Alcohol and Alcoholism, 2023, **58(6)**, 606–611
https://doi.org/10.1093/alcalc/agad035
Advance access publication date 12 May 2023
Article

Impact of alcohol home delivery and other methods of obtaining alcohol in young adults

Jonathan K. Noel[1,*] and Samantha R. Rosenthal[1,2]

[1]Department of Health Science, College of Health & Wellness, Johnson & Wales University, Providence, RI 02903, United States
[2]Department of Epidemiology, Brown School of Public Health, Providence, RI 02903, United States

*Corresponding author. Department of Health Science, Johnson & Wales University, 8 Abbott Park Place, Providence, RI 02903, United States.
E-mail: jknoel@hotmail.com

Abstract

Aims: To estimate the use of home alcohol delivery and other methods of obtaining alcohol, rates of ID checking for home alcohol delivery purchases, and associations with alcohol-related consequences. Methods: Surveillance data from 784 lifetime drinkers participating in the 2022 Rhode Island Young Adult Survey were used. The method of obtaining alcohol (e.g. type of purchase, gifted, theft) was assessed. The Alcohol Use Disorders Identification Test, Brief Young Adults Alcohol Consequences Questionnaire, and a drinking and driving question were used to measure high-risk drinking behaviors, experiencing negative alcohol questions, and history of drinking and driving. Logistic regression models adjusting for sociodemographic variables were used to estimate main effects. Results: About 7.4% of the sample purchased alcohol through a home delivery or to-go purchase; 12.1% of participants who obtained alcohol this way never had their ID checked during the purchase attempt, and 10.2% of these purchases were completed by participants under the legal purchase age. Home delivery/to-go purchases were associated with high-risk drinking. Alcohol theft was associated with high-risk drinking, experiencing negative alcohol consequences, and drinking and driving. Conclusions: Home alcohol delivery and to-go purchases may provide an opportunity for underage access to alcohol, but their current use as a method of obtaining alcohol is rare. Stronger ID checking policies are needed. Alcohol theft was linked to several negative alcohol outcomes, and home-based preventive interventions should be considered.

Keywords: alcohol; home delivery; theft; consumption; ID checking; young adults

Introduction

Alcohol via home delivery

The interest in alcohol home delivery and to-go purchases has increased since the COVID-19 pandemic and subsequent economic lockdowns. Due to the pandemic, state governments in the USA quickly deemed off-premises alcohol outlets, such as liquor stores, "essential services" and allowed them to remain open despite the temporary closure of other stores (APIS 2022). In addition, many states expanded access to alcohol from off-premise and on-premise alcohol outlets, such as bars and restaurants, by allowing alcohol delivery sales and alcohol to be purchased as part of a to-go food order. Specifically, alcohol delivery purchases from off-premise outlets were allowed in five additional states relative to pre-pandemic regulations, from restaurants in 25 additional states, and from bars in 24 additional states. Many of these allowances were subsequently made permanent.

ID checking

Compliance with existing minimum legal purchase age (MLPA requirements for alcohol may be difficult for alcohol delivery purchases. Although general internet alcohol purchases are not novel, the expanded use of third-party delivery services (e.g. Instacart, Drizzly) due to COVID-19 has drastically altered the alcohol sales environment, and there are no stringent training requirements for drivers of such services in the USA, which creates the possibility that individuals under the MLPA can easily access alcohol (Williams and Schmidt 2014, Costa 2020, Grossman *et al.* 2022). For example, within 77 jurisdictions in six high-income countries (i.e. Australia, Canada, Ireland, New Zealand, UK, USA), only 9% required age verification procedures at the time of alcohol purchase (Colbert *et al.* 2021). Compliance rates for age verification at delivery were as low as 0% (Colbert *et al.* 2021), and nearly 60% of young adult alcohol delivery purchasers in New Zealand completed the purchase without an age check (Huckle *et al.* 2021).

The rate of successful ID checking and age verification procedures in traditional off- and on-premises US alcohol outlets ranges from 80 to 99% (Grube *et al.* 2018). The implementation of ID readers and remote age verification procedures has been an important development in ensuring compliance with alcohol age restrictions (van Hoof 2017), and nationwide adoption of such technology has been estimated to prevent over one underage alcohol purchase attempt per day in the Netherlands (van Hoof and van Velthoven 2015). Compliance, though, may be largely dependent on educating retail workers on the MLPA restrictions in place and motivating them to comply with those regulations (Gosselt *et al.* 2012). Compliance may also suffer due to inadequate enforcement of age verification procedures. Only one-third of local law enforcement agencies in the USA may actively perform compliance checks, and only half of those may survey all establishments with an alcohol license (Venkatraman *et al.* 2021).

Use and impact of alcohol home delivery

Young adult and adolescent populations use delivery mechanisms to obtain alcohol. Early data suggest that 10% of

Received: January 20, 2023. **Revised:** March 1, 2023. **Accepted:** April 18, 2023

12th grade US high school students and 7.3% of 18–20 years old purchased alcohol through home delivery (Fletcher *et al.* 2000). More recently, 21% of US adults 26–49 years old purchased alcohol via delivery (Grossman *et al.* 2022), and 40% of New Zealand adults did so during the early phases of the COVID-19 pandemic (Huckle *et al.* 2021).

Data on the relationship between home alcohol delivery purchases and alcohol consumption are scarce. Initial studies suggest that alcohol delivery purchases by adolescents and underage young adults were associated with increased alcohol consumption and binge drinking (Fletcher *et al.* 2000), whereas adult men with a history of alcohol-related problems or who were dependent on alcohol were more likely to purchase alcohol through a delivery service compared with men without no such history (Fletcher *et al.* 1996). Newer research largely confirms these original conclusions, although there remain few relevant studies published. US adults who purchased alcohol via delivery drank on more days, consumed more drinks on drinking days, and were more likely to binge drink (Grossman *et al.* 2022). Moreover, odds of past week heavy drinking were 75% greater in New Zealand adults who purchased alcohol by delivery compared with those that did not (Huckle *et al.* 2021).

Other methods of obtaining alcohol

There are several non-purchase-related methods of obtaining alcohol. In 2019, 40.5% of current drinking US high school students reported being gifted alcohol (YRBSS 2020). Being given alcohol by friends or at parties may also be a common method of obtaining alcohol among college students (Fabian *et al.* 2008). Gifting alcohol to adolescents and young adults may lead to increased alcohol consumption. A longitudinal study of Australian youth suggested that the odds of binge drinking, alcohol-related harm, and symptoms of alcohol use disorder (AUD) were 2.5 times greater in those whose parents gave them alcohol (Mattick *et al.* 2018), and others reported that parental supplies of alcohol intended to be consumed without parental supervision was associated with increased risky drinking (Gilligan *et al.* 2012).

Alcohol can also be obtained through theft. A survey comparing US White and Native American youth determined that 17.4 and 10.1% of youth, respectively, took alcohol from the home without permission, and ~3% of both population groups stole alcohol from a liquor store (Friese *et al.* 2011). Others have reported that up to 12% of youth may steal alcohol from their home and nearly 5% may steal it from a friend's house (Hearst *et al.* 2007). Obtaining alcohol without permission or through theft may be associated with earlier alcohol initiation, increased alcohol consumption, and increased alcohol-related consequences (Trager *et al.* 2023).

Current study

The current study sought to add to the dearth of literature on home alcohol delivery purchases by (i) estimating the prevalence of home alcohol delivery and other methods of obtaining alcohol in young adults; (ii) determining if method of obtaining alcohol differed by age; (iii) assessing whether method of obtaining alcohol is associated with high-risk alcohol consumption and alcohol-related consequences; (iv) estimating the prevalence of ID checking by purchase modality; and (v) assessing whether ID checking during home alcohol delivery purchases was associated with high-risk alcohol consumption and alcohol-related consequences. We hypothesized that home alcohol delivery would be used by a minority of young adults but associated with increased high-risk consumption and alcohol-related consequences. We also hypothesized the prevalence of ID checking would be lowest among home alcohol delivery purchases.

Materials and methods

The study used surveillance data from the 2022 Rhode Island Young Adult Survey (RIYAS) to assess how alcohol is obtained in this population, whether the method of obtainment is associated with adverse outcomes, and ID checking rates for alcohol purchases.

Data collection

The 2022 RIYAS was a de-identified, cross-sectional surveillance study of young adults, 18–25 years old, who lived in Rhode Island for at least part of the year. Participants were recruited through targeted social media advertisements, by email to university students, and via flyers and banners at places young adults were thought to congregate (e.g. malls, coffee shops, community centers). Self-reported data were collected via an online survey from May to August 2022, and participants received a $10 gift card for their participation. Given the nature of this anonymous online survey, rigorous internal validation and fraud detection software were used to authenticate survey submissions. The study was approved by the Johnson & Wales University Institutional Review Board. A total of $n = 1022$ surveys were completed, and $n = 784$ (76.7%) lifetime drinkers were included in the current analysis.

Measures

Method of obtaining alcohol was assessed using: *When you drink any kind of alcohol (more than a sip), where do you usually get the alcohol? Check all that apply.* The response options were: *a parent/guardian gave it to me*, *took it from home without parent's permission*, *a friend/relative who is 21 or older gave it to me*, *a friend/relative who is under 21 gave it to me*, *a non-relative adult gave it to me*, *I took it from someone else's home*, *I got it at a party*, *bar/restaurant*, *liquor store*, *grocery/convenience store*, *I bought it through a delivery service*, and *I bought it from a restaurant as part of a take-out order.* To answer the research questions that incorporate all methods of obtaining alcohol, responses were collapsed into four categories: delivery/to-go purchases, other alcohol purchases (bar/restaurant, liquor store, grocery/convenience store), given alcohol (a parent/guardian, a friend/relative who is 21 or older, a friend/relative who is under 21, party), and stole alcohol (took it from home, took it from someone else's home). Delivery/to-go purchases were considered together for the ID checking analysis as well, although other purchase modalities remained separate.

Three alcohol-related dependent variables were measured. Alcohol use was measured using the Alcohol Use Disorders Identification Test (AUDIT), which is a 10-item survey that assesses alcohol consumption and the experience of alcohol-related problems (Saunders *et al.* 1993). Items were scored and aggregated by summation ($\alpha = 0.83$). Participants with scores ≥ 8 were considered high-risk drinkers. Alcohol consequences were measured using eight items from the Brief Young Adults Alcohol Consequences Questionnaire (Kahler *et al.* 2005).

Items included passing out from drinking, finding out that larger amounts of alcohol are needed to feel the same effect, not being able to remember large stretches of time, not going to work or missing classes, getting into regrettable sexual situations, quality of work or schoolwork suffering, neglecting family or work obligations, and drinking creating problems with spouses or other family members. Participants responded either *yes* or *no* to each item, and a composite variable was created to indicate experiencing *any* alcohol consequences or experiencing *no* alcohol consequences. Drinking and driving were measured using a single item: *Have you ever driven a car or other vehicle when you had been drinking alcohol?* The response options were *no*, *yes more than a month ago*, and *yes in the past month*. Both *yes* options were collapsed to create a dichotomous variable that indicated no drinking and driving or any drinking and driving.

The prevalence of ID checking during an alcohol purchase was measured with: *When you purchased alcohol, how frequently was your ID checked?* Responses were captured on a 5-point Likert scale ranging from *never* to *always*. Responses were dichotomized to indicate whether participants *never* had their ID checked or at least *sometimes* had their ID checked.

Covariates included age, sex at birth (male, female), race/ethnicity (Asian, Black/African American, Hispanic, Native American/Alaskan Native, Native Hawaiian/Other Pacific Island, White, other race not listed), and social status. Participants selected all racial and ethnic categories that applied, and participants identifying as Native American/Alaskan Native, Native Hawaiian/Other Pacific Island, other, or more than one race were collapsed together due to low sample sizes. Social status was measured using the MacArthur Scale of Subjective Social Status, which requires participants to rank themselves relative to other community members on a 1 (worst off) to 10 (best off) scale (Adler *et al.* 2000). Age was used to classify participants as over or under the MLPA.

Statistical analysis

Descriptive statistics for all variables were reported. Age and social status were considered normally distributed continuous variables after examination of their distributions. All other variables were categorical. Chi-square analyses were used to assess any differences in each method of obtaining alcohol by MLPA status. Logistic regression analysis, after adjustment for the covariates, was used to determine if the method of obtaining alcohol and ID checking during alcohol delivery purchases was associated with AUDIT risk category, experiencing alcohol-related consequences, and drinking and driving. Each relationship was estimated in a separate model to avoid collinearity issues since participants selected all methods of obtaining alcohol that applied. The *no* or *never* responses for all independent and dependent variables were used as the referents, and *low risk* drinking was the referent for AUDIT risk category. A *post hoc* analysis that stratified the obtaining alcohol analysis by participants over and under the MLPA and by sex was also conducted. Prevalence of ID checking was reported by alcohol purchase method. Adjusted logistic regression models were used to determine the association between ID checking during alcohol delivery or to-go purchases and AUDIT risk category, experiencing alcohol-related consequences, and drinking and driving. The analysis was completed using SPSS v28.0 (Armonk, NY: IBM Corp), and statistical significance was determined using 95% confidence intervals (CI).

Table 1. Descriptive statistics ($n = 784$).

Variable		*n* (%)
Delivery/to-go purchase	*Yes*	58 (7.4)
	No	726 (92.6)
Other alcohol purchase	*Yes*	533 (68.0)
	No	251 (32.0)
Given alcohol	*Yes*	557 (71.0)
	No	227 (29.0)
Stole alcohol	*Yes*	93 (11.9)
	No	691 (88.1)
Alcohol use	*Low risk*	624 (79.6)
	High risk	160 (20.4)
Experienced alcohol consequences	*Yes*	317 (40.4)
	No	467 (59.6)
Drinking and driving	*Yes*	143 (18.2)
	No	641 (81.8)
Sex	*Female*	652 (83.2)
	Male	132 (16.8)
Race/ethnicity	*Asian*	42 (5.4)
	Black/African American	31 (4.0)
	Hispanic	149 (19.0)
	Other or more than one race	65 (8.3)
	White	497 (63.4)
MLPA	*Under (<21 years old)*	214 (27.3)
	Over (≥21 years old)	570 (72.7)

Results

Mean age of the sample was 21.7 years old (SD = 2.0), and 64.2% were above the MLPA (Table 1). Participants were predominantly female (83.2%); a majority identified as White (63.4%); and mean social status was 5.0 (SD = 1.7). Approximately 20% of participants were classified as high-risk drinkers, whereas 40.4% experienced an alcohol-related consequence. The prevalence of lifetime drinking and driving was 18.2%.

Obtaining alcohol through delivery or to-go purchases was the least prevalent method of obtaining alcohol (7.4%) (Table 1). A majority purchased alcohol through other means (68.0%) or were given alcohol (71.0%). In all, 10.2 and 11.1% of home delivery or to-go purchases and other alcohol purchases were made by participants under the MLPA, respectively. Participants over the MLPA were more likely to purchase alcohol through home delivery or to-go ($P < 0.001$) and purchase alcohol through conventional outlets ($P < 0.001$) (Table 2). Participants under the MLPA were more likely to be gifted alcohol ($P = 0.048$), and there was no significant difference in the rate of alcohol theft by MLPA.

Among the entire sample, the odds of being a high-risk drinker were two times greater for those who completed an alcohol delivery or to-go purchase (OR [95%CI] = 1.98 [1.10, 3.57]) (Table 3), although the effects may be limited to participants under the MLPA (Supplementary Table 1) and males (Supplementary Table 2). Similarly, purchasing alcohol through other outlets was also associated with an increased odds of being a high-risk drinker (OR [95%CI] = 1.82 [1.16,

Table 2. Successfully obtaining alcohol via each measured method by MLPA status.

Method	Under the MLPA (%)	Over the MLPA (%)	χ^2	*P*
Delivery/to-go purchase	6 (1.6)	53 (8.1)	17.91	<0.001
Other alcohol purchase	61 (16.7)	490 (74.7)	318.4	<0.001
Given alcohol	228 (62.3)	367 (55.9)	3.89	0.048
Stolen alcohol	41 (11.2)	60 (9.1)	1.12	0.291

Table 3. Adjusted logistic regression model testing the associations between method of obtaining alcohol and alcohol-related outcomes.[a]

		AUDIT		*Alcohol consequences*		*Drinking and driving*	
Variable		OR	95% CI	OR	95% CI	OR	95% CI
Delivery/to-go	*Yes*	1.98	1.10, 3.57	1.64	0.95, 2.83	1.35	0.71, 2.57
	No	.	.	.	.	.	.
Other alcohol purchase	*Yes*	1.82	1.16, 2.85	1.29	0.91, 1.83	1.08	0.68, 1.72
	No	.	.	.	.	.	.
Given alcohol	*Yes*	1.13	0.75, 1.71	1.38	0.98, 1.95	0.93	0.62, 1.41
	No	.	.	.	.	.	.
Stole alcohol	*Yes*	2.40	1.49, 3.87	2.58	1.64, 4.05	2.16	1.27, 3.65
	No	.	.	.	.	.	.

[a]Adjusted for participant age, sex, race/ethnicity, and social status.

Table 4. Prevalence of ID checking by alcohol purchase method.

Variable	Total purchasers		*n* (%)
Delivery/to-go	58	*Never*	7 (12.1)
		At least sometimes	51 (87.9)
Bar/restaurant	402	*Never*	20 (5.0)
		At least sometimes	382 (95)
Liquor store	464	*Never*	17 (3.7)
		At least sometimes	447 (96.2)
Grocery/convenience store	103	*Never*	4 (3.9)
		At least sometimes	99 (96.1)

2.85]) (Table 3), but the effect may only be significant for those under the MLPA (Supplementary Table 1). The odds of being a high-risk drinker (OR [95%CI] = 2.40 [1.49, 3.87]), experiencing alcohol consequences (OR [95%CI] = 2.58 [1.64, 4.05]), and drinking and driving (OR [95%CI] = 2.16 [1.27, 3.65]) were over two times greater in participants who stole alcohol, but the effect remained significant only among females (Supplementary Table 2).

The prevalence of never checking IDs was highest for alcohol delivery and to-go purchases (12.1%) (Table 4). Never checking IDs for other types of alcohol purchases varied from 3.7 to 5.0%. After adjustment for the covariates, checking IDs during an alcohol delivery or to-go purchase was associated with a 90% decrease in the odds of being a high-risk drinker (OR[95%CI] = 0.10 [0.01, 0.85]) and a 96% decrease in the odds of drinking and driving (OR[95%CI] = 0.04 [0.004, 0.38]). There was no association with experiencing alcohol consequences (OR[95%CI] = 0.39 [0.06, 2.40]).

Discussion

Young adults are primarily gifted alcohol or purchase alcohol through conventional on- and off-premises outlets. The prevalence of underage purchasing of alcohol was similar for home delivery or to-go orders and other purchasing options, and purchasing alcohol, regardless of method, may be associated with being a high-risk drinker in young adults, particularly those under the MLPA and men. ID checking occurred least often for home delivery and to-go purchases, and such checks may be negatively associated with being a high-risk drinker and drinking and driving. Furthermore, alcohol theft may be positively associated with being a high-risk drinker and experiencing greater negative alcohol consequences, regardless of purchase age status.

The concerns surrounding home delivery and alcohol to-go purchases include easier access to alcohol for individuals under the MLPA and easy access to alcohol for individuals who want to drink excessively (Fletcher *et al.* 2000, Brener *et al.* 2022, Grossman *et al.* 2022). The current findings are consistent with both concerns, although it is interesting that significant effects were detected regardless of purchase modality. Alcohol purchasing is an active method of obtaining alcohol, versus passively being gifted alcohol, and may signify a general intention for greater alcohol consumption, regardless of purchase modality. Alcohol purchases are directly influenced by alcohol identity, which describes how close a person thinks he/she is to a typical drinker, and stronger alcohol identities (e.g. persons who more strongly associate with drinking culture) plus greater endorsement of normative alcohol beliefs (e.g. persons who think the typical drinker consumes large amounts of alcohol) are likely to increase their alcohol purchasing behavior (Wang 2020). Moreover, on-premises locations that young adults are more likely to frequent, such as chain bars and night clubs, may be structurally and programmatically designed to increase consumption (Tutenges and Bøhling 2019). Special discounts,

speed drinking devices (e.g. shot glasses, beer bongs), and physical features (e.g. multiple bar counters, limited seating) that discourage moderate drinking have all been documented in such establishments, but do not occur in locations that cater to older audiences, such as wine bars.

The frequency of alcohol home delivery and to-go purchases reported here is lower than those reported in recent adult surveys (Huckle *et al.* 2021, Grossman *et al.* 2022). Higher costs associated with home delivery and to-go purchases may suppress its utility among young adults, who may lack the financial resources to purchase alcohol in this manner (Instacart, n.d., Statista. 2022). We suspect that if costs were equivalent across modalities, home delivery and to-go purchases would be more common. The lack of ID checking is concerning though, and the rate of ID checking, or lack thereof, was consistent with other reports of poor compliance and few statutory age verification requirements (Colbert *et al.* 2021, Huckle *et al.* 2021). Implementation of a standardized system of ID checking for home delivery and to-go purchases, particularly those facilitated by third-party vendors, is essential to minimize access to individuals under the MLPA (van Hoof and van Velthoven 2015). Regulators should also consider expanding dram shop liability laws, which are effective at reducing underage drinking, to include third-party vendors to encourage the adoption of better compliance tools (Fell *et al.* 2016).

Theft of alcohol is infrequently measured, and when incorporated into surveys, the target population is typically adolescents. For example, the Youth Risk Behavioral Surveillance System, which targets US high school and middle school students, includes taking alcohol from a store or family member as a response option in a question about obtaining alcohol (YRBSS 2020), but a similar item is not available in the Behavioral Risk Factor Surveillance System, which targets US adults (BRFSS 2022). Few studies have reported such behavior in young adults, and the rate of alcohol theft reported here is similar to that reported in youth surveys (Hearst *et al.* 2007, Friese *et al.* 2011). Interestingly, there was no difference in alcohol theft behavior for above and below the MLPA, suggesting the behavior may be due to common underlying psychological risk factors of theft and alcohol consumption versus efforts to skirt existing law.

Alcohol theft was strongly associated with each of the measured dependent variables, and it is possible, if not likely, that stealing alcohol is a proxy behavior for an AUD or experiencing alcohol-related consequences instead of an independent risk factor. We speculate that individuals with an AUD may be more likely to steal alcohol due to stigma and shame associated with their disease. Self-stigma in individuals with an AUD has been linked with self-dehumanization (Fontesse *et al.* 2021), and experiences of shame may be related to the AUD disease process (Treeby *et al.* 2020). Alternatively, alcohol theft may be a practical option to obtain alcohol for individuals with an AUD, as previous research suggests they are more likely to be from a lower income level (Grant *et al.* 2015).

Implications

There are several implications to consider. First, method of obtaining alcohol in adult samples is understudied, and the lack of data, particularly on alcohol home delivery and to-go purchases, limits the implementation of preventive action. Large, adult-oriented surveillance systems, including the BRFSS and others, should consider adding an item to measure method of obtaining alcohol to better assess the different strategies used by adults. Second, efforts to prevent harm from alcohol home delivery or to-go purchases, and harm resulting from other alcohol purchase modalities, should mirror the efforts to prevent alcohol-related harm generally. This includes increasing prices through taxation or the implementation of minimum unit pricing; restricting or banning alcohol marketing activities; and in the case of home delivery and to-go purchases, decreasing availability by repealing or allowing COVID-19-related alcohol policies to naturally sunset. Finally, preventive interventions and programs should be considered to encourage the safe storing of alcohol in the home and prevent home-based alcohol thefts.

Limitations

The RIYAS is a cross-sectional survey, and causation cannot be determined. Indeed, it is plausible that method of obtaining alcohol is directly influenced by current alcohol use and experiencing alcohol-related consequences. This is a convenience sample of young adults that overrepresents females and is unlikely to be representative of all young adults, which limits the generalizability of the findings. Because all items are self-reported, responses are subject to recall bias, and given the nature of the questions, social desirability bias is a concern, even though the survey was completed online. It is possible that some methods of obtaining alcohol (e.g. theft), alcohol use, and ID checking were underreported.

Conclusions

Purchasing and theft of alcohol may be associated with high-risk alcohol consumption. Theft of alcohol may also be associated with experiencing alcohol-related consequences and drinking and driving. More data on how adults obtain alcohol are needed, although prevention efforts should largely focus on the existing best practices of increasing prices, decreasing availability, and eliminating alcohol marketing.

Acknowledgements

The authors would like to acknowledge Karen Flora, the Project Director of the Partnerships for Success II grant, which supported this work, as well as the support of the Rhode Island Department of Behavioral Healthcare, Developmental Disabilities and Hospitals.

Author contributions

Jonathan K. Noel (Conceptualization, Formal Analysis, Writing—original draft); Samantha R. Rosenthal (Funding acquisition, Investigation, Project administration, Writing—review & editing).

Supplementary data

Supplementary data is available at *Alcohol and Alcoholism Journal* online.

Conflicts of interest: None declared.

Funding

This work was supported by the Substance Abuse and Mental Health Services Administration Award number 1H79SP080979 indirectly through the Rhode Island Department of Behavioral Health, Developmental Disabilities & Hospitals (BHDDH). The funders had

no role in the design, implementation, analysis, or writing of this study. The views and opinions contained in the publication do not necessarily reflect those of BHDDH, SAMHSA, or the US Department of Health and Human Services.

Data availability

Data is available upon reasonable request to the corresponding author.

References

Adler NE, Epel ES, Castellazzo G *et al.* Relationship of subjective and objective social status with psychological and physiological functioning: preliminary data in healthy White women. *Health Psychol* 2000;**19**:586–92.

Alcohol Policy Information System (APIS). *State Alcohol-Related Laws during the COVID-19 Emergency for on-Premises and off-Premises Establishments as of January 1, 2022*. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism, 2022. https://alcoholpolicy.niaaa.nih.gov/sites/default/files/file-page/digest_state_alcohol_policies_in_response_to_covid-19_220101.pdf (10 January 2023, date last accessed).

Behavioral Risk Factor Surveillance System (BRFSS). *LLCP 2021 Codebook Report*. Atlanta, GA: Centers for Disease Control and Prevention, 2022. https://www.cdc.gov/brfss/annual_data/2021/pdf/codebook21_llcp-v2-508.pdf (13 January 2023, date last accessed).

Brener ND, Bohm MK, Jones CM *et al.* Use of tobacco products, alcohol, and other substances among high school students during the COVID-19 pandemic—adolescent behaviors and experiences survey, United States, January–June 2021. *MMWR Suppl* 2022;**71**:8–15.

Colbert S, Wilkinson C, Thornton L *et al.* Online alcohol sales and home delivery: an international policy review and systematic literature review. *Health Policy* 2021;**125**:1222–37.

Costa C. *Drinking, Social Distancing and a Booze-Delivery-App Boom*. Englewood Cliffs, NJ: CNBC, 2020. https://www.cnbc.com/2020/03/27/drinking-coronavirus-social-distancing-and-alcohol-delivery-app-boom.html (10 January 2023, date last accessed).

Fabian LE, Toomey TL, Lenk KM *et al.* Where do underage college students get alcohol? *J Drug Educ* 2008;**38**:15–26.

Fell JC, Scherer M, Thomas S *et al.* Assessing the impact of twenty underage drinking laws. *J Stud Alcohol Drugs* 2016;**77**:249–60.

Fletcher LA, Nugent SM, Ahern SM *et al.* The use of alcohol home delivery services by male problem drinkers: a preliminary report. *J Subst Abuse* 1996;**8**:251–61.

Fletcher LA, Toomey TL, Wagenaar AC *et al.* Alcohol home delivery services: a source of alcohol for underage drinkers. *J Stud Alcohol* 2000;**61**:81–4.

Fontesse S, Stinglhamber F, Demoulin S *et al.* Self-dehumanisation in severe alcohol use disorder: links with self-stigma and environmental satisfaction. *Int J Psychol* 2021;**56**:878–84.

Friese B, Grube JW, Seninger S *et al.* Drinking behavior and sources of alcohol: differences between Native American and White youths. *J Stud Alcohol Drugs* 2011;**72**:53–60.

Gilligan C, Kypri K, Johnson N *et al.* Parental supply of alcohol and adolescent risky drinking. *Drug Alcohol Rev* 2012;**31**:754–62.

Gosselt JF, Van Hoof JJ, De Jong MD. Why should I comply? Sellers' accounts for (non-)compliance with legal age limits for alcohol sales. *Subst Abuse Treat Prev Policy* 2012;**7**:5.

Grant BF, Goldstein RB, Saha TD *et al.* Epidemiology of DSM-5 alcohol use disorder: results from the National Epidemiologic Survey on alcohol and related conditions III. *JAMA Psychiatry* 2015;**72**:757–66.

Grossman ER, Benjamin-Neelon SE, Sonnenschein S. Alcohol consumption and alcohol home delivery laws during the COVID-19 pandemic. *Subst Abus* 2022;**43**:1139–44.

Grube JW, DeJong W, DeJong M *et al.* Effects of a responsible retailing mystery shop intervention on age verification by servers and clerks in alcohol outlets: a cluster randomised cross-over trial. *Drug Alcohol Rev* 2018;**37**:774–81.

Hearst MO, Fulkerson JA, Maldonado-Molina MM *et al.* Who needs liquor stores when parents will do? The importance of social sources of alcohol among young urban teens. *Prev Med* 2007;**44**:471–6.

van Hoof JJ, van Velthoven BC. Remote age verification to prevent underage alcohol sales. First results from Dutch liquor stores and the economic viability of national adoption. *Int J Drug Policy* 2015;**26**:364–70.

Huckle T, Parker K, Romeo JS *et al.* Online alcohol delivery is associated with heavier drinking during the first New Zealand COVID-19 pandemic restrictions. *Drug Alcohol Rev* 2021;**40**:826–34.

Instacart. *Instacart Fees and Taxes*. (n.d.) https://www.instacart.com/help/section/360007902791/360039164252 (13 January 2023, date last accessed).

Kahler CW, Strong DR, Read JP. Toward efficient and comprehensive measurement of the alcohol problems continuum in college students: the brief young adult alcohol consequences questionnaire. *Alcohol Clin Exp Res* 2005;**29**:1180–9.

Mattick RP, Clare PJ, Aiken A *et al.* Association of parental supply of alcohol with adolescent drinking, alcohol-related harms, and alcohol use disorder symptoms: a prospective cohort study. *Lancet Public Health* 2018;**3**:e64–71.

Saunders JB, Aasland OG, Babor TF *et al.* Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption–II. *Addiction* 1993;**88**:791–804.

Statista. *Poverty Rate in the United States in 2021, by Age and Gender*. New York, NY, 2022 https://www.statista.com/statistics/233154/us-poverty-rate-by-gender/ (13 January 2023, date last accessed).

Trager BM, Morgan RM, Boyle SC *et al.* Taking alcohol from one's parents' home without permission as a risk factor for greater alcohol and marijuana use during the transition into college. *Addict Behav* 2023;**137**:107502.

Treeby MS, Rice SM, Wilson M *et al.* Measuring alcohol use-related shame and guilt: development and validation of the perceptions of drinking scale. *Subst Use Misuse* 2020;**55**:441–51.

Tutenges S, Bøhling F. Designing drunkenness: how pubs, bars and nightclubs increase alcohol sales. *Int J Drug Policy* 2019;**70**:15–21.

Van Hoof JJ. The effectiveness of ID readers and remote age verification in enhancing compliance with the legal age limit for alcohol. *Eur J Public Health* 2017;**27**:357–9.

Venkatraman V, Richard CM, Magee K, Johnson K. *Countermeasures that Work: A Highway Safety Countermeasures Guide for State Highway Safety Offices*, 10th edn, 2020. (Report No. DOT HS 813 097). Washington, DC: National Highway Traffic Safety Administration, 2021. https://www.nhtsa.gov/sites/nhtsa.gov/files/2022-06/15100_Countermeasures10th_080621_v5_tag_0.pdf (10 January 2023, date last accessed).

Wang ES. Hypotheses for the reasons behind beer consumer's willingness to purchase beer: an expanded theory from a planned behavior perspective. *Foods* 2020;**9**:1842.

Williams RS, Schmidt A. The sales and marketing practices of English-language internet alcohol vendors. *Addiction* 2014;**109**:432–9.

Youth Risk Behavioral Surveillance System (YRBSS). *2019 YRBS Data User's Guide*. Atlanta, GA: Centers for Disease Control and Prevention, 2020. https://www.cdc.gov/healthyyouth/data/yrbs/pdf/2019/2019_National_YRBS_Data_Users_Guide.pdf (13 January 2023, date last accessed).