

**The impact of the COVID-19  
pandemic on alcohol consumption  
and harm in Scotland and England:  
An evidence summary**

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## Background and introduction

From March 2020, the governments of the UK and its constituent nations implemented restrictions to attempt to control the spread of COVID-19. These measures, and the pandemic itself, have had economic, social and psychological impacts on much of the population.<sup>1</sup>

The restrictions affected how and where alcohol could be purchased. No alcohol sales were permitted in on-trade premises (such as bars, pubs and clubs) from 21 March 2020, and a national lockdown, affecting businesses and travel, began two days later. Restrictions were eased from July 2020, but over the following months, a variety of restrictions were placed on on-trade premises in the UK, on a national or regional basis. These included physical distancing, alcohol only being served outdoors, and restricted opening hours, with some further periods of complete closure for on-trade premises. Details of alcohol-relevant UK policies over the COVID-19 pandemic can be found in the Institute of Alcohol Studies' interactive timeline,<sup>2</sup> and have been summarised by Hardie et al for Scotland and England.<sup>3</sup>

Rehm et al<sup>4</sup> suggested that alcohol consumption may decrease in the short term due to reduced availability and affordability, but also considered that it may increase due to psychological distress caused by the COVID-19 pandemic. An increase in alcohol use may lead to an increase in alcohol-related health harms, and there may be interactions with COVID-19 and existing liver problems.

This briefing summarises the evidence in Scotland, England and the UK on changes in consumption of alcohol over the COVID-19 pandemic, and on alcohol-related health harms. It builds on previous work by Public Health Scotland and others by including evidence from a range of sources to understand what impact the COVID-19 pandemic has had on alcohol use and associated harms. This helps to contextualise work examining trends in alcohol consumption and harm over time. For example, Public Health Scotland is undertaking an evaluation of Minimum Unit Pricing (MUP) of alcohol in Scotland, which was implemented in 2018. When examining the impact of MUP on health harms, England is used as a control, since MUP has not been

implemented in England. Understanding the effect of COVID-19 in both countries is useful when interpreting any changes in consumption and harm from 2020 onwards.



## Method and details of included sources

### Literature included

Two literature searches were carried out by Public Health Scotland Knowledge Services:

- A search in September 2022, focusing on COVID-19, alcohol and liver damage. Databases searched were Medline, Embase, Scopus, Proquest (Public Health Database, Coronavirus Database, Sociology Collection) and Social Policy & Practice. Results were considered relevant if they discussed the effect of COVID-19 on the liver or the interaction between COVID-19, alcohol use and the liver.
- A search in November 2022, focusing on changes in alcohol consumption in the UK over the COVID-19 pandemic. Databases searched were Medline, Embase, Proquest (Public Health Database, Coronavirus Database, Sociology Collection) and Scopus. A grey literature search was also conducted of Institute for Alcohol Studies, Alcohol Change UK, Scottish Health Action on Alcohol Problems, Alcohol Focus Scotland, Balance, Public Health England (now superseded by the UK Health Security Agency), the Scottish Government and a targeted web search. Results were considered relevant if they compared alcohol consumption in England, Scotland and/or the UK before and after the start of the COVID-19 pandemic. Studies were excluded if they included only data at a sub-national level, e.g. surveys from particular regions of England.

Results included pre-prints. Medline search strategies for both searches can be found in [Appendix 1](#).

Literature was also sourced from an unpublished briefing prepared by Alcohol Focus Scotland in October 2021, and reports published by Public Health Scotland about alcohol consumption and harm over the COVID-19 pandemic were included.

Since research in this area is fairly new, no evidence was excluded due to methodological quality. However, the way data were collected has some implications

for interpretation. This is explained further below, and a summary of the methodology for each of the included studies is given in [Appendix 2](#).

## **Methodology of evidence sources**

For all studies included except reviews, details of the study design, data collection, study timeframe, sample size, whether published in a peer-reviewed journal or grey literature and whether descriptive or inferential statistics were reported are given in [Appendix 2](#). The different methodological choices and their implications are described below. Details of the included reviews are then given.

### **Study design**

Some surveys collected data both before and after the pandemic, through either a longitudinal design, where the same participants were surveyed at different time points, or a repeated cross-sectional design, where different participants took part at each time point. Some studies are cohort studies, a particular type of longitudinal study where participants typically share some characteristics. A longitudinal design allows outcomes at different time points to be compared directly for the same participants. Data collection taking place before the pandemic means that consumption changes do not have to be based on participants' recall of their drinking habits pre-pandemic, or of their perception of consumption changes over time. In contrast, some surveys asked respondents to reflect on their pre-pandemic drinking habits once the pandemic had started, which may introduce recall bias.

However, the pandemic meant that the methodology of most longitudinal and repeated cross-sectional surveys had to change, for example by moving a previously face-to-face interview to one on the telephone. This means that outcomes are not always directly comparable between waves. This has been noted in the evidence summary where relevant.

One of the studies about COVID-19, alcohol and the liver is a case-control study, which matches participants with a particular diagnosis (in this case, substance use disorder) with control participants who do not have this diagnosis.

## **Type and mode of data collection**

### **Alcohol consumption evidence**

Evidence about alcohol consumption during the COVID-19 pandemic includes:

#### **Alcohol sales data**

These are either market research data gathered from retailers or alcohol duty receipt data from HM Revenue and Customs. It allows consumption to be estimated at a population level, but does not allow exploration of consumption in population subgroups. The sales data used by Public Health Scotland are more likely to underestimate rather than overestimate population-level alcohol consumption.<sup>12</sup> This is due mainly to unrecorded alcohol, which is not captured by alcohol retail sales data. Since the net bias is fairly consistent over time, it can be useful for comparing alcohol consumption over time.<sup>12</sup>

Data from HM Revenue and Customs are useful because they include alcohol sold by all outlets. However, they are subject to some of the same biases as retail sales data, and duty receipts are returned by traders the month after goods enter the market, creating a time lag.<sup>13</sup> In addition, the alcohol by volume level of some products must be estimated when converting duty receipts to alcohol volume.

#### **Self-reported consumption through surveys**

This was the most common type of alcohol consumption evidence found, and allows for subgroup analysis of alcohol consumption. Self-reported alcohol consumption can be subject to bias, due to participant recall or unwillingness to report their alcohol consumption, or due to survey measurement error or sampling bias.<sup>5</sup>

Participants were asked to report their frequency and/or volume of alcohol consumption, either as a typical amount, or over a certain period of time (e.g. the last four weeks or last year). Some studies collected data through diary entries, which would help to reduce participant recall problems. Some studies used validated data collection instruments or screening tests as part of their data collection, such as the

Alcohol Use Disorder Identification Test (AUDIT) or the shorter Alcohol User Disorder Identification Test for Consumption (AUDIT-C).<sup>\* 6</sup>

As mentioned above, some surveys changed the mode of data collection from in-person to telephone or online during the pandemic. This may have affected participants' willingness to disclose drinking behaviour. For example, they may have felt more comfortable disclosing hazardous or harmful drinking behaviour in an online survey than a face-to-face interview.

### **Alcohol-related harms and treatment services**

Data relating to alcohol-related harms and treatment services are mainly from administrative sources, provided by treatment or healthcare providers, or by the Office for National Statistics. Details on the coverage of the administrative data are usually reported by the individual sources. A study that considered the use of professional support for alcohol reduction attempts used monthly cross-sectional surveys from before and after the start of the pandemic.

Both of the models that predicted future alcohol-related health harms for England used consumption data from the Alcohol Toolkit Study, which is described in the table in [Appendix 2](#).

Since several reviews were available around COVID-19, alcohol and the liver, preference was given to them for inclusion in this evidence summary, rather than referencing individual studies with the same conclusions.

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\* The Alcohol Use Disorders Identification Test (AUDIT) is a ten-question alcohol harm screening tool. The Alcohol Use Disorders Identification Test Consumption (AUDIT-C) comprises the three questions around consumption from the full AUDIT.

## **Sample size**

Sample size varied between studies and is given in [Appendix 2](#). Nearly all samples were weighted to be representative of the population of interest, e.g. the UK population. It is noted in Appendix 2 when this is not the case.

## **Timeframe**

Some data were collected soon after the start of the pandemic, while others were collected later. These could reflect changes in alcohol consumption or harms as the pandemic progressed. The data collection period for each study is included in the table in [Appendix 2](#).

## **Literature in peer-reviewed journals and institutional reports**

Some sources appeared in peer-reviewed journals, and so would have been subject to academic reviews. Others were institutional reports found in the grey literature. These may have been subject to institutional and/or external review before publication.

## **Descriptive and inferential statistics**

Some sources reported data descriptively, while others used inferential statistical tests. If inferential statistical tests were not used, it is possible that any descriptive differences reported between groups or over time are due to chance rather than a real effect. Where figures based on inferential statistics have been included, a 95% confidence interval\* has been reported in the summary, where available.

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\* The confidence interval indicates a range of values which is likely to include the 'true' value for the population. The 95% confidence interval means that the range of values has a 95 in 100 chance of including the 'true' value.

## Reviews

As well as primary studies, evidence was sought from reviews. These are not included in the table in Appendix 2 but are described here.

Reviews used for alcohol consumption evidence were:

- A review undertaken by Public Health England.<sup>13</sup> This did not report being systematic. The authors note that the studies they included were often of low methodological quality, and that methodological information could be hard to find.
- A review on the effect of COVID-19 on alcohol use disorders and complications in the UK.<sup>31</sup> This did not report being a systematic review.
- An Institute of Alcohol Studies briefing on women and alcohol.<sup>41</sup> This did not report being a systematic review.

Five reviews were included in the COVID-19, alcohol and the liver section.<sup>57,58,59,63,64</sup>

This included one meta-analysis<sup>59</sup> and one systematic review<sup>63</sup>. The other papers did not detail their review methods.

# Alcohol consumption during the COVID-19 pandemic

## Population-level consumption

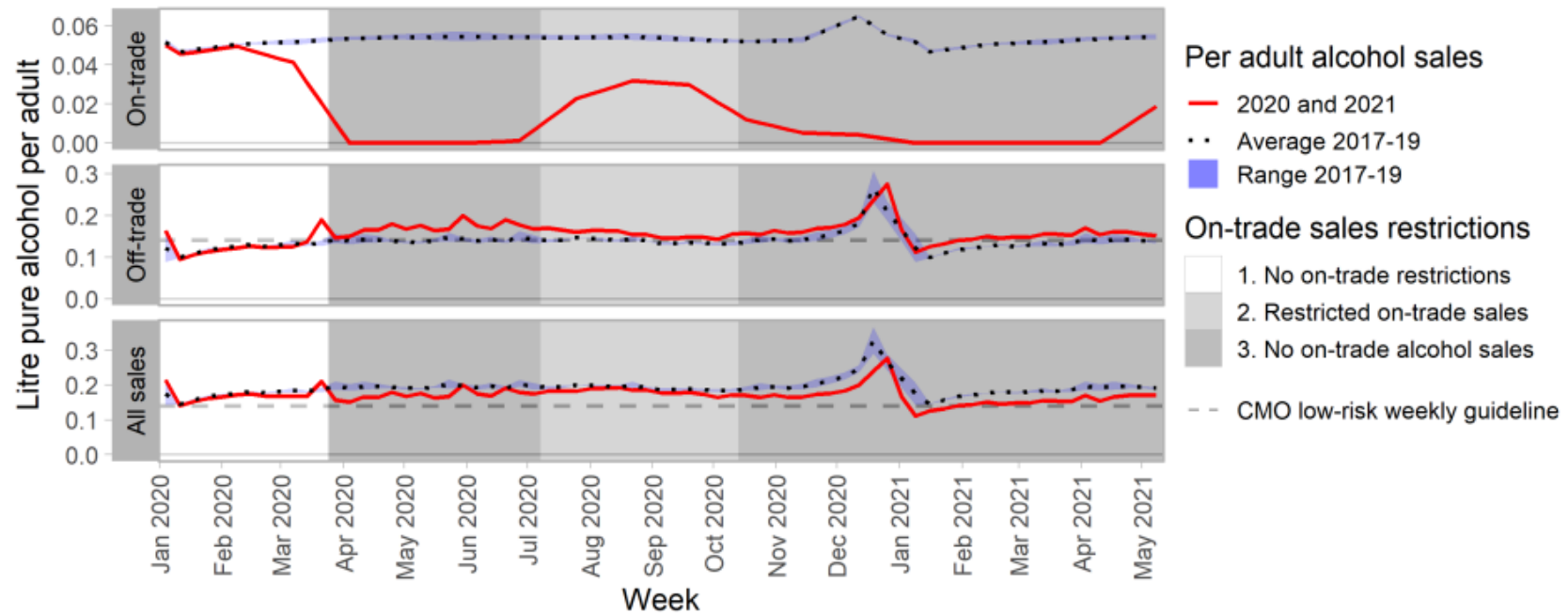
### Key points

- Overall, alcohol consumption decreased at a similar rate in Scotland and England & Wales after the start of the COVID-19 pandemic.
- Consumption in the on-trade sector fell following the introduction of COVID-19 related restrictions, while consumption in the off-trade increased.

Market research data from Scotland showed that alcohol sales were 9% lower in 2020 and 16% lower in January to May 2021 compared to the average for the equivalent time periods in 2017–19<sup>7</sup>. Figure 1 shows that this was driven by a decrease in on-trade sales, and that off-trade sales increased compared to 2017–19. Minimum Unit Pricing (MUP) was introduced in Scotland in May 2018. After three years of implementation, the impact of this was a net reduction of 3.0% (95% CI: -4.2% – -1.8%) in total volume of pure alcohol sold per adult in Scotland (when controlling for sales in England & Wales, and adjusting for other factors, including the COVID-19 pandemic).<sup>8</sup> The 9% and 16% figures are descriptive comparisons, which do not control for the introduction of MUP, so at least some of the reduction in sales may be due to MUP, rather than the COVID-19 pandemic.

Despite the overall decrease, the average per-adult sales of alcohol from January 2020 to May 2021 were around 17 units per week.

**Figure 1: Weekly alcohol sales (litres of pure alcohol per adult) by trade sector; Scotland, 1 January 2020 to 8 May 2021 and 2017–2019 average and range**



Source: Richardson et al, 2022<sup>7</sup>

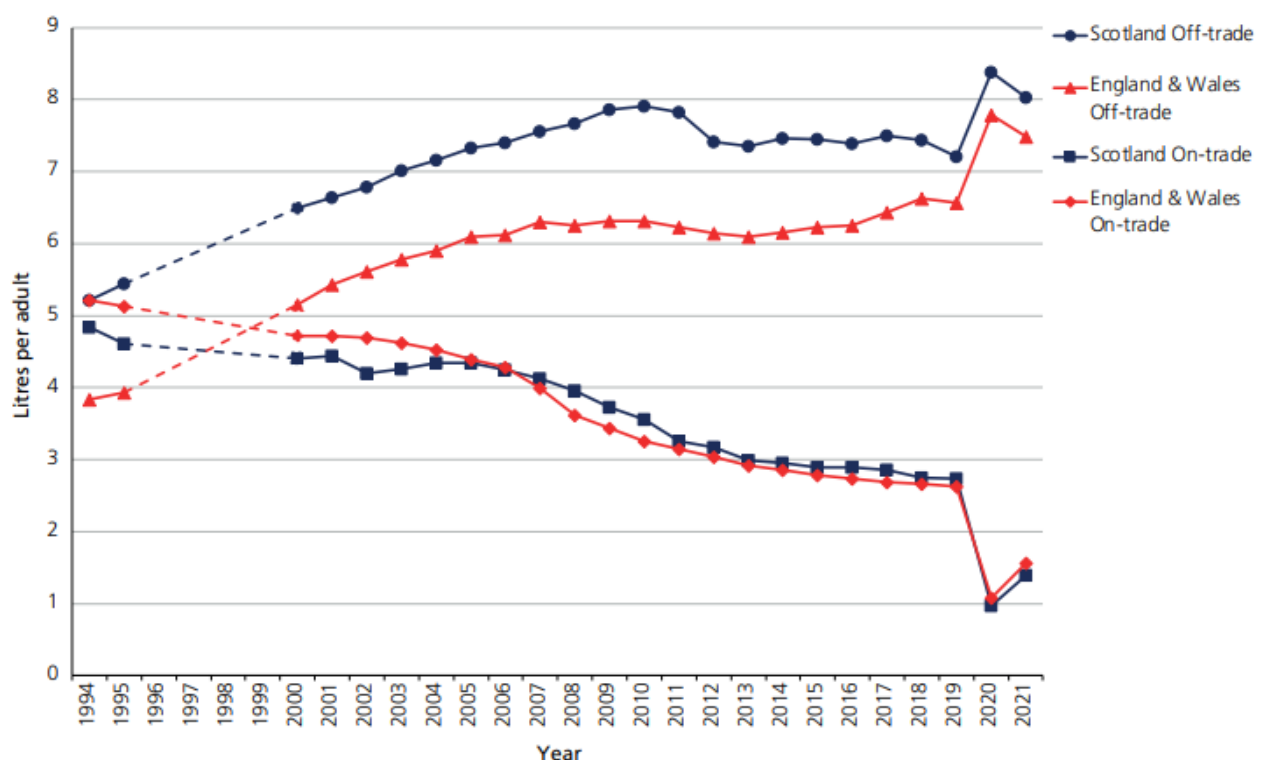
Note that different scales are used for all sales, off-trade and on-trade.



Sales in England & Wales followed a similar pattern to those in Scotland. COVID-19 and associated restrictions were associated with a 6% reduction in the average weekly volume of pure alcohol sold per adult in March to July 2020 for both regions, compared to what would be expected from pre-COVID-19 trends.<sup>9</sup> Off-trade sales increased by 28% for Scotland and 29% for England & Wales over the same period. An analysis of Great Britain shopping panel data similarly found an increase in off-trade purchases between 23 March and 31 December 2020 compared to 2015–2019, with the increase in Scotland being less than that in England & Wales.<sup>16</sup>

Figure 2 shows broadly similar changes to on- and off-trade sales in Scotland and England & Wales in 2020 and 2021. Total per-adult sales of alcohol remained higher in Scotland in 2020 and 2021 (both 9.4 litres/adult) compared to England (8.9 litres/adult and 9.0 litres/adult respectively), although the difference was the lowest found in the available time series.<sup>10</sup>

**Figure 2: Volume of pure alcohol sold per adult in Scotland and England & Wales, by trade sector, 1994–2021**



Source: Ponce Hardy and Giles, 2022<sup>10</sup>

The market research data above included online delivery from supermarkets, but not sales from online specialist retailers, such as Majestic. This may have led to an underestimation of off-trade consumption. There is evidence that online sales have increased during the pandemic,<sup>11</sup> although the proportion of alcohol sales through specialist online retailers are relatively small: from mid-March 2020 to mid-February 2021, online sales accounted for an average of 2.1% of the total off-trade alcohol sales in Scotland and 1.7% in England & Wales.<sup>12</sup>

Analysis by Public Health England found similar consumption patterns using different data and over a slightly different time period: UK-wide alcohol duty receipts from HM Revenue and Customs in financial year 2020–21 were 1.2% less than 2019–20.<sup>13</sup> Using receipt data from household purchases, Public Health England found that off-trade volume sales of alcohol increased by 25.0% between 2019 and 2020.

Hardie et al<sup>3</sup> performed interrupted time series analysis of data from a continuous cross-sectional diary survey. They compared drinking behaviour pre-pandemic (January 2002 to February 2019) with the March 2020 lockdown, July 2020 easing of restrictions and October 2020 re-introduction of some restrictions. In March 2020, they found an increase in off-trade units/week (Scotland: 2.32; 95% confidence interval [CI]: 0.61 – 4.02; England: 1.18, 95% CI: 0.65 – 1.70) and decrease in on-trade units/week (Scotland: -2.84, 95% CI: -3.63 – -2.06; England: -2.53, 95% CI: -2.86 – -2.20). Combined on- and off-trade units/week also decreased in March 2020 (Scotland: -0.84, 95% CI: -6.76 – 5.09; England: -0.95, 95% CI: -3.34 – 1.43), but these changes were not statistically significant. This suggests that the increase in off-trade units largely offset the decrease in on-trade units in March 2020. Descriptively, the total mean units/week and mean drinking days per week stayed below pre-pandemic levels in July and October 2020.

## Changes in drinking behaviour for different groups

### Key points

- In Scotland, England and across the UK, change in drinking behaviour was polarised: most people did not change their alcohol consumption, but some increased and some decreased their consumption.
- Those who increased their alcohol consumption tended to drink more before the pandemic, and those who decreased consumption tended to drink less.
- Several surveys found that, in England, there was an increase in high-risk drinking following the start of the pandemic, although some evidence is mixed. Evidence of this from Scotland and the UK is mixed.
- UK evidence shows that increased alcohol consumption was associated with anxiety, depression and boredom. Decreased consumption may be because people were not in the same social situations as before the pandemic.

The patterns in population-level alcohol sales are important for understanding the overall impact of COVID-19, but do not tell us about individual-level drinking behaviour. Survey results from Scotland and England show that the largest group of respondents did not change their drinking behaviour during the pandemic.<sup>13,14,15,19</sup> Analysis from the Scottish Health Survey found that the majority of respondents did not change the amount of alcohol they consumed (71% of respondents) or the number of days on which they drank alcohol (59% of respondents) between the start of the first lockdown and August to September 2020.<sup>15</sup> A Public Health England summary of surveys and polls up to August 2020 found that between 38% and 57% of respondents reported drinking the same amount as before the pandemic, and between 42% and 63% at the same frequency.<sup>13</sup>

Studies from Scotland, England and across the UK found that the proportion of people who drank less after the pandemic was similar to the proportion who drank more.<sup>13,14,15,19</sup>

## Increased alcohol consumption

Results from some surveys in Scotland and England suggest that a higher proportion of respondents increased the frequency of their drinking, compared to those who increased the amount they drank on a typical day.<sup>14,15</sup> For example, an April 2020 survey found that 29% of current drinkers in Scotland increased the frequency of their drinking after lockdown, while 18% of current and previous drinkers increased the amount.<sup>14</sup> The figures for England were 22% and 14% respectively. However, this pattern was not found when comparing responses across different surveys for England.<sup>13</sup>

Those who were heavier drinkers before the pandemic were more likely to increase the amount they were drinking. A Public Health England analysis of off-trade consumer panel data for Great Britain split respondents into quintiles (five equal groups), depending on their level of alcohol consumption between April 2018 and June 2020.<sup>13</sup> It found that the heaviest-drinking quintile accounted for 42.1% of the total increase in alcohol bought in 2020 to 2021 compared to 2019 to 2020. The two heaviest buying quintiles accounted for 68.3% of the increase. Separate analysis from the same panel survey up to December 2020 found that households in the heaviest-purchasing quintile before lockdown increased their alcohol purchases 17 times more than the lightest-purchasing quintile (incidence rate ratio\* 17.25, 95% CI: 14.75 – 20.19).<sup>16</sup>

Surveys from Scotland, England and across the UK show a similar picture.<sup>13,17,18,21</sup> For example, a UK-wide survey from Alcohol Change UK found that 38% of those

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\* In this case, the incidence rate ratio is the increase in alcohol purchasing in the highest-purchasing quintile, divided by the increase in alcohol purchasing in the lowest-purchasing quintile.

who typically drank at least seven units on drinking days pre-lockdown increased their drinking by June 2020, while this was only true for 23% of those who typically drank two units or less.<sup>18</sup> A Scottish sample from the same survey found that 33% of those who drank at least seven units on drinking days pre-lockdown agreed with the statement that they drank more alcohol than usual during lockdown, compared to 19% of those who typically drank two units or less.<sup>19</sup> A YouGov survey for Drinkaware found that higher-risk drinkers were more likely to report drinking on more days of the week than usual during the pandemic (43% compared with 20% of all drinkers in Scotland) and drinking earlier in the day than usual (21% compared with 10% of all drinkers).<sup>20</sup> A UK survey found that higher AUDIT scores before lockdown predicted increased alcohol consumption.<sup>21</sup>

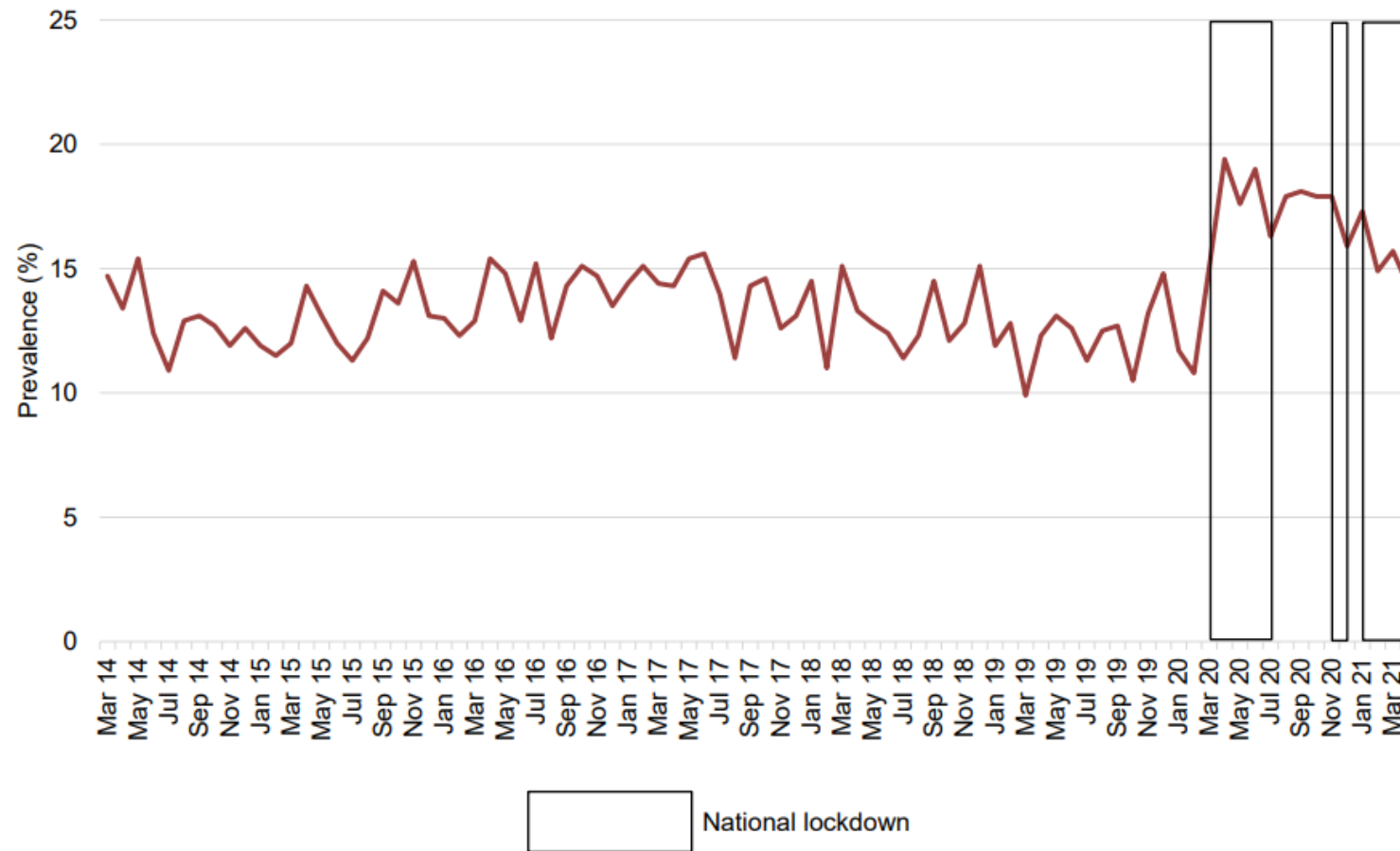
## **Increase in high-risk drinking**

Analysis of UCL's Alcohol Toolkit Study by Public Health England found a step-change following the start of the national lockdown, as can be seen in Figure 3.<sup>13</sup> 19.4% of respondents were drinking at increasing- or higher-risk levels\* in April 2020, which was a 57.7% increase compared to April 2019.

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\* Defined as a score of seven or more in the Alcohol Use Disorders Identification Test (AUDIT).

**Figure 3: Prevalence of increasing and higher risk drinking in England**



Source: Public Health England analysis of UCL's Alcohol Toolkit Study.<sup>13</sup> Reproduced under the [Open Government Licence](#).

Note that data are missing for March 2020, when face-to-face data collection did not take place due to the COVID-19 pandemic.

A repeated cross-sectional poll found that, in England, the proportion of those drinking over 14 units per week increased during the first lockdown (25.0%) compared to the week before (22.1%).<sup>13</sup> The proportion of respondents drinking 50 or more units per week also increased.

Jackson et al found that lockdown was associated with increases in higher-risk drinking in England, but also with alcohol reduction attempts by higher-risk drinkers.<sup>22</sup>

Evidence of an increase in higher-risk drinking in Scotland is less clear, and there is some mixed evidence for England: a continuous cross-sectional survey found no significant difference in heavy drinking behaviour in Scotland following lockdown, and a decrease in England.<sup>23</sup> Interrupted time series analysis of data from the same survey found no significant changes in either the proportion of respondents drinking more than 14 units a week or in the frequency of heavy-drinking occasions in Scotland and England in March 2022 compared to pre-pandemic levels.<sup>3</sup> A YouGov survey for Drinkaware found no significant changes in the prevalence of harmful drinking, as measured by AUDIT-C scores, between 2019 and August to September 2020 for Scottish drinkers.<sup>20</sup> The Scottish Health Survey found that 23% of adults reported drinking at hazardous or harmful levels in 2021. This compares to 24% in 2019, and is the lowest in the available time series (since 2003).<sup>24</sup> However, some methodology changes between 2019 and 2021, including the move to a telephone survey in 2021, mean that results may not be directly comparable. Respondents were also not asked about hazardous or harmful drinking in 2020, so the immediate effect of the pandemic is unclear.

Evidence from UK-wide surveys is mixed. A UK-wide survey found that the proportion of high-risk drinkers (as measured by an AUDIT-C score of 5+) decreased from 35.9% (95% CI: 32.8 – 39.0%) before the pandemic to 32.0% (95% CI: 28.6% – 35.5%) in March to July 2020.<sup>25</sup> The pre-pandemic AUDIT-C score was based on participants' recall of their drinking behaviour pre-lockdown, when asked in April to May 2020. However, another survey found the proportion of UK respondents who drank 28+ units a week increased from 24.1% (95% CI: 21.3% – 26.9%) before the pandemic to 26.0% (95% CI: 23.1% – 28.9%) during it.<sup>17</sup> Alcohol consumption was not directly reported by participants: units were extrapolated based on a retrospective AUDIT-C questionnaire for pre-pandemic consumption, and consumption following

the start of the pandemic was extrapolated based on participants reporting changes in their frequency and quantity of drinking, on a five-point scale from much less (often) to much more (often).

Analysis from the UK Household Longitudinal Study found that the proportion of respondents binge drinking at least weekly increased from 10.8% (95% CI: 10.3% – 11.3%) in 2017–19 to 16.2% (95% CI: 15.0% – 17.4%) during lockdown.<sup>26</sup>

Descriptive analysis from the same survey (but using different time periods) found that, as with overall drinking patterns, most people (61%) did not change their frequency of heavy episodic drinking (HED, 6 or more drinks) during the pandemic.<sup>27</sup> However, those who did change their frequency were split, with 14% reporting increasing the frequency and 26% decreasing.

## **Decreased alcohol consumption**

Analysis from the Scottish Health Survey found that 17% of respondents decreased the number of days on which they drank alcohol following the start of lockdown, and 18% decreased the amount of alcohol they consumed.<sup>15</sup> A survey from Alcohol Change UK and Alcohol Focus Scotland found that 10% of respondents in Scotland who reported drinking before the pandemic had stopped drinking completely and a further 20% drank less frequently in April 2020 than before lockdown.<sup>14</sup>

Figures from England are similar: Public Health England's summary of repeated cross-sectional surveys and polls found that, in England, between 21% and 42% of respondents reported drinking less than before.<sup>13</sup>

In Scotland, those who drank less often before the pandemic were more likely to decrease their drinking after the pandemic had started: a June 2020 survey found that 18% of respondents who had typically drunk four times a month or fewer before lockdown reported reducing the frequency of their drinking during the pandemic, compared to 13% of those who typically drank at least four days a week.<sup>19</sup> Similarly, 19% of those who drank four times a month or fewer before the pandemic reported drinking less on a typical drinking day, compared to 7% who typically drank at least four days a week.



Similar patterns were found in a UK-wide survey from Alcohol Change UK: 47% of respondents who previously drank once a week or less cut down or stopped drinking following the start of the pandemic, compared to 27% of people who drank two to six times a week, and 17% of daily drinkers.<sup>28</sup>

## **Reasons for changes in alcohol consumption**

Evidence from the UK shows that increased alcohol consumption was associated with having more free time, less structured time and increased boredom over the pandemic.<sup>29,30</sup> It was also associated with a deterioration in psychological wellbeing and financial situation, and with increased anxiety, depression and loneliness.<sup>21,27,30,31,32,33</sup> Psychological distress increased following the start of the pandemic,<sup>34</sup> and some survey respondents reported drinking to manage stress and anxiety.<sup>14,19</sup> The relationship between mental health and alcohol consumption may have fluctuated during the pandemic: a meta-analysis of four Great Britain cohort studies compared the risk of high-risk drinking between those with the highest and lowest levels of anxiety/depression and psychological distress.<sup>35</sup> It found that the risk difference between those in the highest and lowest levels was 5.4% (95% CI: 1.3% – 9.4%) prior to the pandemic, rising to 10.2% (95% CI: 6.3% – 14.1%) in May 2020 and falling to 6.4% (95% CI: 1.5% – 11.3%) in September 2020.

An analysis of eight UK longitudinal studies found no association between being on furlough and increased frequency or amount of alcohol consumption,<sup>36</sup> although a UK cross-sectional survey found that increased frequency of heavy episodic drinking was associated with being on furlough.<sup>27</sup>

Analysis of a qualitative study with British consumers found that some participants increased their consumption in terms of variety, quantity and frequency, with one participant spending more on alcohol because their outgoings were lower on other activities.<sup>37</sup> Participants increased alcohol use due to online socialising, weekend drinking evolving into weekday drinking and escapism. Similarly, another qualitative study found that some participants reported increasing their alcohol intake when at home, since it was easier to start drinking earlier than usual and they did not have to worry about appearing too drunk in public.<sup>38</sup> A UK cross-sectional survey found that

impatience was associated with increased alcohol use and hazardous drinking among 19-year-olds and that risk-taking was associated with hazardous drinking for 30-year-olds.<sup>33</sup>

A decrease in alcohol consumption could be because of people spending less time with the people that they normally drink with, or in the places that they normally drink.<sup>30</sup> One qualitative study found that a shift to home-based drinking during the pandemic led some participants to decrease their drinking due to, for example, being away from social pressures and normal pub and club environments in which they would drink.<sup>38</sup> Lockdown may also have been seen as an opportunity for self-development, including reducing alcohol intake, and the chance to minimise or eliminate alcohol consumption away from social pressure.<sup>38</sup>

## Differences between demographic groups in drinking patterns

### Key points

- Women may have increased their alcohol consumption more than men during the pandemic, although some evidence is mixed.
- Those in younger age groups were most likely to change their drinking behaviour during the pandemic.
- Evidence was mixed around changes in alcohol consumption and socioeconomic groups. Some studies found that those in higher social grades or with higher incomes were more likely to increase their alcohol consumption during the pandemic, while others found the opposite pattern.
- Adults in households with children may have been more likely to increase their drinking during the pandemic, although some evidence is mixed.

## Sex

Before the pandemic, men were less likely to be non-drinkers than women, consumed more alcohol than women and were more likely to drink at hazardous or harmful levels.<sup>39,40</sup> However, the gap in alcohol consumption between sexes had been closing over time.<sup>41</sup>

Evidence from UK studies suggests that women may have been more likely to increase their drinking following the pandemic compared to men, although there is some mixed evidence. A cross-sectional survey found that women were more likely than men to drink more than usual following the start of lockdown (odds ratio (OR)\* 1.36, 95% CI: 1.22 – 1.51).<sup>42</sup> Being male was also associated with being more likely to drink less during lockdown (OR 0.76, 95% CI: 0.68 – 0.84). Several studies found that women were more likely to increase the frequency of their drinking than men following the pandemic.<sup>26,29,43</sup> However, one UK survey found that being male predicted increased alcohol consumption during lockdown.<sup>21</sup> The Scottish Health Survey found no sex differences for changes in drinking frequency.<sup>15</sup>

A June 2020 survey from Alcohol Change UK and Alcohol Focus Scotland found that women in Scotland were more likely to report an increase in the frequency of their drinking after the start of lockdown compared to men, and less likely to report decreasing the frequency of their drinking. However, a similar proportion of males and females agreed with the statement that they had drunk more than usual during lockdown.<sup>19</sup> A UK study found that binge drinking increased more for women than men.<sup>26</sup>

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\* An odds ratio (OR) is a measure of association between an exposure (or characteristic) and an outcome. It represents the odds that an outcome (e.g. increased alcohol consumption) will occur given a particular exposure or characteristic (e.g. being a woman), compared to the odds of the outcome occurring in the absence of that exposure or characteristic. If the OR is greater than 1, the exposure is associated with higher odds of the outcome. If it is less than 1, the exposure is associated with lower odds of the outcome.

Patterns of drinking between sexes may have changed as the pandemic continued: a YouGov survey for Drinkaware found that women were more likely than men to report drinking more than usual in the early part of lockdown (27% of women; 25% of men), but that men were more likely to drink more than usual in the later part of lockdown (14% of women; 16% of men).<sup>29</sup> Women were more likely than men to return to their normal drinking levels in the later part of lockdown.

Public Health England's analysis of UCL's Alcohol Toolkit study and a YouGov survey found the prevalence of increasing- and higher-risk drinking (measured by AUDIT) and the prevalence of those drinking more than 14 units a week to increase for both men and women in England following the start of the pandemic.<sup>47</sup> YouGov's survey for Drinkaware found a sex difference using the shorter AUDIT-C questionnaire: women were more likely to be drinking at higher risk levels (AUDIT-C 8–12) in 2020 (11%) compared to 2018 (8%). Men were just as likely to drink at higher risk levels in both years (20%).<sup>29</sup>

Analysis of the UK Household Longitudinal Study found that psychological distress, as measured by the General Health Questionnaire, increased more for women than men following the start of the pandemic.<sup>26</sup> Women were also more likely than men to have insecure employment situations and to be furloughed.<sup>44</sup> Increased drinking was associated with a deterioration in psychological wellbeing and financial situation, and an increase in heavy episodic drinking was associated with being furloughed for both men and women.<sup>27</sup> This may help to explain some of the sex differences in alcohol consumption change following the start of the pandemic. However, some evidence is mixed, with one study finding that being furloughed was associated with an increase in frequency of drinking among men, but not among women.<sup>27</sup>

## **Age**

Before the pandemic, frequency of drinking and prevalence of hazardous or harmful drinking in Scotland and England tended to increase with age until around 65, then decrease for the oldest age groups.<sup>39,40</sup>

During the pandemic, younger drinkers were more likely to change their alcohol consumption than older drinkers, either by increasing or decreasing their

consumption. The Scottish Health Survey found that 47% of 16–44-year-olds changed (either increased or decreased) the number of days they drank alcohol, and 33% changed the amount of alcohol they consumed since the start of lockdown. This compared with between 29%–41% and 20%–31% of older age groups (45–64 years, 65–74 years and 75+ years) respectively.<sup>15</sup> Similarly, a June 2020 Alcohol Change UK and Alcohol Focus Scotland survey found that 18–24-year-olds were more likely to change both their drinking frequency and amount drunk in a typical day than those in older age groups.<sup>19</sup>

As with the overall trend, younger people who changed their drinking behaviour were split between those drinking more and those drinking less than usual. Analysis of the UCL COVID-19 social study found that both drinking more and drinking less were associated with being younger.<sup>42</sup>

Several surveys found that older age groups (either 55+ or 65+ years, depending on the survey) were most likely to not change the frequency or amount they normally drank following the pandemic.<sup>14,15,29,42</sup> However, a health tracker survey analysis found that being older was associated with an increase in AUDIT-C scores, and a higher amount and frequency of alcohol consumption following the pandemic.<sup>43</sup> Similarly, the YouGov survey for Drinkaware found that there was an increase in the proportion of those aged 55+ drinking four or more times per week (25% in 2019, 29% in 2020), which was not found for younger age groups.<sup>29</sup> In the Scottish sample for the Drinkaware study, there was a change over time, with younger adults (aged 25–34) more likely than other age groups to report drinking more than usual during the early stage of lockdown, but drinkers aged 45–54 more likely to drink more than usual in the latter stages of lockdown, and the younger age group appearing to cut back.<sup>20</sup> The authors suggest that this could be because of fewer opportunities for young people to drink in pubs, clubs and with friends during lockdown.

The studies described above have used different age-group banding and/or different measures of alcohol consumption change. This may help to explain the mixed evidence found by the studies.

## Socioeconomic status

Before the pandemic, those in the areas of highest deprivation or lowest income quintile were most likely to be non-drinkers, and least likely to drink at hazardous or harmful levels.<sup>39,40</sup> However, for those who did drink at hazardous levels, mean weekly consumption for those who exceed the guideline was highest in the lowest income group.<sup>39</sup>

Some studies found that, following the start of the pandemic, those in higher social grades (ABC1)\* were more likely to increase the frequency and amount they drank than those in lower social grades (C2DE).<sup>19,29</sup> In a Scottish survey, these differences were seen soon after the start of the pandemic, in April 2020, but little difference between social grades was seen in June 2020.<sup>19</sup> Analysis from the UK Household Longitudinal Study found that the rate of binge drinking and drinking at least four times a week increased most for those with a degree-level qualification, compared to those with A level, GCSE or no qualifications.<sup>26</sup> Drinking more during the start of lockdown was also associated with post-16 qualifications (OR = 1.21, 95% CI: 1.04 – 1.40) and high income (OR = 1.43, 95% CI: 1.27 – 1.61), while drinking less was associated with low income (OR = 0.74, 95% CI: 0.66 – 0.83).<sup>42</sup>

These changes seem to continue previous patterns of drinking. However, a Great Britain study found a more complex picture when breaking down the social grades: those in grade E were more likely to increase their off-trade alcohol purchases following lockdown than those in grades AB, but those in grade D were less likely than those in grade AB.<sup>16</sup> This study also found a different pattern of results to those found above, with households with the lowest income and living in areas of highest

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\* National Readership Survey social grades, which are based on occupation. ABC1 includes those in grades A (higher managerial, administrative and professional), B (intermediate managerial, administrative and professional) and C1 (supervisory, clerical and junior managerial, administrative and professional). C2DE includes those in grades C2 (skilled manual workers), D (semi-skilled and unskilled manual workers) and E (state pensions only, casual workers and unemployed with state benefits only).

deprivation more likely to increase their alcohol purchases than those in the highest income and area of lowest deprivation. Similarly, an online cross-sectional survey found that those with above average income had lower odds of increased alcohol consumption following the start of lockdown.<sup>45</sup> In England, the rate of higher-risk drinking as defined by AUDIT or AUDIT-C increased more for those in C2DE than ABC1.<sup>47,46</sup> For example, rates of high-risk drinking (AUDIT-C score of five or more) increased by 63.9% for those in C2DE, compared to 29.2% for those in ABC1.<sup>46</sup>

## **Households with children**

Some studies found that parents with children were more likely to increase their drinking over lockdown, compared with those without children. A June 2020 Alcohol Change UK and Alcohol Focus Scotland Scottish survey found that, compared to before the pandemic, 39% of parents with children under 18 reported drinking more frequently and 26% reported drinking more units on a typical drinking day, compared to 14% and 9% of non-parents respectively.<sup>19</sup> In a UK-wide survey for Drinkaware, 34% of parents reported increasing their drinking earlier on in lockdown (late March to June 2020), compared to 14% of those without children.<sup>29</sup> The gap narrowed by July to August 2020, but the proportion was still higher for those with children (19%) than without (14%).

UK surveys found that a higher proportion of parents (39%) compared to non-parents (15%) reported increased household tensions after the start of lockdown,<sup>14</sup> and that parents were more likely than non-parents to report experiencing mental health problems more than usual following the start of lockdown.<sup>29</sup> Since an increase in alcohol consumption has been associated with a decrease in psychological wellbeing over the COVID-19 pandemic (see section on Reasons for changes in alcohol consumption), this could help to explain the results above.

In contrast, an analysis of a UK online cross-sectional survey found that those with children in the household had lower odds of increased alcohol consumption in the third month of lockdown compared to households without children.<sup>45</sup> Another UK-wide survey found a sex difference: living with children was associated with an

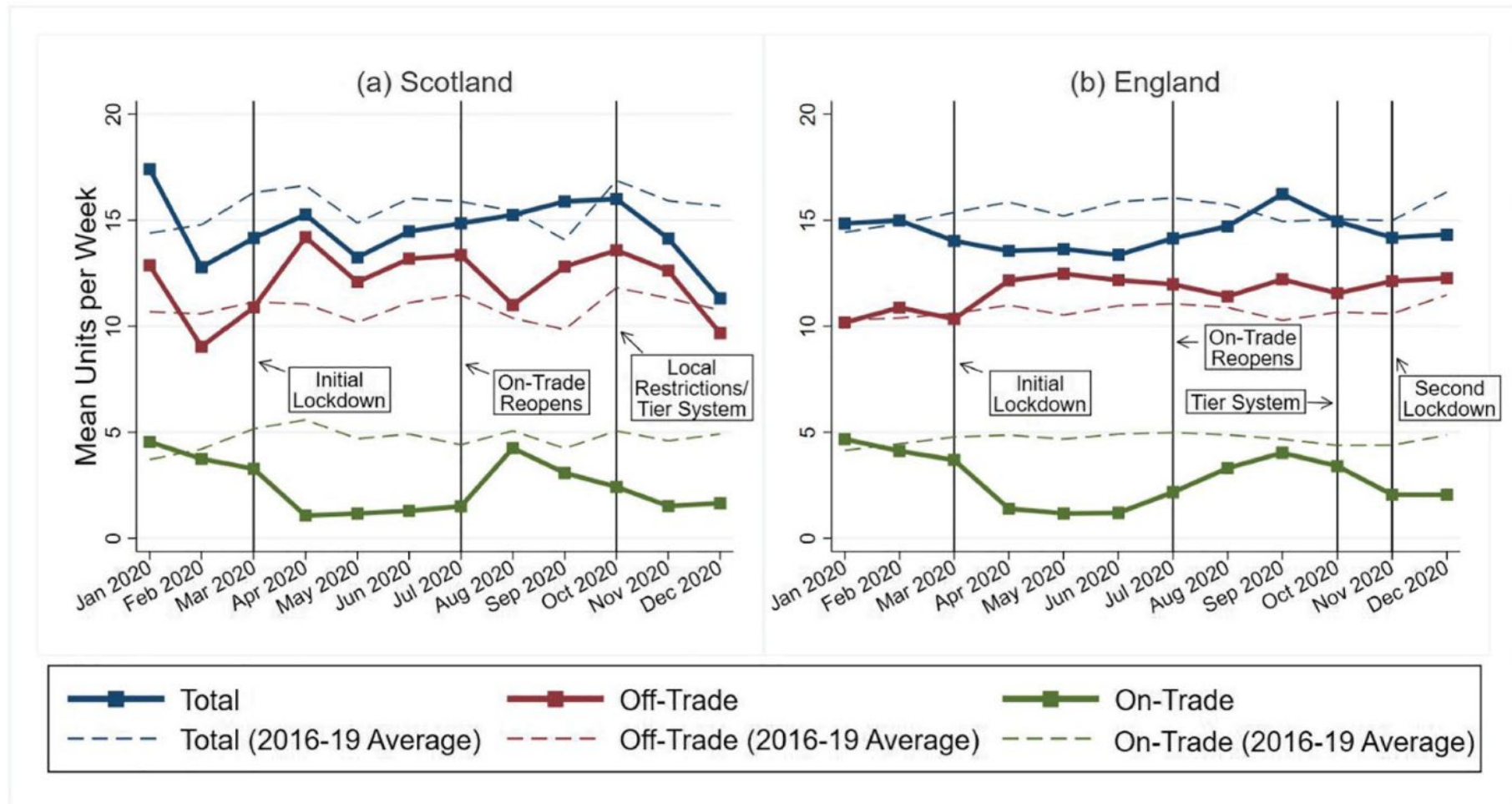


increase in units of alcohol consumed and the frequency of heavy episodic drinking for men, but not for women.<sup>27</sup>

## **Fluctuations in drinking behaviour over the pandemic**

Surveys that were repeated at different times over the COVID-19 pandemic suggest that changes to drinking behaviour fluctuated over the pandemic. For example, Hardie et al<sup>3</sup> found that on-trade drinking, which had decreased following the start of the pandemic, increased again in July 2020 following easing of restrictions, but was still lower than the average for 2016–2019 (see Figure 4). Total alcohol consumption increased from June to October (for Scotland) or September (for England) 2020, which was a different pattern to that found in previous years.

Figure 4: Mean units per week in Scotland and England in 2020 (with 2016–19 average for each month for comparison)



Source: Hardie et al, 2022.<sup>3</sup> Reproduced under the [Creative Commons Attribution](#) License.

A UK-wide YouGov survey for Drinkaware found that 26% of respondents reported drinking more than usual at the start of the pandemic (late March to June 2020), but that this fell to 15% in July to August 2020. The number of respondents drinking less than usual stayed similar during the two lockdown periods (27% and 29% respectively).<sup>29</sup> The survey showed a similar pattern for Scotland alone: 29% of drinkers reported increasing their drinking at the start of the pandemic (significantly more than the UK-wide figure at this time), compared to 13% in July to August 2020.<sup>20</sup> Separate figures were not given for England.

In England, the prevalence of increasing- and higher-risk drinking dropped from 19% in June 2020, to 15% in April 2021, but increased again to 18% in December 2021.<sup>47</sup> All rates were higher than the prevalence before the pandemic of 12% in February 2020 (data are three-month rolling averages).

## Alcohol treatment services

### Key points

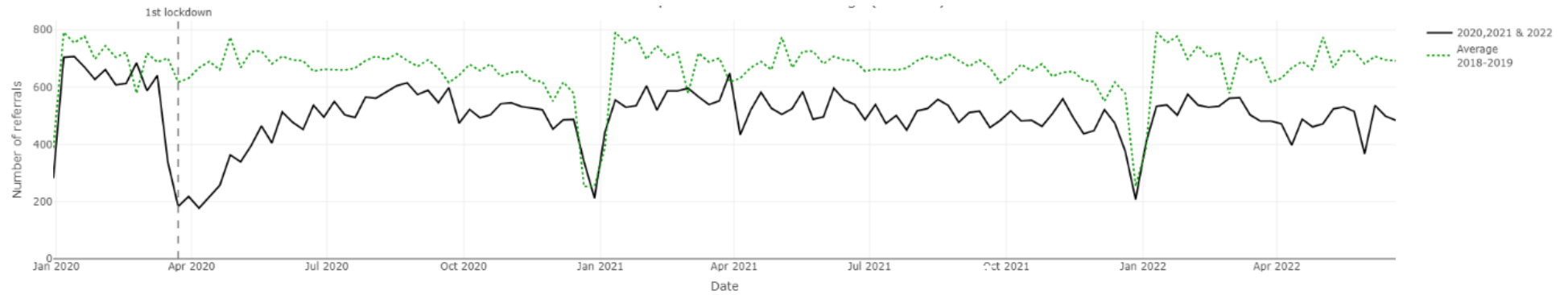
- It was recommended that alcohol treatment services should remain open during the pandemic, with minimal face-to-face contact. There were some concerns that this may pose access challenges for some clients.
- In Scotland, referrals to alcohol treatment services fell following the start of the pandemic.
- In England, the number of adults entering treatment for substance use was similar in 2020–21 compared to the previous year, but a higher proportion of those accessing treatment died during treatment in 2020–21 compared to 2019–20, especially those in treatment for alcohol use. Data on deaths among people accessing treatment were not available for Scotland.

During the pandemic, it was recommended that alcohol treatment services should remain open but that face-to-face contact should be minimised.<sup>48,49</sup> An August 2020 survey by the Alcohol Health Alliance found that, while some professionals working in the substance use field reported that clients were engaging well with their services, some raised concerns around barriers to access, such as a lack of internet access.<sup>50</sup> Results of a cross-sectional survey in England found that, over lockdown, use of evidence-based support decreased among high-use drinkers who made a reduction attempt,<sup>22</sup> and that their use of remote support did not change significantly.

Figure 5 shows that the number of referrals to alcohol treatment services in Scotland fell markedly in April 2020, and have mainly stayed below the 2018–19 average up to June 2022.<sup>51</sup>

In England, the number of people entering treatment services for substance abuse (alcohol and/or drugs) in 2020–21 was similar to those in the previous year.<sup>52</sup> However, there was an increase in deaths of people who were in contact with treatment services, from 1.1% of adults in treatment in 2019–20 to 1.4% in 2020–21. The highest percentage increase was found for those in treatment for alcohol only (rather than drugs or alcohol and drugs), with an increase from 1.0% to 1.4%. Data around deaths for people in contact with treatment services were not available for Scotland.

**Figure 5: Number of alcohol treatment referrals in 2020, 2021 and 2022 compared with 2018–19 average, Scotland**



Source: COVID-19 wider impacts on the health care system dashboard, Public Health Scotland<sup>51</sup>

## Alcohol-related health harms during the COVID-19 pandemic

### Key points

- Alcohol-related hospital admissions decreased in Scotland and England over the COVID-19 pandemic.
- Hospital admissions and stays decreased during periods of lockdown and increased during periods of lockdown easing.
- Alcohol-specific deaths increased in Scotland and England over the COVID-19 pandemic.
- Modelling studies for England predict that alcohol-related harm will continue to increase in the medium term, following pandemic-related changes in consumption.
- Those who have alcohol use disorder may be at higher risk of catching COVID-19, and have more severe outcomes.
- COVID-19 can injure the liver, and this can be particularly severe for those who have pre-existing liver disease.

### Alcohol-related hospital stays

In Scotland, the age-sex standardised rate of alcohol-related hospital admissions to general acute hospitals was 10% lower in financial year 2020/21 (614 per 100,000 population), compared to 2019/20 (681 per 100,000.)<sup>53</sup>

Richardson et al investigated the impact of the COVID-19 pandemic by comparing the rate of alcohol-related hospital stays in 2020, to an average for 2017–19, and

found that the 2020 figure was 7.3% lower (95% CI: 5.9% – 8.6%), compared to the average for 2017–19.<sup>7</sup> Hospital stay rates fell for alcoholic liver disease and mental and behavioural disorders due to alcohol, but increased for toxic effects of alcohol. Hospital stays decreased most in Scotland for those aged 45 years and older, males, and those living in deprivation quintiles 1, 2 and 3 (where quintile 1 is most deprived and quintile 5 is least deprived). In general, these groups had the highest alcohol-related hospital stay rates pre-pandemic.

Scottish-comparable data are not available for 2020/21 alcohol-related hospital stays for England, but Public Health England found that the number of unplanned alcohol-specific hospital admissions decreased by 3.2% in 2020 compared to 2019.<sup>13</sup> Unplanned admission rates decreased for mental and behavioural disorders due to alcohol and alcohol poisoning, but increased for alcoholic liver disease.

In both Scotland and England, hospital stay rates decreased during periods of lockdown and increased to at or above pre-pandemic levels between lockdown periods. This reflects overall trends in hospital admissions during this period, and may be due to temporary suspension of services, or to individuals choosing to avoid hospitals, either to ease pressure on the NHS or to reduce their risk of catching COVID-19.<sup>7,13</sup> In England, those in the most deprived quintiles saw larger decreases in emergency admission rates during lockdown periods and larger increases during lockdown easing than those in the least deprived quintiles.<sup>13</sup>

## **Alcohol-specific deaths**

Alcohol-specific death rates increased for both Scotland and England from 2019 to 2020 (Scotland 15.6% increase; England 19.3% increase) and then again between 2020 and 2021 (Scotland 4.2% increase; England 6.9% increase), with percentage increases greater for England than Scotland.<sup>54</sup>

In Scotland, the alcohol-specific death rate was 8.0% (95% CI: -0.6% – 17.3%) higher in 2020 compared to the 2017–19 average.<sup>7</sup> Death rates increased for alcoholic liver disease and mental and behavioural disorders due to alcohol use, but decreased for alcohol poisoning. The increase in death rates was greatest for males and those

aged 45 to 64 years, groups which already had high alcohol-specific death rates before the pandemic.

The increase in alcohol-specific deaths in England between 2019 and 2020 was driven by an increase in alcoholic liver disease death rates, although death rates due to mental and behavioural disorders due to alcohol and alcohol poisoning also increased.<sup>13</sup> The increase in death rates from alcoholic liver disease could be driven by increased rates of acute-on-chronic liver failure, which can happen due to increased heavy drinking in those with existing liver disease.<sup>13</sup> In England, the greatest increase in death rates was in the most deprived quintile.

In contrast to the hospitalisation changes, death rates tended to increase for Scotland and England in early 2020 and stay higher than the comparison time periods throughout the year.

## **Predictions for future alcohol-related health harms**

Two separate studies, from the University of Sheffield and the Institute of Alcohol Studies, have modelled potential future alcohol-related deaths and hospitalisations in England, following changes in alcohol consumption during the COVID-19 pandemic.<sup>55,56</sup> They found that, even if drinking was to soon return to pre-pandemic levels, there would be an increase in alcohol-related harm over the next 13–20 years, and that this would affect those in the most deprived areas disproportionately. Depending on different scenarios for alcohol consumption trends, Angus et al predicted that the additional alcohol-attributable hospital admissions in England due to pandemic-related drinking changes would be between 42,677 and 972,382 over the next 20 years, along with an additional 1,830 to 25,192 deaths.<sup>55</sup> Boniface et al predicted between 2,431 and 9,914 extra premature deaths by 2035, and between 2,860 and 147,892 additional cases of alcohol-related diseases in England by the same year.<sup>56</sup>



## COVID-19, alcohol and the liver

It has been suggested that alcohol use, particularly at high levels, leads to a higher risk of catching COVID-19 and/or of severe COVID-19 outcomes. This could be due to an impaired immune system, as well as a higher prevalence of comorbidities, such as age, obesity, smoking, chronic kidney disease or the use of immunosuppressants for alcoholic hepatitis.<sup>57</sup> Those using alcohol may be less likely to practise physical distancing, increasing their risk of catching COVID-19.<sup>31</sup> Men tend to drink more than women, and are more likely to have alcohol use disorder.<sup>57,58</sup> Men also have higher odds of an ICU admission or death following COVID-19 infection than women.<sup>59</sup>

An American study found that lifetime alcohol use disorder was a risk factor for developing COVID-19 (adjusted odds ratio 1.42, 95% CI: 1.34 – 1.50), and that having a recent alcohol use disorder diagnosis increased the risk (adjusted odds ratio 7.75, 95% CI: 7.04 – 8.54).<sup>60</sup> Other studies have found associations with alcohol consumption and COVID-19 risk or severity, although some have found no association.<sup>31</sup> A study using UK Biobank data found different effects depending on the type and amount of alcohol previously drunk. For example, while those who drank at least five glasses a week of beer/cider (OR 1.28, 95% CI: 1.20 – 1.38) or spirits (OR 1.09, 95% CI: 1.03 – 1.17) had an increased risk of COVID-19 infection, a decreased risk was found for red wine drinkers (OR for at least five glasses a week 0.83, 95% CI: 0.78 – 0.88) and, to a lesser extent, for current drinkers (OR compared to never drinkers 0.91, 95% CI: 0.83 – 0.99).<sup>61</sup> The risk was based on alcohol consumption levels self-reported 10 to 15 years before the COVID-19 outcome.

As seen above, the mortality rates from alcoholic liver disease have increased during the pandemic. Alcohol is a major risk factor in liver disease and cirrhosis, with increasing consumption leading to increased risk.<sup>62</sup> COVID-19 also affects the liver. This can be through direct injury to the liver cells, or through low levels of oxygen, immune stress or inflammatory injury. Drugs used to treat COVID-19 may also cause injury to the liver themselves.<sup>63,64</sup>

Abnormal results on liver function tests are seen in around 60% of COVID-19 patients.<sup>65</sup> Although these are often mild and may be asymptomatic, effects on the liver can be severe, and can lead to further decomposition in those with existing

chronic liver disease.<sup>64</sup> Liver injury in those with COVID-19 is more common in males than females, in older patients, and in those with more severe COVID-19, as well as those with existing liver disease.<sup>64</sup> For example, an analysis of English NHS data found that liver disease was an independent risk factor for COVID-19 death (adjusted hazard ratio 1.75, 95% CI: 1.51 – 2.03).<sup>66</sup>

The number of liver transplants in the UK decreased by 18.0% in 2020 compared to 2019.<sup>67</sup> This, and reduced access to clinical settings during the pandemic, suggests that those requiring a liver transplant may be less likely to receive it following the start of the pandemic.

## Conclusion

Overall, alcohol consumption decreased in Scotland and England following the start of the COVID-19 pandemic. However, changes in drinking behaviour were polarised, with some increasing their alcohol consumption and others decreasing. This was associated with drinking behaviour before the pandemic: those who increased their alcohol consumption tended to drink more before the pandemic, and those who decreased consumption tended to drink less. In England, some evidence of an increase in high-risk drinking was seen following the start of the COVID-19 pandemic, although some studies found no effect. Evidence of this in Scotland is mixed, partly because of there being less Scottish-specific data available. Increased drinking is associated with increased psychological distress and factors related to changes in work and social circumstances.

Women and adults in households with children may have been most likely to increase their alcohol consumption over the pandemic, although some evidence was mixed. Evidence was mixed around the relationship between consumption changes and socioeconomic status. Younger people were more likely than older people to change how much they drank, either by increasing or decreasing the amount or frequency.

Understanding the polarised nature of changes in alcohol consumption, and the fact that those who were the heaviest drinkers before the pandemic were more likely to increase their alcohol consumption, helps to inform where support can be targeted now, and for any future pandemics. The link between poorer mental health and increased alcohol consumption over the pandemic indicates the importance of supporting people's psychological wellbeing to lower their risk of increased alcohol consumption and alcohol-related harms.

Alcohol-related hospitalisations decreased, while alcohol-related deaths increased. This could be due to changing patterns of consumption and to the decrease in access to services over the pandemic. Harms from COVID-19 itself may also disproportionately affect people with alcohol use disorder and pre-existing chronic liver disease. These individuals may be at a higher risk of catching COVID-19 and have a higher risk of further liver injury if they catch COVID-19. Modelling studies for

England predict that alcohol-related harm will continue to increase in the medium term, following pandemic-related changes in consumption. The fact that COVID-19 had a large impact on alcohol-related health harms during lockdown, and potentially beyond, is useful to consider when contextualising changes in health harms over time, and when evaluating alcohol-related interventions.

## Appendix 1: Literature search strategies

### COVID-19, alcohol and liver damage MEDLINE search strategy

#### Ovid MEDLINE(R) ALL <1946 to September 15, 2022>

1. COVID-19/ or exp COVID-19 Testing/ or COVID-19 Vaccines/ or SARS-CoV-2/
2. (coronavirus/ or betacoronavirus/ or coronavirus infections/) and (disease outbreaks/ or epidemics/ or pandemics/)
3. (nCoV\* or 2019nCoV or 19nCoV or COVID19\* or COVID or SARS-COV-2 or SARSCOV-2 or SARS-COV2 or SARSCOV2 or SARS coronavirus 2 or Severe Acute Respiratory Syndrome Coronavirus 2 or Severe Acute Respiratory Syndrome Corona Virus 2).ti,ab,kf,nm,ot,ox,rx,px.
4. ((new or novel or "19" or "2019" or Wuhan or Hubei or China or Chinese) adj3 (coronavirus\* or corona virus\* or betacoronavirus\* or CoV or HCoV)).ti,ab,kf,ot.
5. (longCOVID\* or postCOVID\* or postcoronavirus\* or postSARS\*).ti,ab,kf,ot
6. ((coronavirus\* or corona virus\* or betacoronavirus\*) adj3 (pandemic\* or epidemic\* or outbreak\* or crisis)).ti,ab,kf,ot.
7. ((Wuhan or Hubei) adj5 pneumonia).ti,ab,kf,ot.
8. 1 or 2 or 3 or 4 or 5 or 6 or 7
9. exp drinking behavior/ or exp alcohol drinking/
10. exp Alcohol-Related Disorders/
11. exp Liver Diseases, Alcoholic/

12. Hepatitis, Alcoholic/
13. Alcoholics/
14. alcohol\*.ti,ab,tw.
15. 9 or 10 or 11 or 12 or 13 or 14
16. liver\*.ti,ab,tw.
17. exp Liver/
18. exp Liver Diseases/
19. 16 or 17 or 18
20. 8 and 15 and 19
21. limit 20 to english language

## **UK changes in alcohol consumption over the COVID-19 pandemic MEDLINE search strategy**

### **Ovid MEDLINE(R) ALL <1946 to November 15, 2022>**

1. COVID-19/ or exp COVID-19 Testing/ or COVID-19 Vaccines/ or SARS-CoV-2/
2. (coronavirus/ or betacoronavirus/ or coronavirus infections/) and (disease outbreaks/ or epidemics/ or pandemics/)
3. (nCoV\* or 2019nCoV or 19nCoV or COVID19\* or COVID or SARS-COV-2 or SARSCOV-2 or SARS-COV2 or SARSCOV2 or SARS coronavirus 2 or Severe Acute Respiratory Syndrome Coronavirus 2 or Severe Acute Respiratory Syndrome Corona Virus 2).ti,ab,kf,nm,ot,ox,rx,px.

4. ((new or novel or "19" or "2019" or Wuhan or Hubei or China or Chinese) adj3 (coronavirus\* or corona virus\* or betacoronavirus\* or CoV or HCoV)).ti,ab,kf,ot.
5. (longCOVID\* or postCOVID\* or postcoronavirus\* or postSARS\*).ti,ab,kf,ot.
6. ((coronavirus\* or corona virus\* or betacoronavirus\*) adj3 (pandemic\* or epidemic\* or outbreak\* or crisis)).ti,ab,kf,ot.
7. ((Wuhan or Hubei) adj5 pneumonia).ti,ab,kf,ot.
8. exp drinking behavior/ or exp alcohol drinking/
9. exp Alcohol-Related Disorders/
10. exp Liver Diseases, Alcoholic/
11. Hepatitis, Alcoholic/
12. Alcoholics/
13. alcohol\*.ti,ab,tw.
14. 8 or 9 or 10 or 11 or 12 or 13
15. (consum\* adj3 alcohol\*).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
16. 14 or 15
17. 1 or 2 or 3 or 4 or 5 or 6 or 7
18. 16 and 17
19. exp United Kingdom/
20. (national health service\* or nhs\*).ti,ab,in.

21. (english not ((published or publication\* or translat\* or written or language\* or speak\* or literature or citation\*) adj5 english)).ti,ab.
22. (gb or "g.b." or britain\* or (british\* not "british columbia") or uk or "u.k." or united kingdom\* or (england\* not "new england") or northern ireland\* or northern irish\* or scotland\* or scottish\* or ((wales or "south wales") not "new south wales") or welsh\*).ti,ab,jw,in.
23. (bath or "bath" or ((birmingham not alabama\*) or ("birmingham" not alabama\*) or bradford or "bradford" or brighton or "brighton" or bristol or "bristol" or carlisle\* or "carlisle" or (cambridge not (massachusetts\* or boston\* or harvard\*)) or ("cambridge" not (massachusetts\* or boston\* or harvard\*)) or (canterbury not zealand\*) or ("canterbury" not zealand\*) or chelmsford or "chelmsford" or chester or "chester" or chichester or "chichester" or coventry or "coventry" or derby or "derby" or (durham not (carolina\* or nc)) or ("durham" not (carolina\* or nc)) or ely or "ely" or exeter or "exeter" or gloucester or "gloucester" or hereford or "hereford" or hull or "hull" or lancaster or "lancaster" or leeds\* or leicester or "leicester" or (lincoln not nebraska\*) or ("lincoln" not nebraska\*) or (liverpool not (new south wales\* or nsw)) or ("liverpool" not (new south wales\* or nsw)) or ((london not (ontario\* or ont or toronto\*)) or ("london" not (ontario\* or ont or toronto\*)) or manchester or "manchester" or (newcastle not (new south wales\* or nsw)) or ("newcastle" not (new south wales\* or nsw)) or norwich or "norwich" or nottingham or "nottingham" or oxford or "oxford" or peterborough or "peterborough" or plymouth or "plymouth" or portsmouth or "portsmouth" or preston or "preston" or ripon or "ripon" or salford or "salford" or salisbury or "salisbury" or sheffield or "sheffield" or southampton or "southampton" or st albans or stoke or "stoke" or sunderland or "sunderland" or truro or "truro" or wakefield or "wakefield" or wells or westminster or "westminster" or winchester or "winchester" or wolverhampton or "wolverhampton" or (worchester not (massachusetts\* or boston\* or harvard\*)) or ("worchester" not (massachusetts\* or boston\* or harvard\*)) or (york not ("new york\*" or ny or ontario\* or ont or toronto\*)) or ("york" not ("new york\*" or ny or ontario\* or ont or toronto\*)))).ti,ab,in.



24. (bangor or "bangor"or cardiff or "cardiff"or newport or "newport"or st asaph or "st asaph"or st davids or swansea or "swansea").ti,ab,in.
25. (aberdeen or "aberdeen"or dundee or "dundee"or edinburgh or "edinburgh"or glasgow or "glasgow"or inverness or (perth not australia\*) or ("perth"not australia\*) or stirling or "stirling").ti,ab,in.
26. (armagh or "armagh"or belfast or "belfast"or lisburn or "lisburn"or londonderry or "londonderry"or derry or "derry"or newry or "newry").ti,ab,in.
27. 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26
28. (exp africa/ or exp americas/ or exp antarctic regions/ or exp arctic regions/ or exp asia/ or exp australia/ or exp oceania/) not (exp United Kingdom/ or europe/)
29. 27 not 28
30. 18 and 29
31. limit 30 to (embase or "preprints (unpublished, non-peer reviewed)")

## Appendix 2: Methodological details of included primary studies

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
Hardie et al, 2022 <sup>3</sup>	Repeated cross-sectional	Online survey. Retrospective drinking diary	January 2009 to December 2020	Scotland: 41,507 adult drinkers; England: 253,148 adult drinkers	Peer-reviewed journal	Descriptive and inferential
Richardson et al, 2022 <sup>7</sup>	Repeated cross-sectional for sales data; all recorded data for health harms data	Electronic point of sale and wholesale data from retailers. Routinely collected data from Public Health Scotland (hospital stays) and National Records of Scotland (deaths)	2017 to 2021	Sample of retailers in Scotland for sales data. Patients with alcohol-related hospital stays and people who died from causes wholly attributable to alcohol in Scotland	Grey literature	Descriptive and inferential
Richardson et al, 2021 <sup>9</sup>	Repeated cross-sectional	Electronic point of sale and wholesale data from retailers	1 January 2017 to 11 July 2020	Sample of retailers in Scotland and England & Wales	Grey literature	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
Ponce Hardy and Giles, 2022 – sales data <sup>10</sup>	Repeated cross-sectional	Electronic point of sale and wholesale data from retailers	1994 to 2021	Sample of retailers in Scotland and England & Wales	Grey literature	Descriptive
The IWSR, 2021 <sup>11</sup>	Unclear, but likely repeated cross-sectional	Market, economic and consumer research (details unknown)	2019 to 2020	Markets in 20 counties, including the UK	Grey literature	Unknown
Fraser et al, 2022 – online sales analysis <sup>12</sup>	Repeated cross-sectional	Receipt-based panel survey	23 March 2021 to 21 February 2020	21,000 users for online data; 80,000 for offline	Grey literature	Descriptive
Public Health England, 2021 <sup>13</sup> – HMRC analysis	All recorded data, before and after start of pandemic	Alcohol duty receipts from HM Revenue and Customs	January 2018 to March 2021	All alcohol duty receipts between January 2018 and March 2021	Grey literature	Descriptive
Public Health England,	All recorded data, before and after start of pandemic	Routinely collected data from Hospital Episode Statistics	Hospitalisations January 2018 to February	Patients with unplanned alcohol-specific hospital	Grey literature	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
2021 <sup>13</sup> – alcohol-specific morbidity and mortality		(hospitalisations) and Office for National Statistics (deaths)	2021; deaths January 2018 to April 2021	admissions and people who died from alcohol-specific causes in England		
Alcohol Change UK, 2022 <sup>14</sup>	Repeated cross-sectional, after the start of the pandemic	Online cross-sectional survey. Self-reported retrospective pre-pandemic alcohol consumption and perception of changes in consumption	July 2020	2,010 respondents from the UK for UK results, including 169 from Scotland and 1,786 from England & Wales. 'Boosted' sample of 576 respondents from Scotland for Scotland-only results	Grey literature	Descriptive
Scottish Government, 2021 <sup>15</sup>	Repeated cross-sectional, but methodology changes mean change in consumption	Telephone survey. Self-reported perception of changes in consumption	April to September 2021	1,920 respondents living in Scotland	Grey literature	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
	questions not comparable with other years.					
Anderson et al, 2022 <sup>16</sup>	Longitudinal (with some movement in panel members)	Household shopping panel (Kantar Worldpanel)	January 2015 to December 2020	Approximately 30,000 British households at one time. Not weighted, but broadly representative of households in Great Britain	Peer-reviewed journal	Descriptive and inferential
Rossow et al, 2021 <sup>17</sup>	Cross-sectional	Online survey. Self-reported retrospective pre-pandemic alcohol consumption using AUDIT-C and perception of changes in consumption. Unit amounts	April to June 2020	926 UK respondents (plus other international respondents)	Peer-reviewed journal	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		extrapolated by researchers				
Alcohol Change UK, 2022 <sup>18</sup> and Holmes, 2020 <sup>28</sup>	Cross-sectional	Online survey. Self-reported retrospective pre-pandemic alcohol consumption and perception of changes in consumption	7 to 9 April 2020	2,010 UK respondents	Grey literature	Descriptive
Alcohol Focus Scotland and Alcohol Change UK <sup>19</sup>	Cross-sectional	Online survey. Self-reported retrospective pre-pandemic alcohol consumption and perception of changes in consumption	26 June to 1 July 2020	550 Scottish adults	Grey literature	Descriptive
YouGov and Drinkaware <sup>20</sup>	Repeated cross-sectional	Online survey. Self-reported alcohol consumption,	27 August to 15 September 2020	1,318 adults in Scotland	Grey literature	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		including using AUDIT-C and Drinking Motive Questionnaire: Revised Short Form. Self-reported changes in drinking behaviour 'earlier' (late March to June) or 'later' lockdown (July in August)				
Irizar et al, 2021 <sup>21</sup>	Longitudinal, starting after the start of the pandemic	Online survey. Pre-lockdown alcohol consumption reported retrospectively. Pre-lockdown and current alcohol consumption self-reported using AUDIT (or AUDIT-	8 April to 6 July 2020	539 UK adults at baseline (8 April), where pre-pandemic and current drinking behaviour was recorded. 97 participants completed all five weekly surveys. No	Peer-reviewed journal	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		C) and the 'timeline follow back questionnaire'. Drinks converted to weekly alcohol units		weighting reported for representativeness, but weighting used for predictors of attrition		
Niedzwiedz et al, 2021 <sup>26</sup>	Longitudinal, before and after start of pandemic	Longitudinal household panel survey (UK Household Longitudinal Study). Self-reported alcohol consumption in either last four weeks or last year using AUDIT-C	2015 to 2020	9,748 UK adults	Peer-reviewed journal	Descriptive and inferential
Oldham et al, 2021 <sup>27</sup>	Cross-sectional	Online survey (HEalth BEhaviours during the COVID-19 pandemic (HEBECO) study).	30 April 2020 to 14 June 2020	2,977 UK adults	Peer-reviewed journal	Descriptive and inferential



Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		Self-reported pre- and post-pandemic alcohol consumption using AUDIT-C, with pre-pandemic retrospective				
Jackson et al, 2022 <sup>22</sup>	Repeated cross-sectional, pre- and post-pandemic, with some methodological changes from April 2020 because of the pandemic	Monthly cross-sectional survey (Alcohol Toolkit Study). Face-to-face computer-assisted interview before April 2020 and telephone survey in April 2020. Self-reported alcohol consumption using AUDIT-C, considering previous six months	Before lockdown (April 2019 to February 2020); after lockdown (April 2020)	Adults in England. 18,884 participants in before lockdown sample; 1,674 in after lockdown sample	Peer-reviewed journal	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
Stevely et al, 2021 <sup>23</sup>	Repeated cross-sectional	Online survey (Alcovision). 7-day retrospective drinking diary	December 2016 to June 2020	11,223 drinkers in Scotland and 70,126 drinkers in England, in total over time period	Grey literature	Descriptive
Scottish Health Survey, 2022 <sup>24</sup>	Repeated cross-sectional, but with a change in methodology from previous years due to the pandemic	Telephone survey. Self-reported alcohol consumption, including using AUDIT	April to September 2021	4,557 adults in Scotland	Grey literature	Descriptive and inferential
McBride et al, 2022 <sup>25</sup>	Mainly longitudinal, with some respondents differing between waves	Online survey. Self-reported alcohol consumption, including using adapted AUDIT-C. Retrospective for pre-pandemic	Three waves: 23 to 28 March 2020; 22 April to 1 May 2020; 9 to 23 July 2020	1,406 adults (in Wave 2) living the UK	Peer-reviewed journal	Descriptive and inferential
YouGov and Drinkaware, 2020 <sup>29</sup>	Repeated cross-sectional	Online survey. Self-reported alcohol consumption,	27 August to 15 September 2020	9,046 UK adults, including 1,318 in Scotland	Grey literature	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		including using AUDIT-C and Drinking Motive Questionnaire: Revised Short Form. Self-reported changes in drinking behaviour 'earlier' (late March to June) or 'later' lockdown (July in August)				
Winstock et al, 2020 <sup>30</sup>	Cross-sectional	Online survey. Self-reported alcohol consumption and change in alcohol consumption	May to June 2020	1,300 UK respondents. Not weighted for representation	Grey literature	Descriptive
Jacob et al, 2021 <sup>32</sup>	Cross-sectional	Online survey. Self-reported change in alcohol consumption	17 March to 1 June 2020	691 UK adults who were self-isolating	Peer-reviewed journal	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
Clay et al, 2021 <sup>33</sup>	First wave of longitudinal study (cross-sectional data presented)	Online survey (CLS COVID-19 survey). Self-reported alcohol consumption using five questions from AUDIT. Retrospective reporting for pre-pandemic	2 to 31 May 2020	13,453 UK adults from different birth cohorts	Peer-reviewed journal	Descriptive and inferential
Scottish Government, 2020 <sup>34</sup>	First wave of longitudinal study (cross-sectional data presented)	Online survey. Self-reported mental health; retrospective for pre-pandemic	28 May to 21 June 2020	2,514 respondents living in Scotland	Grey literature	Descriptive and inferential
Villadsen et al, 2021 <sup>35</sup>	Analysis of data from four cohort studies. Alcohol consumption captured after the start of the pandemic.	Online survey. Sample of participants from cohort studies completed survey on self-reported alcohol	May 2020 and September 2020 for alcohol consumption questions.	10,666 UK participants who provided health behaviours data. Participants are a subset from four cohort studies:	Peer-reviewed journal	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		consumption, retrospective for before the pandemic. Questions on frequency and volume, which were used to construct a measure of risky drinking (more than 12 drinks weekly and 5 or more drinks per session)	Data on mental health captured pre- and post-pandemic	National Child Development Study, 1970 British Cohort Study, Next Steps Cohort and Millenium Cohort Study		
Green et al, 2022 <sup>36</sup>	Analysis of eight longitudinal studies, including pre- and post-pandemic data collection	Surveys, various modes. Self-reported alcohol consumption (frequency and volume), and (for some surveys) change in alcohol consumption. Pre-	2013 to 2020 (varies depending on survey)	27,841 UK working-age people, with at least one outcome in a COVID-19 survey between April and July 2020. Sample taken from eight	Peer-reviewed literature	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		pandemic alcohol consumption recorded contemporaneously for some studies, and retrospectively for others		longitudinal surveys: Millenium Cohort Study, Avon Longitudinal Study of Parents and Children, Next Steps, 1958 National Child Development Study, Understanding Society, English Longitudinal Study of Ageing, Generation Scotland and ALSPAC-G1		
Gordon-Wilson, 2021 <sup>37</sup>	Qualitative	Two phases: one using netnography (qualitative social media research) and one using	Netnography March to April 2020; interviews 3 to 7 May 2020	Netnography using two internet forums with a total of around 25,500	Peer-reviewed journal	Qualitative

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		online semi-structured interviews		members.13 UK interviewees		
Nicholls and Conroy, 2021 <sup>38</sup>	Cross-sectional/qualitative	Internet-mediated qualitative interviews and focus groups. Half of respondents completed a drinks diary	May to August 2020	20 UK-based adults. Qualitative results presented; not weighted	Commentary article in a peer-reviewed journal. Subject to editorial review and possibly peer review	Qualitative
Scottish Government, 2019 <sup>39</sup>	Repeated cross-sectional	Face-to-face interview; sometimes paper questionnaire for alcohol questions for those younger. Self-reported alcohol consumption including AUDIT-C	January to December 2019	4,903 adults	Grey literature	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
Bankiewicz et al, 2020 <sup>40</sup>	Repeated cross-sectional	Alcohol questions in face-to-face interview for those aged 25 and over; sometimes self-completed questionnaire for those younger. Self-reported alcohol consumption over last 12 months and last week	January to December 2019	8,205 adults living in England.	Grey literature	Descriptive and inferential
Garnett et al, 2021 <sup>42</sup>	Cross-sectional	Online survey. Self-reported alcohol consumption and changes in consumption in past week	21 March to 4 April 2020	30,375 UK adults	Peer-reviewed journal	Descriptive and inferential
Naughton et al, 2021 <sup>43</sup>	Cohort study beginning after the pandemic	Prospective cohort study. Baseline self-reported	10 April to 18 May 2020	1,044 UK respondents, purposively	Peer-reviewed journal	Descriptive and inferential



Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		alcohol consumption using AUDIT-C, then daily report of alcoholic drinks consumed over 30 days		sampled from vulnerable populations (those with physical high risk condition for COVID-19; those living in a high deprivation area; those with a self-reported mental health issue). No weighting described		
McAloney-Kocaman et al, 2022 <sup>45</sup>	Longitudinal, starting after the start of the pandemic	Online survey. Self-reported changes in alcohol consumption (drinking less, about the same or more than usual since the lockdown)	Wave in which alcohol consumption was recorded: May to August 2020	1,268 UK adults. No weighting reported	Peer-reviewed journal	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
Jackson et al, 2021 <sup>46</sup>	Repeated cross-sectional	Cross-sectional survey, collected face-to-face before April 2020 and via telephone afterwards. Self-reported alcohol consumption using AUDIT-C and self-reported reduction attempts and details of support received.	Monthly between August 2018 and July 2020	36,980 adults in England	Peer-reviewed journal	Descriptive and inferential
Office for Health Improvement and Disparities, 2022 <sup>47</sup> – YouGov survey data	Repeated cross-sectional (possibly longitudinal). Began after the start of the pandemic.	Online survey. Self-reported alcohol consumption, retrospective for before the pandemic. For unit consumption questions, responses are	Various waves, from May 2020	Respondents from England. Sample size unknown.	Grey literature	Descriptive

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		categories with a range (e.g. 1–2 units). The highest number of units in each category was used				
Office for Health Improvement and Disparities, 2022 <sup>47</sup> – Alcohol Toolkit Study	Repeated cross-sectional (survey includes follow-up of some respondents six months after initial survey, but unclear whether these data are included in the present analysis)	Cross-sectional survey. In-person computer-assisted interviews, except for April 2020 to December 2021, when telephone interviews used. Self-reported alcohol consumption in a typical week, including using AUDIT. For unit consumption questions,	Various waves, from May 2014	Approximately 1,800 respondents a month living in England	Grey literature	Descriptive

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		responses are categories with a range (e.g. 1–2 units). The highest number of units in each category was used				
Institute of Alcohol Studies, 2020 <sup>50</sup> , reporting on Alcohol Health Alliance UK survey	Cross-sectional	Quantitative and qualitative survey. Other methodological details unknown	August 2020	103 people in recovery or trying to manage their drinking, plus 22 parents or carers of children with fetal alcohol spectrum disorders	Grey literature	Qualitative results reported
Public Health Scotland, 2022 <sup>51</sup>	Routine statistics	Routinely collected data on treatment service referrals, extracted from Public Health Scotland's Drug	2018 to 2022	People referred to drug and alcohol treatment services in all NHS Boards in Scotland	Grey literature	Descriptive

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		and Alcohol Information System (from April 2021, or earlier for some NHS Boards), or Drug and Alcohol Treatment Waiting Times database. Data from treatment services provided to Public Health Scotland				
Office for Health Improvement and Disparities, 2021 <sup>52</sup>	Routine statistics	Routinely collected data on treatment, from Public Health England's National Drug Treatment Monitoring System	2013/14 to 2020/21	Users of treatment providers in England	Grey literature	Descriptive
Public Health Scotland, 2022 <sup>53</sup>	Routine statistics	Routinely collected data on alcohol-related hospital admissions,	1981/82 to 2020/21	Patients with alcohol-related hospital admissions in Scotland	Grey literature	Descriptive

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		provided to Public Health Scotland from NHS Boards in Scotland				
Office for National Statistics, 2022 <sup>54</sup>	Routine statistics	Routinely collected data on alcohol-specific deaths in the UK	2001 to 2021	People who die from alcohol-specific causes in the UK	Grey literature	Descriptive and inferential
Angus et al, 2022 <sup>55</sup>	Scenario modelling using Sheffield Alcohol Policy Model	Self-reported alcohol consumption. Pre-pandemic consumption from repeated cross-sectional survey (Health Survey for England). Changes in alcohol consumption from repeated cross-sectional survey (Alcohol Toolkit	Alcohol consumption: 2018 to 2021 Hospitalisations and deaths (from routinely collected data) 2012 to 2016/17	Health Survey for England: around 8,000 adults in England each year. Alcohol Toolkit Study: around 1,700 adults in England each month	Grey literature	Descriptive (modelling study)

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
		Study, using AUDIT)				
Boniface et al, 2022 <sup>56</sup>	Scenario modelling using HealthLumen microsimulation model	Self-reported alcohol consumption from repeated cross-sectional survey (Alcohol Toolkit Study)	Alcohol consumption: January 2019 to November 2021	Alcohol Toolkit Study: around 1,700 adults in England each month	Grey literature	Descriptive (modelling study)
Wang et al, 2021 <sup>60</sup>	Case-control study	Retrospective case-control study of electronic health records from IBM Watson Health Explorys database	Data extracted 15 June 2020, with the start of health collection data in 1999	73,099,850 patients in the US	Peer-reviewed journal	Descriptive and inferential
Dai et al, 2021 <sup>61</sup>	Cohort study	Self-reported typical alcohol consumption at baseline (2006–2010)	Alcohol consumption data: March 2006 to December 2010	473,958 UK subjects	Peer-reviewed journal	Descriptive and inferential

Paper	Study design	How alcohol consumption (or other alcohol-related) data collected	Period data collected	Participants (all surveys weighted to be representative of respective population, unless noted)	In peer-reviewed journal or grey literature	Descriptive or inferential statistics
			COVID-19 test results: up to 26 July 2021			
Williamson et al, 2020 <sup>66</sup>	Cohort study	Linked routinely collected primary care electronic health records from GP practices in England to COVID-19 deaths from the Office for National Statistics	1 February to 6 May 2020	Primary care records of 17,278,392 adults in England	Peer-reviewed journal	Descriptive and inferential
Aubert et al, 2021 <sup>67</sup>	Cohort study	Routinely collected data. Transplant data from NHS Blood and Transplant for the UK. COVID-19 prevalence and related deaths data from Johns Hopkins database	1 January to 31 December 2021, compared with data from same time period in 2019	Data from 22 countries, including the UK	Peer-reviewed journal	Descriptive and inferential



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