%), or lived in urban areas (80.3%). Smaller percentages identified as Black (13.3%), Hispanic/Latinx (15.4%), or other races or ethnicities (8.1%). Most respondents lived in states that allowed beer/wine/spirits bar/restaurant delivery (70.3%) and/or carryout/to-go sales (80.1%). During the first year of the COVID-19 pandemic, 7.5% of respondents reported ordering alcohol for delivery and 14.5% bought alcohol to-go.

### Population coverage of alcohol to-go and home delivery sales policies

From December 2019 to December 2020, 170.3 million more people were covered by policies allowing bar/restaurant beer/wine/spirits delivery (increased from 60.0 to 230.3 million), and 232.7 million more lived in states allowing beer/wine/spirits to-go/carryout sales (increased from 37.1 to 269.8 million; Table 2, Figure 1). There were concurrent decreases in the number of people living in states that only allowed bars/restaurants to deliver beer/wine (54.6 million) or sell to-go/carryout beer/wine (101.0 million). The decline in the number of people living in states that banned bar/restaurant delivery (116.4 million) and to-go/carryout alcohol (131.6 million) was sharp. These decreases led to only small segments of the US population (39.1 million for delivery and 10.6 million for to-go/carryout) being covered by bans as of December 2020.

### Bivariate associations between alcohol consumption patterns and alcohol purchasing behaviors

All of the bivariate tests between alcohol use and purchasing were significant, such that a larger percentage of people who drank, drank larger volumes, or experienced more alcohol-related harms had alcohol delivered or bought it to-go (Table 3). A larger percentage of adults who drank in the past year (vs. not) ordered alcohol for delivery (1.4% vs. 10.2%,  $p<0.001$ ) or bought alcohol to-go (1.7% vs. 20.0%,  $p<0.001$ ). A larger percentage of adults who exceeded daily guidelines had alcohol delivered (vs. not; 6.0% vs. 12.9%,  $p=0.01$ ) or bought it to-go (9.9% vs. 30.4%,  $p<0.001$ ). Similarly, a larger percentage of those who exceeded weekly guidelines had alcohol delivered (vs. not; 6.5% vs. 19.2%,  $p<0.001$ ) or bought it to-go (15.1% vs. 28.5%,  $p<0.001$ ) during the first year of the COVID-19 pandemic. There were also differences in the prevalence of alcohol delivery ( $p<0.001$ ) and to-go drinks ( $p<0.001$ ) by AUD severity. Post-hoc pairwise comparisons showed that, relative to those without AUD symptoms, larger percentages of people with mild (12.8% vs. 27.6%,  $p<0.01$ ) or moderate AUD symptoms (12.8% vs. 35.4%,  $p<0.001$ ) ordered alcohol to-go. Similarly, larger percentages of people with mild (6.6% vs. 13.8%,  $p=0.02$ ) or moderate AUD symptoms (6.6% vs. 19.6%,  $p<0.001$ ) had alcohol delivered compared to those with no AUD symptoms.

## Adjusted associations between demographics, behaviors, COVID-19 impacts, and policies and reporting buying alcohol for delivery and to-go

In adjusted models, younger respondents had higher odds of alcohol to-go during the first year of the COVID-19 pandemic (Table 4). Each additional year of age was associated with 3% lower odds of ordering alcohol to-go ( $aOR=0.97$ , 95% CI: 0.96, 0.99,  $p<0.001$ ). Compared to non-excessive drinkers, excessive drinkers had twice the odds of ordering alcohol to-go ( $aOR=2.14$ , 95% CI: 1.45, 3.17,  $p<0.001$ ). At the  $p<0.1$  level, excessive drinkers had 64% higher odds of having alcohol delivered ( $aOR=1.64$ , 95% CI: 0.98, 2.76,  $p=0.06$ ) than did non-excessive drinkers. Abstainers had lower odds of having alcohol delivered ( $aOR=0.18$ , 95% CI: 0.06, 0.54,  $p<0.001$ ) and buying it to-go ( $aOR=0.11$ , 95% CI: 0.04, 0.31,  $p<0.001$ ) than did non-excessive drinkers. Compared to people who are married or live with a partner, those who were never married, separated, divorced, or widowed had 34% lower odds of buying alcohol to-go ( $aOR=0.66$ , 95% CI: 0.43, 0.99,  $p=0.04$ ).

Compared to White people, Black people had nearly three times the odds of buying alcohol to-go ( $aOR=2.91$ , 95% CI: 1.54, 5.53,  $p<0.001$ ), and, at the  $p<0.1$  level, people of other races and ethnicities (not including Hispanic/Latinx) had half the odds of alcohol delivery ( $aOR=0.51$ , 95% CI: 0.24, 1.12,  $p=0.09$ ). Compared to those with the highest incomes, people from the middle household income group had half the odds of ordering alcohol to-go ( $aOR=0.47$ , 95% CI: 0.29, 0.77,  $p<0.001$ ). Compared to drinkers with a high school degree or less, respondents with some college or more had 121% higher odds of getting alcohol delivered ( $aOR=2.21$ , 95% CI: 1.39, 3.51,  $p<0.001$ ). Respondents who had all four self-reported household economic burdens had 2.3 times the odds of getting alcohol delivered than those who had none ( $aOR=2.32$ , 95% CI: 1.01, 5.32,  $p=0.05$ ).

Respondents from states permitting carryout/to-go beer, wine, and spirits sales had twice the odds of buying to-go alcohol as those from states where such sales were banned or limited to beer/wine ( $aOR=2.20$ , 95% CI: 1.22, 3.96,  $p=0.01$ ). At the  $p<0.1$  level, people who lived in a state that allowed bars/restaurants to deliver beer, wine, and spirits had 2.6 times the odds of having alcohol delivered ( $aOR=2.64$ , 95% CI: 0.88, 7.97,  $p=0.08$ ) as their counterparts in states that banned bar/restaurant alcohol delivery. There were no associations between reduced bar hours during COVID-19 and alcohol delivery/to-go purchases.

## DISCUSSION

Consistent with the majority of previous research (16, 20, 21), we determined a select subset of drinkers have alcohol delivered or buy it to-go. People who have alcohol delivered tended to drink excessively; live in states that permitted bars/restaurants to deliver beer, wine, and spirits; have more education but higher household economic burden from the COVID-19 pandemic; and they tend to be younger. Excessive drinking and state policies allowing beer, wine, and spirits carryout/to-go sales were also associated with higher odds of buying alcohol to-go. In addition, people who were Black, had mid-level incomes, and were employed reported buying alcohol to-go more often than other groups.

The Community Preventive Services Task Force recommended restrictions on physical and temporal availability of alcohol to prevent public health burdens during the pandemic

(32). However, we found a relative increase of 284% in exposure to bar/restaurant spirits delivery and a more dramatic relative rise of 627% in people living in states where bars/restaurants may sell to-go/carryout cocktails. These policy changes are occurring faster than the scientific process, leaving policymakers to decide the fate of bills without knowing how they may affect public health. Several US states have sunsets built into their alcohol delivery and/or to-go/carryout sales bills, but many do not. Future research should prioritize evaluating the public health consequences of these sales in those jurisdictions.

As in our results, prior risk factor analyses for alcohol delivery (13, 16-18, 20) also have found that heavier drinkers have higher odds of getting alcohol delivered. These associations merit future consideration because heavier drinkers have higher risk of alcohol-attributable harms (33-35). Thus, these new sales methods may inadvertently increase societal harms if alcohol delivery and to-go sales trigger a rise in consumption levels among those who drink the most. Future studies should determine how alcohol consumption patterns may change after enacting or amending delivery policies. These studies should compare policies to determine if specific regulations (e.g., volume/quantity restrictions) are associated with lower levels of alcohol-related harms to provide actionable evidence for policy decisions.

Ideally, policy changes should not create new disparities. Our regressions detected socioeconomic effects at both ends of the spectrum; drinkers with the most education as well as those with the most household economic burdens from COVID-19 had higher odds of having alcohol delivered. Stress has played a key role in alcohol consumption during the pandemic (36-38), and this may have encouraged the use of delivery services among those hit hardest economically by the pandemic. Delivery service utilization by those with COVID-19 economic burdens may lead to socioeconomic disparities, because drinkers with a higher educational advantage may have access to resources that will allow them to mitigate or offset adverse effects of their consumption (39). Our models also revealed that Black people had higher odds of buying alcohol to-go than their White counterparts. Both of these results may be confined to the COVID-19 pandemic. For example, fewer Black people were able to telework during the pandemic than White people (40), and buying alcohol to-go may be more convenient once outside the home. Still, these differences are worthy of future monitoring because Black people and those with fewer economic resources experience more harms per liter of alcohol (41, 42).

Our results should be viewed in light of this study's limitations. Our analyses were cross-sectional, so reported associations should not be interpreted as causal. Our data were self-reported and are subject to standard self-report biases (43). Our population coverage analyses estimated the number of people who lived in states allowing bars/restaurants and/or off-premise outlets to sell alcohol to-go or via delivery. Some of these people may live in parts of the state where no outlets offer to-go or delivery services. Alcohol delivery was relatively rare (7.5%), so we may have been underpowered to detect associations even with a modest sample size. Similarly, the small number of states that banned to-go sales in December 2020 coupled with our sample size resulted in small cell sizes that prevented us from separating bans from beer/wine to-go policies. However, policies that allow for beer/wine/spirits to-go sales may serve as a proxy for less restrictive to-go sales environments overall (e.g., fewer safeguards on food requirements, volume limits, etc.). Remote alcohol



sales are expanding rapidly, which is why we encourage future research that surveils the prevalence and consequences of alcohol delivery using larger samples. The follow-up survey did not ask the type of retailer from which respondents had alcohol delivered or bought it to-go, so responses may have included other types of retailers beyond bars and restaurants (e.g., breweries, wineries).

Despite these limitations, these are the first nationally representative prevalence estimates of alcohol delivery and to-go purchases in the US general population of which we are aware. We also identify a range of correlates of alcohol delivery and to-go purchases. There was a rapid expansion of access to alcohol delivery and to-go/carryout sales in the US during the pandemic. Our hope is that these data assist researchers and policymakers by highlighting key sub-populations that buy alcohol via home delivery and to-go sales.

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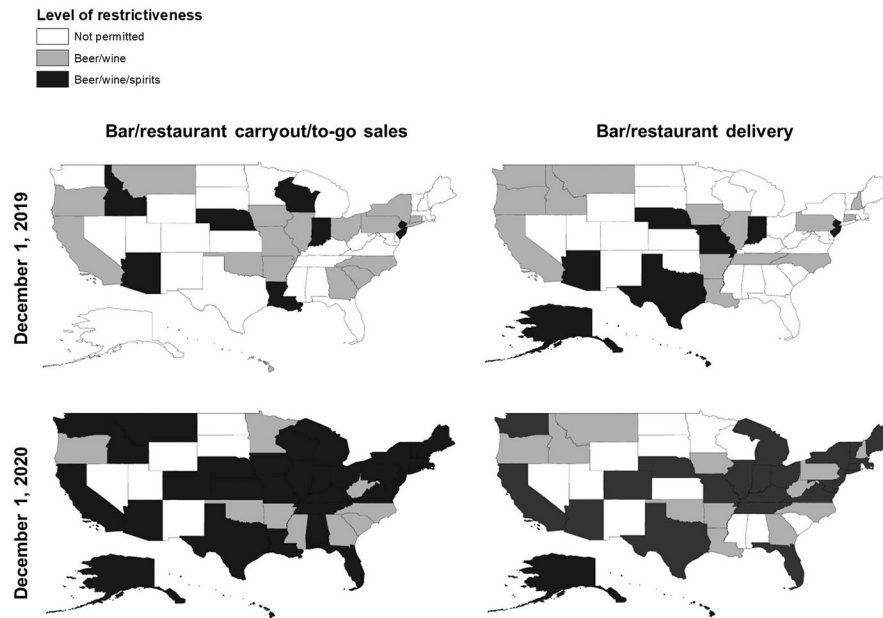
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**KEY POINTS**

- To-go/carryout policies grant bars/restaurants permission to sell individual drinks for off-site consumption.
- In the first year of the COVID-19 pandemic, 7.5% of US adults had alcohol delivered and 14.5% bought alcohol to-go.
- The number of people who lived in states that allowed bars/restaurants to deliver alcohol rose by 284% during the first year of the pandemic; this number climbed by 627% for to-go sales.
- People with greater educational advantage, more COVID-19 household economic burdens, are excessive drinkers, and live in states that allow bar/restaurant beer/wine/spirits delivery had higher odds of getting alcohol delivered.
- People who are younger, Black, excessive drinkers, and/or live in states that allow bar/restaurant beer/wine/spirits to-go sales had higher odds of buying alcohol to-go.



**Figure 1. State-level alcohol carryout/to-go and delivery policies by beverage type, December 1, 2019 and December 1, 2020**

These maps show the state policy conditions for bar/restaurant carryout/to-go sales (left) and bar/restaurant delivery (right) as of December 1, 2019 (top row) and December 1, 2020 (bottom row). The shading indicates each state's level of restrictiveness for a particular sales method, with white denoting it is not permitted, grey meaning it is only allowed for beer/wine, and black signifying it is allowed for beer/wine/spirits. For carryout/to-go sales and bar/restaurant delivery there are more black states in December 2020 than one year earlier.

**Table 1.**

Sample description by use of alcohol to-go and delivery sales methods (n=1,677)

Variable	%	Alcohol delivered			Bought alcohol to-go		
		No n=1,524	Yes n=153	P- value	No n=1,404	Yes n=273	P- value
<b>Demographics and behaviors</b>							
Sex assigned at birth							
Female	52.1	52.0	53.6	0.80	52.6	49.2	0.46
Male	47.9	48.0	46.4		47.4	50.8	
Age							
18 to 39 years	38.4	36.9	56.4	<0.01	35.5	54.8	<0.001
40 to 59 years	33.5	34.1	25.8		33.7	32.4	
60+ years	28.2	29.0	17.8		30.8	12.8	
Race and ethnicity							
Black	13.3	13.7	8.7	0.09	11.9	21.5	0.01
Hispanic/Latinx	15.4	14.8	22.0		15.0	17.5	
Other races and ethnicities	8.1	8.3	4.9		8.2	7.4	
White	63.3	63.2	64.4		64.9	53.6	
Education level							
Less than a college degree	67.9	68.8	56.6	0.02	68.8	62.2	0.09
College degree or more	32.1	31.2	43.4		31.2	37.8	
Household income level							
\$20k or less	17.6	16.8	27.1	0.02	17.5	18.3	<0.001
\$20,001 to \$80k & missing	56.5	57.8	40.5		58.8	42.9	
\$80,001 to \$100k or more	25.9	25.4	32.3		23.7	38.8	
Region							
Midwest	21.1	20.8	24.3	0.65	20.5	24.1	0.75
Mountain	9.8	10.0	7.2		9.9	9.1	
Northeast	18.2	17.9	21.9		17.9	19.8	
Pacific	36.3	36.8	30.3		37.1	31.6	
South	14.6	14.5	16.3		14.5	15.4	
NIAAA low-risk guidelines							
Abstainer	29.9	31.9	5.4	<0.001	34.4	3.6	<0.001
Drank within guidelines	44.4	44.3	45.2		44.1	46.0	
Exceed daily and/or weekly limits <sup>a</sup>	25.8	23.8	49.4		21.5	50.5	
<b>COVID impacts</b>							
Average household economic burden <sup>b</sup>							
Less than 0.25	55.2	56.4	40.2	0.04	56.7	46.6	<0.01
0.25 or more but less than 0.50	9.9	9.9	9.3		9.6	11.6	
0.50 or more but less than 0.75	23.7	22.7	35.9		24.0	22.1	

Variable	%	Alcohol delivered			Bought alcohol to-go		
		No n=1,524	Yes n=153	P- value	No n=1,404	Yes n=273	P- value
0.75 or more	11.3	11.0	14.7		9.8	19.7	
Change in access to friends/family							
None or mild	42.1	42.8	34.0	0.28	42.9	37.6	0.43
Moderate or severe	27.0	26.9	28.4		27.0	27.2	
2+ people in immediate family diagnosed with COVID-19							
No	81.0	81.4	76.5	0.36	81.0	80.9	0.98
Yes	19.0	18.6	23.5		19.0	19.1	
<b>Alcohol policies</b>							
Bar/restaurant delivery							
Not permitted	12.6	13.1	6.1	0.20	12.7	12.0	0.42
Beer/wine only	17.2	17.4	13.8		17.9	12.8	
Beer/wine/spirits	70.3	69.5	80.2		69.4	75.2	
Carryout or to-go sales							
Not permitted or beer/wine only	19.9	20.8	9.1	<0.01	21.2	12.6	0.05
Beer/wine/spirits	80.1	79.2	90.9		78.8	87.4	
Percent of time bars open <sup>c</sup>							
Less than 75%	22.2	22.4	20.1	0.79	21.9	24.1	0.76
75% or more but less than 80%	55.7	55.4	59.3		55.7	55.9	
80% or more	22.1	22.2	20.6		22.4	20.0	

NOTE: Percents may not sum to 100 due to rounding.

<sup>a</sup> *Daily guidelines* are <4 drinks in any day for persons identified as female at birth or <5 drinks for persons identified as male at birth (i.e., binge drinking). *Weekly guidelines* are <7 drinks per week for persons identified as female or <14 drinks for persons identified as male (i.e., heavy drinking).

<sup>b</sup> The percent of time that bars were open was calculated from March 2020 through February 2021.

<sup>c</sup> This variable averaged four binary (yes/no) survey questions, which asked whether any of the following applied to someone in the household since April 1, 2020: 1) Lost their job, 2) Applied for unemployment, or 3) Had reduced pay or hours, and 4) Had difficulty paying the rent/mortgage.

**Table 2.**

State population coverage in millions of bar/restaurant alcohol to-go and home delivery sales laws as of December 1 2019 and 2020

<b>Policy</b>	<b>December 1, 2019</b>	<b>December 1, 2020</b>
Alcohol delivery		
Not permitted	155.5 (47.4%)	39.1 (11.9%)
Beer and/or wine only	112.7 (34.3%)	58.1 (17.9%)
Beer, wine, and spirits	60.0 (18.3%)	230.3 (70.1%)
Alcohol carryout/to-go sales		
Not permitted	142.2 (43.3%)	10.6 (3.2%)
Beer and/or wine only	148.9 (45.4%)	47.9 (14.6%)
Beer, wine, and spirits	37.1 (11.3%)	269.8 (82.2%)

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**Table 3.**

Prevalence of past-year alcohol use behaviors and harms among drinkers by use of alcohol delivery and to-go services

Drinking pattern or harm indicator	Alcohol delivery since April 1, 2020			Drinks to-go since April 1, 2020		
	No % (95% CI)	Yes % (95% CI)	P-value	No % (95% CI)	Yes % (95% CI)	P-value
Drank alcohol						
No	98.6 (96.3, 99.5)	1.4 (0.5, 3.7)	<0.001	98.3 (95.3, 99.4)	1.7 (0.6, 4.7)	<0.001
Yes	89.8 (87.4, 91.9)	10.2 (8.2, 12.6)		80.0 (76.8, 82.9)	20.0 (17.1, 23.2)	
Exceeded NIAAA guidelines						
Exceed daily guidelines <sup>a</sup>						
No	94.0 (91.9, 95.6)	6.0 (4.4, 8.1)	<0.001	90.1 (87.7, 92.0)	9.9 (8.0, 12.3)	<0.001
Yes	87.1 (82.8, 90.5)	12.9 (9.5, 17.2)		69.6 (63.0, 75.6)	30.4 (24.5, 37.0)	
Exceed weekly guidelines <sup>b</sup>						
No	93.7 (91.8, 95.2)	6.3 (4.8, 8.2)	<0.001	86.7 (84.1, 88.9)	13.3 (11.1, 15.9)	<0.001
Yes	81.4 (74.7, 86.7)	18.6 (13.3, 25.3)		74.9 (67.1, 81.4)	25.1 (18.6, 32.9)	
Exceed daily or weekly guidelines						
No	93.4 (91.6, 95.0)	6.5 (5.0, 8.4)	<0.001	84.9 (81.3, 88.0)	15.1 (12.0, 18.7)	<0.001
Yes	80.8 (72.9, 86.8)	19.2 (13.2, 27.1)		71.5 (65.4, 76.9)	28.5 (23.1, 34.6)	
DSM-5 AUD severity						
No AUD	93.4 (91.5, 94.9)	6.6 (5.1, 8.6)	<0.001	87.2 (84.7, 89.3)	12.8 (10.7, 15.3)	<0.001
Mild AUD	86.2 (76.7, 92.3)	13.8 (7.7, 23.4)		72.4 (58.3, 83.1)	27.6 (16.9, 41.7)	
Moderate or severe AUD	80.4 (69.6, 88.0)	19.6 (12.0, 30.4)		64.6 (50.2, 76.7)	35.4 (23.3, 50.0)	

NOTE: P-values are from a Rao Scott chi-squared test of association.

NIAAA = National Institute on Alcohol Abuse and Alcoholism, DSM-5 = Diagnostic and Statistical Manual of Mental Disorders, 5<sup>th</sup> Edition; AUD = alcohol use disorder

<sup>a</sup>Daily guidelines are <4 drinks in any day for persons identified as female at birth or <5 drinks for persons identified as male at birth (i.e., binge drinking).

<sup>b</sup>Weekly guidelines are <7 drinks per week for persons identified as female or <14 drinks for persons identified as male (i.e., heavy drinking).

**Table 4.**

Logistic regression results for adults' purchasing behaviors since April 1, 2020 (n=1,677)

Predictor	Delivery			To-go		
	aOR	95% CI	P-value	aOR	95% CI	P-value
<b>Demographics &amp; behavior</b>						
Male sex at birth (vs. female)	0.86	0.53, 1.37	0.52	1.09	0.74, 1.62	0.65
Age in years	0.98	0.96, 1.00	0.11	<b>0.97</b>	<b>0.96, 0.99</b>	<b>&lt;0.001</b>
Race and ethnicity						
Black	0.61	0.31, 1.20	0.15	<b>2.92</b>	<b>1.54, 5.54</b>	<b>&lt;0.001</b>
Hispanic/Latinx	1.29	0.67, 2.49	0.44	1.25	0.72, 2.18	0.43
Other races and ethnicities	0.51	0.24, 1.12	0.09	1.13	0.56, 2.25	0.74
White	Ref			Ref		
Some college or more (vs. high school or less)	<b>2.21</b>	<b>1.39, 3.51</b>	<b>&lt;0.001</b>	1.15	0.73, 1.82	0.55
Household income						
\$20,000 or less	2.03	0.85, 4.84	0.11	0.59	0.29, 1.18	0.13
\$20,001 to \$80,000 or missing	0.77	0.47, 1.26	0.30	<b>0.48</b>	<b>0.30, 0.78</b>	<b>&lt;0.001</b>
\$80,001 or more	Ref			Ref		
Unemployed, retired, homemaker, student, disabled (vs. employed)	0.64	0.37, 1.10	0.11	<b>0.65</b>	<b>0.43, 0.97</b>	<b>0.03</b>
Region						
Midwest	0.95	0.40, 2.27	0.91	1.00	0.52, 1.91	1.00
Mountain	0.82	0.27, 2.46	0.72	1.30	0.54, 3.14	0.56
Northeast	Ref			Ref		
Pacific	0.67	0.27, 1.67	0.39	0.86	0.47, 1.57	0.63
South	0.74	0.34, 1.64	0.46	0.94	0.45, 1.98	0.87
NIAAA low-risk guidelines						
Abstainer	<b>0.18</b>	<b>0.06, 0.54</b>	<b>&lt;0.001</b>	<b>0.11</b>	<b>0.04, 0.32</b>	<b>&lt;0.001</b>
Drank within guidelines <sup>a</sup>	Ref			Ref		
Exceed daily and/or weekly limits <sup>b</sup>	1.64	0.98, 2.76	0.06	<b>2.06</b>	<b>1.40, 3.03</b>	<b>&lt;0.001</b>
<b>COVID-19 impacts</b>						
Average household economic burden <sup>c</sup>	<b>2.32</b>	<b>1.01, 5.32</b>	<b>0.05</b>	1.38	0.68, 2.83	0.37
Moderate/severe changes in access to friends/family (vs. no or mild changes)	1.05	0.61, 1.79	0.87	1.09	0.73, 1.62	0.67
2+ people in immediate family diagnosed with COVID-19 (vs. not)	1.20	0.63, 2.27	0.58	0.93	0.57, 1.51	0.77
<b>Policy</b>						
Delivery						
Not permitted	Ref			—		
Beer and/or wine only	2.23	0.56, 8.82	0.25	—		
Beer, wine, and spirits	2.64	0.88, 7.97	0.08	—		
Carryout or to-go sales						
Not permitted or beer and/or wine only	—			Ref		

Predictor	Delivery			To-go		
	aOR	95% CI	P-value	aOR	95% CI	P-value
Beer, wine, and spirits	—			<b>2.20</b>	<b>1.22, 3.96</b>	<b>0.01</b>
Percent of time bars open, March 2020-Feb 2021 <sup>d</sup>	1.12	0.30, 4.16	0.87	1.28	0.40, 4.11	0.67

aOR, adjusted odds ratio; CI, confidence interval; ref, reference group

NOTE: **Bolding** indicates that  $p < 0.05$ . The models are adjusted for all other covariates listed in the table.

<sup>a</sup>People who drank alcohol in the past year but did not report consuming volumes that exceed NIAAA low-risk guidelines (i.e., binge or heavy drinking).

<sup>b</sup>People who reported consuming volumes that exceed NIAAA low-risk guidelines (i.e., binge and/or heavy drinking) in the past year.

<sup>c</sup>This variable averaged four binary (yes/no) survey questions, which asked whether any of the following applied to someone in the household since April 1, 2020: 1) Lost their job, 2) Applied for unemployment, or 3) Had reduced pay or hours, and 4) Had difficulty paying the rent/mortgage.

<sup>d</sup>The percent of time that bars were open was calculated from March 2020 through February 2021.