

# Online alcohol delivery is associated with heavier drinking during the first New Zealand COVID-19 pandemic restrictions

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## Abstract

**Introduction.** This paper aimed to assess purchasing and drinking behaviour during the first COVID-19 pandemic restrictions in New Zealand. **Method.** A convenience sample was collected via Facebook from 2173 New Zealanders 18+ years during pandemic restrictions April/May 2020. Measures included: the quantity typically consumed during a drinking occasion and heavier drinking (6+ drinks on a typical occasion) in the past week; place of purchase including online alcohol delivery. Descriptive statistics were generated, logistic and linear regression models predicted heavier drinking and typical occasion quantity, respectively. Weighting was not applied. **Results.** During pandemic restrictions, around 75% of respondents purchased from supermarkets, 40% used online alcohol delivery services (18% for the first time during COVID-19). Purchasing online alcohol delivery during pandemic restrictions was associated with heavier drinking (75% higher odds) in the past week, while purchasing from supermarkets was not. About 58% of online purchasers under 25 reported no age checks. Sixteen percent of those purchasing online repeat ordered online to keep drinking after running out. Of respondents who had tried to buy alcohol and food online, 56% reported that alcohol was easier to get delivered than fresh food. Advertising for online alcohol delivery was seen by around 75% of the sample. Half of the sample reported drinking more alcohol during the restrictions. **Discussion and Conclusions.** Online alcohol delivery during the COVID-19 pandemic restrictions was associated with heavier drinking in the past week. The rapid expansion of online alcohol delivery coupled with a lack of regulatory control requires public health policy attention. [Huckle T, Parker K, Romeo JS, Casswell S. Online alcohol delivery is associated with heavier drinking during the first New Zealand COVID-19 pandemic restrictions. *Drug Alcohol Rev* 2021;40:826–834]

**Key words:** alcohol, COVID-19, heavier drinking, online alcohol delivery.

## Introduction

Alcohol was deemed an essential service during COVID-19 pandemic restrictions in New Zealand [1]. The European office of the World Health Organization recently released a COVID-19 and alcohol factsheet [2] outlining risks, including increased susceptibility as alcohol can compromise the immune system. Heavy alcohol use is a risk factor for the development of acute respiratory distress syndrome, which is one of the main complications of COVID-19 [3]. A recent systematic review and meta-analysis found that any measure of high relative to low alcohol consumption was associated with a significantly increased risk of acute respiratory distress syndrome [3]. One justification for alcohol being an essential service may have been to protect dependent people who can experience life threatening withdrawal if they do not have access to alcohol [1]. Just over 15% of the New Zealand population aged 15+

years are at risk for problematic alcohol use as defined by the Alcohol, Smoking and Substance Involvement Screening Test [4]. An informal estimate suggests there are at least 200 000 people likely to meet the criteria for alcohol use disorder in New Zealand (Sellman D, National Addiction Centre, Christchurch School of Medicine and Health Sciences, New Zealand, personal communication 2020). Another reason may have been concern for business interests [1].

Alcohol as an essential service during COVID-19 was of additional health importance as drinkers consuming alcohol confined in home settings may cause an escalation of harm to those in the household environment including domestic violence and child maltreatment [2]. Police data show that family violence was intensified during lockdown, with a 22% increase in investigations [5]. In New Zealand, a third of family violence offences are alcohol-related [6]. Home confinement may be particularly distressing for children

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who are being maltreated. Around 30% of child maltreatment is related to heavy drinking by caregivers [7,8].

Alcohol sales were permitted with some conditions during the first pandemic restrictions during March/May 2020 in New Zealand (Figure S1, Supporting Information, shows the full description of dates, all pandemic and alcohol restrictions [9]). There were different levels of pandemic restrictions in New Zealand. During Level 4 (Lockdown—stay home orders, 25 March to 27 April) and Level 3 (Restrict—stay home orders, but able to expand contact to include close family/whānau, caregivers or support isolated people, 27 April to 13 May 2020) restrictions dedicated alcohol shops were closed (except for in a few small trust areas). All on-premises such as bars, nightclubs and restaurants were closed. Supermarkets were open to sell alcohol (supermarkets are only permitted to sell beer and wine). Online alcohol sales, permitted to sell all types of alcohol including spirits and ready to drinks, were also allowed, likely to be of considerable importance given the stay home orders. Initially restricted to existing online-only alcohol businesses, including supermarkets, they were then extended to other premises, provided they consulted with their local council authorities. This increased online potential availability from about 250 online-only businesses to around 1000 physical bottle shops [1]. Social media were used to promote online sales [1]. During Level 2 (Reduce—stay home orders removed, 13 May to 8 June 2020), dedicated alcohol shops and bars could now open as could restaurants/cafes but booking numbers were restricted and social distancing rules were in place.

The COVID-19 pandemic restrictions affected the way New Zealanders accessed alcohol and may have affected how they consumed alcohol. Some predictions based on findings from both the SARS2 pandemic and the global 2007/2008 financial crisis suggest that alcohol consumption may increase in response to an increase in psychological distress triggered by financial difficulties, social isolation and uncertainty about the future; on the other hand, a reduction in alcohol use could also occur with reduced physical availability and negative financial implications [10]. These scenarios are not mutually exclusive, and timing of the impacts may differ, that is, immediate vs. the months or years after the crisis.

A New Zealand online panel survey conducted in the first few weeks of the pandemic stay home orders (Level 4) reported online alcohol delivery was used by 14% of New Zealanders (7% for the first time). It also reported that most respondents had either not changed their usual levels of consumption or were drinking less but 20% did report increased drinking [11].

Documentation of alcohol and purchasing behaviours during COVID-19 pandemic restrictions will inform future discussions of alcohol regulation. Therefore, this study will assess purchasing and drinking behaviour in the context of the COVID-19 pandemic restrictions among a sample of New Zealand Facebook users.

### Objectives

1. To assess if COVID-19 pandemic restrictions affected alcohol purchasing behaviour.
2. To assess the use of online alcohol delivery services during the COVID-19 pandemic restrictions including factors that facilitate access.
3. To assess if online alcohol delivery was associated with heavy drinking during the COVID-19 pandemic restrictions.
4. To assess if/how drinking changed during COVID-19 pandemic restrictions relative to before the restrictions (including by job or income loss due to COVID-19).

### Methods

Cross-sectional, self-report survey data were obtained from a convenience sample of 2173 New Zealand Facebook users aged 18+ years between 30 April and 28 May 2020. Participants aged 18+ were recruited on Facebook via a paid ad. Drinkers and non-drinkers over 18 years were eligible. The age range was selected to comply with Facebook policy and reflected the legal purchase age for alcohol in New Zealand (18 years). Participants who clicked on the survey link were taken to an online survey where they consented to participate. Respondents were completely anonymous to the researchers and IP addresses were suppressed. Facebook was chosen as the recruitment platform as online data collection was safe and appropriate during the pandemic stay at home orders, further this recruitment platform allows access to an online savvy community. As of May 2020, 66% of New Zealanders were on Facebook [12].

The sample was comprised of respondents during Level 3 (Restrict) which included stay home orders (62%;  $n = 1350$ ) and during Level 2 (Reduce) (38%;  $n = 823$ ). The period of pandemic restrictions that respondents could report on covered 25 March to 28 May 2020. It was not possible to measure the response rate associated with this approach as, although Facebook gives information about the reach of the ad, the number of people who were exposed to the survey recruitment efforts cannot be determined. We do know that the completion rate was 81%. That is, of the people who started the survey, 81% went on to complete it.

## Measures

### *Alcohol purchase and behaviour during pandemic restrictions*

Respondents were asked where they purchased alcohol during the COVID-19 pandemic restrictions (covering 25 March to 28 May 2020). Response options included: supermarkets; online delivery from local alcohol shops; other online delivery; alcohol shops (not online); on-licences such as bars and pubs; from friends; any other (specify); and have not purchased. Response options were yes/no.

Respondents were also asked if the COVID-19 pandemic restrictions had affected their, or their household's, alcohol purchasing behaviour in the following ways—switched to purchasing online to get spirits/ready to drinks, purchasing more alcohol than usual during the restrictions, less money to purchase alcohol, and any other. Response options were yes/no.

### *Online delivery during the pandemic restrictions*

For respondents who indicated that they had purchased alcohol online during the COVID-19 pandemic restrictions, a series of follow-up questions were asked.

- **Prior purchase:** Respondents were asked if they had purchased alcohol online prior to the COVID-19 pandemic restrictions (yes/no).
- **Ease of delivery:** Respondents were asked about the ease of getting alcohol delivered online relative to fresh food/groceries (much easier, somewhat easier, not easier, have not tried to buy alcohol online, have not tried to buy groceries online).
- **Time to delivery:** Respondents were asked how long on average it took for their alcohol to be delivered during the COVID-19 pandemic restrictions (less than 1 h, between 1 and 3 h, 4 and 8 h, 8 and 24 h, and 1 and 2 days, more than 2 days).
- **ID at delivery:** Respondents under 25 reported whether they had been asked to show age ID when online alcohol had been delivered (often, sometimes, never, not under 25 years of age).
- **Ads for online delivery:** Respondents were asked how many ads they had noticed for online delivery per day during the COVID-19 pandemic restrictions (a lot of ads per day, some ads per day, a few ads per day, no ads per day, do not know).

Respondents were also asked: If their alcohol had run out while they were in the middle of drinking, did they sometimes order more alcohol online to keep drinking? (often, sometimes, never, not applicable).

### *Alcohol consumption*

*Typical occasion quantity in the past week.* Respondents told us the beverage(s) they drank on a typical occasion in the past week (from a specified list of all beverages available in New Zealand). Respondents could report multiple responses (yes/no). Respondents reported their consumption of different beverages and reported how much they drank by selecting from specified lists of containers and glass sizes in which alcohol is commonly served and sold in New Zealand. In this way, respondents do not have to 'calculate' and report their consumption in terms of standard drinks which is likely to introduce error [13]. Calculation of the quantity of millilitre of ethanol was made using the appropriate assumptions regarding alcohol content for each beverage and container sizes based on Statistics New Zealand conversion factors.

*Heavier drinking.* Respondents were categorised into 6+ drinks on a typical occasion in the past week versus less than 6 drinks. A drink was defined as 15 ml absolute alcohol.

*Change in drinking.* Respondents were asked "during the COVID-19 restrictions, has your drinking changed compared to before any restrictions?" (drinking a lot more, a little more, about the same, a little less, a lot less, did not drink during pandemic restrictions).

*Census 2018 data.* Census 2018 data were not included in the main analysis but were used to compare the demographic composition of the convenience sample against the New Zealand population. Census data are the most comprehensive data available for comparison.

## Analysis

For study aims 1, 2 and 4, the descriptive analysis generated sample percentages, cross-tabs and confidence intervals. The confidence intervals are not applicable to the New Zealand population, only to the current sample. Descriptive analysis was conducted separately for males and females, as more females responded to the survey than males. For the variables related to describing aspects of online alcohol delivery denominators differed (see Table 1). For the measure 'ease of delivery' if respondents reported they had not bought alcohol online or groceries online (or both), they were excluded from analysis ( $n = 1158$ ). For the measure 'ran out of alcohol in the middle of drinking and ordered more online', those who specified this was not applicable were excluded from analysis ( $n = 171$ ). For 'asked for age ID verification on delivery' those over 25 years were excluded ( $n = 733$ ). For ads for online delivery seen per day, those who reported they did not

know if they had seen ads were excluded from analysis ( $n = 81$ ).

For study aim 3, variables that predicted heavier drinking were explored using logistic regression, including online alcohol delivery, purchase from supermarkets controlling for gender, age, Māori (Y/N), New Zealand European (Y/N) and job/income loss due to COVID-19 (Y/N) and Level 3 versus Level 2 restrictions. For typical occasion quantity, the log of this variable was used, and a linear regression was run using the same variables as the model above. Models were built up one variable at a time to check for multicollinearity. No weighting was used for any of the models. After the final models had been run, residuals were checked to see if they were approximately normal and if there were any clear patterns remaining. Using Cook's distance we did not see any influential outliers in any of the models. Analysis was carried out using R 4.0 with some additional data management performed in SAS 9.4.

## Results

### Demographics

Most respondents who completed the survey were female (79%), 21% were male and 1% gender diverse (given the small number of gender diverse participants we were unable to conduct analysis separately for this group). Most of the sample were New Zealand European/Pakeha (89%); 6% of the sample were Māori (Table 1). The median age of the sample was 43 years. Table 1 shows the demographic comparison of the convenience sample to the New Zealand Population using Census 2018.

### COVID-19 pandemic restrictions and purchasing

Supermarkets were the most common place where alcohol was purchased during the COVID-19 pandemic restrictions. Around 40% of males and females used any online alcohol delivery service. Twenty-one percent of males purchased from an alcohol store (in store) and 17% of females did the same. Very small percentages of respondents reported purchasing from on-licences, friends or other places. Around 13% of both males and females did not purchase alcohol during the pandemic restrictions (Figure 1).

There were few differences observed between Levels 3 and 2. There were slight changes in the percentages of respondents purchasing any online alcohol delivery—around 40% in Level 3 and 36% in Level 2. Purchase from alcohol shops (in store) was 15% during Level

**Table 1.** Demographic comparison of the convenience sample to the New Zealand population 2018

Demographics	New Zealand population 2018	Survey population	
	%	%	<i>n</i>
<i>Age, years</i>			
15–24	17	11.3 <sup>a</sup>	241
25–34	18.3	20.3	432
35–44	15.8	23.8	507
45–54	16.9	24.6	525
55–64	15.2	12.7	270
65–84	16.8	7.4	157
Total	100	100	2132
<i>Sex</i>			
Female	49.4	78.6	1661
Male	50.6	21.4	451
Total	100	100	2112
<i>Employment</i>			
Employed full-time	50.1	56.2	1214
Employed part-time	14.7	17.4	376
Unemployed	4	1.5	32
Total	68.8	75.1	1622
<i>Ethnicity (multi-response)</i>			
European	70.2	86.7	1883
Māori	16.5	6	131
Pacific Peoples	8.1	0.8	17
Asian	15.1	1.8	39
Middle Eastern/Latin American/African	1.5	1.7	36
Other ethnicity	1.2	3.7	81
Total (multi-response)	112.6	100.7	2187

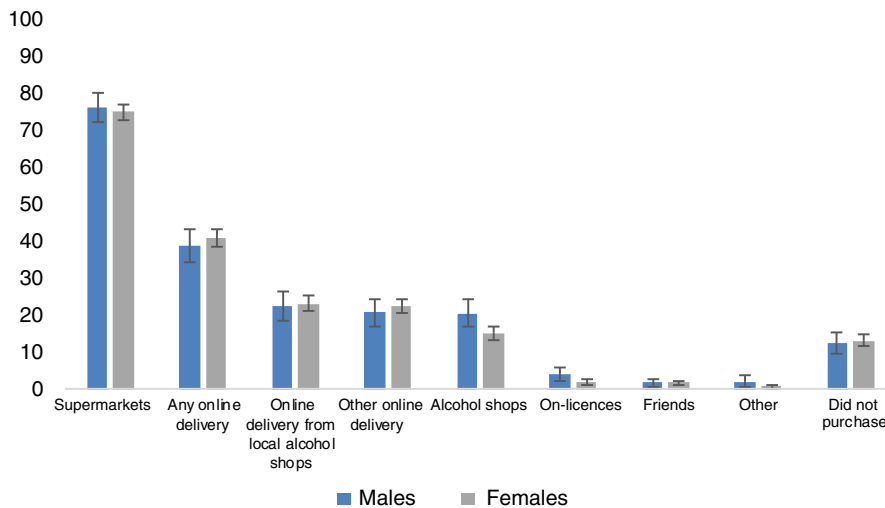
<sup>a</sup>Age group 18–24 in the survey sample. Source—New Zealand Census 2018 [28].

3 and 21% during Level 2. On-premise purchase was 1.5% during Level 3 and 7% during Level 2.

### Changes to purchasing behaviour during COVID-19 pandemic restrictions

Of those who purchased alcohol during the COVID-19 pandemic restrictions, around 30% of males and females reported switching to online purchasing to buy spirits/ready to drinks, 51% of females and 46% of males reported purchasing more alcohol during the pandemic restrictions, and 16% of females and 12% of males said they had less money to purchase alcohol.

There were few differences observed between Levels 3 and 2. However, for 'Switched to purchasing online in order to get spirits/ready to drinks' results were: Level 3: females = 35%, males = 33%; Level 2: females = 25%, males = 25%.



**Figure 1.** Where alcohol was purchased from during COVID-19 pandemic restrictions: Percentages of males and females.

#### *Online alcohol delivery including factors that facilitate access*

Table 2 shows aspects related to online alcohol delivery that may facilitate access. Of all purchasers, around 18% of males and females reported purchasing online alcohol delivery for the first time during COVID-19 pandemic restrictions. Of online alcohol purchasers only, 45% of males and 47% of females had done so for the first time.

Online alcohol delivery was relatively easy to access during the pandemic restrictions. Of those who had purchased online alcohol and had tried to also buy fresh food online, 58% of males and 53% of females agreed that alcohol was easier to get delivered than fresh/food or groceries during the restrictions.

Of those who had purchased online alcohol delivery, almost one-quarter of males and 14% of females reported ordering more alcohol during a drinking session after having run out. While most deliveries took more than 2 days, 5% of males and almost 8% of females reported that delivery took less than 3 h. Of those who were under 25 years and purchased online alcohol delivery, 47% of males and 60% of females reported never being asked for age ID verification at delivery. Most respondents who had purchased alcohol online (73% females and 78% males) reported seeing at least one ad per day for online alcohol delivery, with around 26% of males and 16% of females reporting seeing a lot of ads per day.

#### *Online alcohol delivery and heavier drinking*

Respondents who used online alcohol delivery services during the pandemic restrictions had 75% higher odds of being a heavier drinker in the past week [Note:

Heavier drinking was defined as 6+ drinks on a typical occasion in the past week. A drink was defined as 15 ml absolute alcohol] than respondents who did not. Purchasing from the supermarket was not associated with heavier drinking. Those who had lost a job or income due to COVID-19 had 78% higher odds of being a heavier drinker compared to those who had not. Males had 98% higher odds of being a heavier drinker in the past week during COVID-19 pandemic restrictions compared to females. Older people had lower odds of being a heavier drinker relative to younger people (Table 3).

Those who purchased online alcohol delivery during COVID-19 pandemic restrictions reported 24% higher typical occasion quantity on average in the past week, while those who had purchased from the supermarket were estimated to have 34% higher typical occasion quantity. Being male was associated with an increase of 36%, Māori an increase of 30% and having lost a job or income an increase of 22% typical occasion quantity in the past week during COVID-19 pandemic restrictions. Each additional 5 years of age was associated with a decrease of 5% of typical occasion quantity. Drinkers consumed a 13% more typical occasion quantity in the past week in Level 3 restrictions compared to Level 2 (Table 3).

#### *Changes in drinking during COVID-19 pandemic restrictions*

Around 47% of males and 53% of females reported drinking more during COVID-19 pandemic restrictions, for those who used online alcohol delivery these percentages were around 58% for males and 68% for females (Table 4).

**Table 2.** Percentages using online alcohol delivery during COVID-19 pandemic restrictions and factors that may facilitate access

Online delivery measure	Male		Female		Total	
	(%)	CI	(%)	CI	(%)	CI
<i>Purchased online for first time during COVID-19 pandemic restrictions</i>						
Total sample ( <i>n</i> = 2173)	17.3	(14, 21.2)	18.5	(16.7, 20.5)	18.2	(16.6, 19.9)
Of those who purchased online ( <i>n</i> = 857)	44.6	(37.1, 52.3)	46.7	(42.7, 50.4)	46.2	(42.7, 49.4)
<i>Ease of online delivery</i>						
Alcohol easier to get delivered than fresh food/groceries ( <i>n</i> = 723)	52.4	(44, 60.5)	57.6	(53.4, 61.7)	56.0	(52.3, 59.7)
<i>Repeat online order to keep drinking</i>						
Ran out of alcohol in the middle of drinking and ordered more online ( <i>n</i> = 686)	23.0	(16.4, 31.1)	13.7	(10.9, 16.9)	15.5	(12.9, 18.4)
<i>Time delivery took (<i>n</i> = 853)</i>						
Less than 1 h	1.2	(0.2, 4.5)	1.5	(0.8, 2.9)	1.6	(0.9, 2.8)
Between 1–3 h	3.5	(1.4, 7.7)	6.1	(4.4, 8.3)	5.4	(4, 7.2)
Between 4–8 h	5.8	(2.9, 10.6)	3.5	(2.3, 5.3)	3.9	(2.7, 5.5)
Between 8–24 h	9.2	(5.5, 14.8)	4.3	(2.9, 6.2)	5.2	(3.8, 6.9)
Between 1–2 days	28.7	(22.3, 36.2)	25.0	(21.7, 28.5)	25.9	(23, 29)
More than 2 days	51.7	(44.1, 59.3)	59.7	(55.8, 63.4)	58.0	(54.6, 61.4)
<i>If under 25 years, asked for age ID verification on delivery (<i>n</i> = 120)</i>						
Never	47.1	(30.2, 64.6)	60.7	(49.4, 71)	57.5	(48.1, 66.4)
Sometimes	14.7	(5.5, 31.8)	13.1	(7, 22.6)	13.3	(8, 21)
Often	38.2	(22.7, 56.4)	26.2	(17.5, 37.1)	29.2	(21.4, 38.3)
<i>Seeing ads for online alcohol delivery (<i>n</i> = 777)</i>						
A few ads per day	33.3	(26.2, 41.3)	35.9	(32.1, 39.9)	35.4	(32, 38.9)
Some ads per day	19.5	(13.8, 26.7)	21.5	(18.4, 25.1)	21.0	(18.2, 24)
A lot of ads per day	25.8	(19.3, 33.4)	15.9	(13.1, 19.1)	17.9	(15.3, 20.8)
No ads	21.4	(15.5, 28.7)	26.7	(23.2, 30.5)	25.7	(22.7, 29)

CI, confidence interval.

**Table 3.** Regression model estimates predicting heavier drinking<sup>a</sup> and typical occasion quantity in the past week

Predictors	6+ drinks on a typical occasion <sup>a</sup> (past week)			Typical occasion quantity (past week)			
	OR	CI	<i>P</i>	Predictors	Estimates	CI <sup>b</sup>	<i>P</i>
Intercept	0.43	0.22–0.83	<b>0.013</b>	Intercept	50.53	39.37–64.86	<b>&lt;0.001</b>
Online [Yes]	1.75	1.36–2.27	<b>&lt;0.001</b>	Online [Yes]	1.24	1.13–1.36	<b>&lt;0.001</b>
Supermarket [Yes]	1.47	1.00–2.19	0.053	Supermarket [Yes]	1.34	1.17–1.54	<b>&lt;0.001</b>
Gender [Male]	1.98	1.49–2.62	<b>&lt;0.001</b>	Gender [Male]	1.36	1.22–1.52	<b>&lt;0.001</b>
Age	0.97	0.96–0.98	<b>&lt;0.001</b>	Age	0.99	0.99–0.99	<b>&lt;0.001</b>
NZ <sup>2</sup> European/Pakeha	0.86	0.64–1.17	0.331	NZ European/Pakeha	0.93	0.83–1.05	0.255
Māori	1.34	0.81–2.19	0.245	Māori	1.30	1.07–1.59	<b>0.009</b>
Lost job or income	1.78	1.35–2.35	<b>&lt;0.001</b>	Lost job or income	1.22	1.10–1.37	<b>&lt;0.001</b>
Level 3 vs. 2 restrictions	1.26	0.97–1.64	0.081	Level 3 vs. 2 restrictions	1.13	1.02–1.24	<b>0.015</b>

<sup>a</sup>6+ drinks defined as 15 ml absolute alcohol. <sup>b</sup>Exponentiated coefficients and confidence intervals. CI, confidence interval; NZ, New Zealand; OR, odds ratio. Significant *P* values are bolded.

### Changes in drinking related to income or job loss due to COVID-19

A slightly higher percentage of females who had lost a job or income due to COVID-19 were observed to be

drinking less relative to those who had not, and both males and females who had lost a job or income were slightly less likely to be drinking more (relative to those who had not). See Table S1, Supporting Information.

**Table 4.** Percentages of drinkers consuming less, the same or more during COVID-19 pandemic restrictions

	Purchased any alcohol						Purchased online alcohol delivery					
	Male (%)	CI	Female (%)	CI	Total (%)	CI	Male (%)	CI	Female (%)	CI	Total (%)	CI
Drinking less	25.5	(21.4, 29.9)	22.2	(20.1, 24.4)	22.7	(20.9, 24.6)	17.8	(12.6, 24.5)	11.5	(9.2, 14.2)	12.9	(10.8, 15.4)
Drinking same	27.8	(23.7, 32.4)	24.5	(22.4, 26.8)	25.4	(23.5, 27.3)	24.7	(18.6, 31.9)	21.9	(18.8, 25.3)	22.4	(19.6, 25.3)
Drinking more	46.7	(41.9, 51.6)	53.3	(50.8, 55.8)	51.9	(49.7, 54.1)	57.5	(49.8, 64.9)	66.7	(62.9, 70.2)	64.7	(61.4, 67.9)

CI, confidence interval.

## Discussion

While most respondents purchased alcohol from supermarkets during the COVID-19 pandemic restrictions in New Zealand, it was online alcohol delivery that was associated with heavier drinking in the past week. Online alcohol delivery is an easy way of delivering alcohol to private households; 74% of all the alcohol consumed in harmful drinking occasions in New Zealand is consumed in private homes (harmful drinking defined as 8+ drinks for males and 6+ for females) [14]. The effects of heavier drinking may be exacerbated during home confinement, and initial police and women's refuge data suggest there was an increase in calls for family violence [5], as has been found in other countries (e.g. United States, China, Brazil and Australia [15]). In the current study, almost one-quarter of males and 15% of females who had purchased online delivery said they ordered more alcohol online after running out while drinking. This suggests a direct facilitation of heavier drinking by online delivery during COVID-19 pandemic restrictions.

Online alcohol delivery is a rapidly emerging market internationally and COVID-19 has triggered a sudden expansion of online alcohol delivery in New Zealand, for example, a 2015 national random sample of 2000 drinkers found that 2% had purchased online alcohol delivery (SHORE & Whariki, 2015, unpublished International Alcohol Control study data) compared to around 40% during pandemic restrictions in this study. China's online alcohol delivery market is expanding by 15% per year [16] and Australia has also experienced a sudden growth in online alcohol sales and delivery [17]. Retailers providing online sales in Australia offer a variety of alcohol products cheaply, most offered discounts for purchasing greater quantities and one in 10 websites allowed customers to purchase alcohol using a 'buy now, pay later' scheme such as AfterPay or Zip Pay [18]. Online alcohol delivery remains under-regulated in most jurisdictions

although, for example, in New South Wales, Australia there are proposed regulations to prevent same day online sales and sales to intoxicated people [19].

Over half of the sample reported drinking more than they had before the pandemic restrictions. This percentage was higher among those who used online alcohol delivery, and particularly so among females. Our study findings differ from a previous study conducted during the first few weeks of lockdown, where most respondents had either not changed their usual levels of consumption or were drinking less [11]. This could be due to a different sample, or perhaps our sample drank more the longer the home confinement orders lasted possibly reflecting an increase in psychological distress [10].

Our findings show that there was a relative ease in obtaining online alcohol delivery during COVID-19 pandemic restrictions and several factors facilitated access: alcohol was easier to get delivered compared to fresh food/groceries; relaxed age ID verification processes were apparent; and some drinkers could get alcohol delivered within hours of ordering. Furthermore, around three-quarters of respondents who had used online delivery services saw ads for online delivery at least daily. There is little research into the impacts of these types of ads which is a gap, especially as they can provide a direct link to the source of alcohol.

There has been a rapid expansion in online alcohol delivery during COVID-19 in New Zealand. A New Zealand survey conducted in the first few weeks of the pandemic stay home orders (Level 4), reported online alcohol delivery was used by 14% of New Zealanders (7% for the first time) [11]. The findings of this study show that 40% of respondents used online alcohol delivery in Level 3 and 36% in Level 2, with 18% of the total sample purchasing online for the first time during COVID-19. Again, it is possible that differences in the samples contributed to this

finding or it could reflect a rapid increase in online alcohol delivery that occurred during COVID-19. This may suggest that the increase in online alcohol delivery services will be permanent, although further research will be needed to confirm such a finding.

Respondents financially affected by COVID-19, that is, had job or income loss as a result, were more likely to be heavier drinkers, or vice versa given the cross-sectional nature of the data. Either way, this finding suggests that the conditions of COVID-19 and financial distress may exacerbate inequalities relating to alcohol and may result in compounding stress for whānau (family) and individuals. While there was an association between heavier drinking and the financial impact of COVID-19, only a small percentage of those financially impacted were drinking less than their usual level. Financial loss in the pandemic makes alcohol more difficult to afford, but it is primarily a stressor, which could explain this finding.

### Implications

The increased use of online delivery services during the pandemic has highlighted an already existing problem—there is insufficient policy in place to mitigate harms from home delivery of alcohol. The policy framework permitting and governing online alcohol delivery may not be suitable for protecting public health. Online alcohol delivery in New Zealand is governed by a remote licence that includes restrictions typical of those placed on take-away outlets, however, there is no evidence that these regulations minimise harm as stipulated in the *Sale and Supply of Alcohol Act* [20]. For example, there are no restrictions on rapid delivery or repeat online delivery to extend heavy drinking occasions, or on buy now pay later options such as Afterpay or Zip Pay (which is available in some other countries for purchasing alcohol online) [21].

Future monitoring of alcohol consumption will be important as, during prior epidemics, some affected individuals have increased their drinking. This may reflect self-medication, which can have long-term negative effects, including exacerbating alcohol's role in the 'diseases and deaths of despair' [22], including those related to alcohol use disorder.

### Limitations

The sample is a convenience sample and is not representative of the New Zealand population nor Facebook users. However, the study was able to test relationships between variables in the general population where

representativity is not a key necessity [23]. Utilising Facebook was a feasible and safe way to conduct research during stay at home orders. A Facebook sample also may better represent the online savvy community, which should be considered when comparing these findings to others from New Zealand, that is respondents may be more likely to order online alcohol. The fact that more females responded than males may be related to the COVID-19 stay home orders. A similar survey we have conducted on Facebook outside of the stay home orders is more sex balanced. Females use social networking sites to make connections and stay in touch with family or friends, more so than males [24], a pattern which may have been heightened during stay home orders. Females have also been reported to engage in far more Facebook activity than males [25]. However, females have also been shown to be over-represented in convenience samples (albeit not to the extent in this study) [26]. We undertook descriptive analysis separately by males and females to ameliorate bias that may be present from only reporting total percentages only and controlled for a number of variables (i.e. age, ethnicity, level of pandemic restrictions, loss of income/job) in the models. As our sample is a convenience sample and lacks numbers in some population groups including males, it is likely our survey has underestimated consumption relative to that in the New Zealand population. It is possible social desirability bias meant that respondents were less likely to report heavy drinking [27], however, this does not change the main conclusions of the study. We were unable to calculate a response rate.

### Conclusion

During the first COVID-19 pandemic restrictions half of the drinkers in our sample were consuming more alcohol relative to before the restrictions. The source of alcohol associated with heavier drinking during COVID-19 was online alcohol delivery. There was ease of access to online delivery during the pandemic along with advertising directly linking drinkers to alcohol. The rapid expansion of online alcohol delivery coupled with a lack of regulatory control requires public health policy attention.

### References

- [1] Casswell S. Alcohol can make coronavirus worse—so why was it treated as essential in New Zealand's lockdown. *The Conversation*, 2020. Available at: <https://theconversation.com/alcohol-can-make-coronavirus-worse-so-why-was-it-treated-as-essential-in-new-zealands-lockdown-137698> (accessed August 2020)



- [2] World Health Organization. Frequently asked questions about alcohol and COVID-19. Copenhagen, Denmark: Regional Office for Europe, 2020.
- [3] Saengow U, Assanangkornchai S, Casswell S. Alcohol: a probable risk factor of COVID-19 severity. *Addiction* 2020 [Epub ahead of print]. <https://doi.org/10.1111/add.15194>.
- [4] Ministry of Health. New Zealand Health Survey—Mental Health Data Explorer (2020). Available at: [https://minhealthnz.shinyapps.io/nz-health-survey-2016-17-mental-health-explorer/\\_w\\_c0e359c4/#/](https://minhealthnz.shinyapps.io/nz-health-survey-2016-17-mental-health-explorer/_w_c0e359c4/#/) (accessed September 2020)
- [5] Foon E. Domestic violence calls to police increase in lockdown (2020). Available at: <https://www.rnz.co.nz/news/national/415553/domestic-violence-calls-to-police-increase-in-lockdown> (accessed August 2020).
- [6] New Zealand Police. Framework for preventing and reducing alcohol-related offending and victimisation 2010–2014. 2010.
- [7] Christoffersen M, Sothill K. The long-term consequences of parental alcohol abuse: a cohort study of children in Denmark. *J Subst Abuse Treat* 2003;25:107–16.
- [8] Laslett A-M, Dietze P, Room R. Carer drinking and more serious child protection case outcomes. *Br J Social Work* 2013;43:1384–402.
- [9] New Zealand Government. Unite Against COVID - COVID-19 Alert System (2020). Available at: <https://covid19.govt.nz/alert-system/> (accessed October 2020).
- [10] Rehm J, Kilian C, Ferreira-Borges C *et al.* Alcohol use in times of the COVID-19: implications for monitoring and policy. *Drug Alcohol Rev* 2020;39:301–4.
- [11] Health Promotion Agency. The impact of lockdown on health risk behaviours (2020). Available from: <https://www.hpa.org.nz/research-library/research-publications/the-impact-of-lockdown-on-health-risk-behaviours> (accessed August 2020)
- [12] StatCounter - Global Stats. Social Media Stats in New Zealand (2020). Available from: <https://gs.statcounter.com/social-media-stats/all/new-zealand> (accessed October 2020).
- [13] World Health Organization. International guide for monitoring alcohol consumption and related harm. Geneva: Department of Mental Health and Substance Dependence, World Health Organization, 2000.
- [14] Huckle T, Callinan S, Pham C, Chaiyasong S, Parker K, Casswell S. Harmful drinking occurs in private homes in some high-and middle-income alcohol markets: data from the international alcohol control study. *Drug Alcohol Rev* 2020;39:616–23.
- [15] Usher K, Bhullar N, Durkin J, Gyamfi N, Jackson D. Family violence and COVID-19: increased vulnerability and reduced options for support. *Int J Ment Health Nurs* 2020;29:549–52.
- [16] Wang N. IWSR: China Leads Global Online Alcohol Consumption (2018). Available at: <https://www.thedrinksbusiness.com/2018/09/iwsr-china-leads-global-online-alcohol-consumption/> (accessed November 2020).
- [17] FARE. Online sales & delivery: Foundation for Alcohol Research & Education (2019). Available at: <http://fare.org.au/policy/online-sales-and-delivery/> (accessed August 2020).
- [18] Colbert S, Thornton L, Richmond R. Content analysis of websites selling alcohol online in Australia. *Drug Alcohol Rev* 2020;39:162–9.
- [19] Inside FMCG. NSW government cracks down on online booze sales 2020 (5 June 2020). Available at: <https://insidefmcg.com.au/2020/06/05/nsw-govt-cracks-down-on-online-booze-sales/> (accessed August 2020).
- [20] New Zealand Parliament. Part 1. Preliminary Matters. 3 Purpose. Sale and Supply of Alcohol Act 2012 (2012). Available at: <http://www.legislation.govt.nz/act/public/2012/0120/latest/whole.html#DLM3339339> (accessed August 2020).
- [21] Han E. 'Increased harm': The push to ban sales of \$1.50 alcohol via Afterpay. *Sydney Morning Herald* (2018). Available at: <https://www.smh.com.au/national/increased-harm-the-push-to-ban-sales-of-1-50-alcohol-via-afterpay-20181219-p50nab.html> (accessed August 2020).
- [22] Kontopantelis E, Buchan I, Webb R, Ashcroft D, Mamas M, Doran T. Disparities in mortality among 25–44 year-olds in England: a longitudinal population-based study. *Lancet Public Health* 2018;3:e567–75.
- [23] Rehm J, Kilian C, Rovira P, D SK, Manthey J. The elusiveness of representativeness in general population surveys for alcohol. *Drug Alcohol Rev* 2020 [Epub ahead of print]. <https://doi.org/10.1111/dar.13148>.
- [24] Vermeren I. Men vs. Women: Who is more active on social media? (2015). Available at: <https://www.brandwatch.com/blog/men-vs-women-active-social-media/> (accessed August 2020)
- [25] Jacobs T. Women spend more time (and have more friends) on Facebook: Pacific Standard (2017). Available at: <https://psmag.com/economics/men-women-use-facebook-differently-48325> (accessed August 2020).
- [26] Owen JE, Bantum EO, Criswell K, Bazzo J, Gorlick A, Stanton AL. Representativeness of two sampling procedures for an internet intervention targeting cancer-related distress: a comparison of convenience and registry samples. *J Behav Med* 2014;37:630–41.
- [27] Latkin CA, Edwards C, Davey-Rothwell MA, Tobin KE. The relationship between social desirability bias and self-reports of health, substance use, and social network factors among urban substance users in Baltimore, Maryland. *Addict Behav* 2017;73:133–6.
- [28] Stats NZ. 2018 Census population and dwelling counts (2019). Available at: <https://www.stats.govt.nz/information-releases/2018-census-population-and-dwelling-counts> (accessed November 2020)

## Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

**Figure S1.** First pandemic and alcohol restrictions: levels, start dates and descriptions.

**Table S1.** Percentages of drinkers consuming less, the same or more by job or income loss due to COVID-19.