Public Health Scotland

Alcohol sales and harm in Scotland during the COVID-19 pandemic

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Contents

Key points

- The COVID-19 pandemic, and restrictions implemented to control its spread, reduced the availability of alcohol for consumption on licensed premises (pubs, clubs and restaurants; on-trade) in Scotland in 2020 and 2021.

Alcohol sales

- Overall, total combined alcohol sales (litres of pure alcohol per adult) were 9% lower in 2020 than the 2017–19 annual average, and 16% lower in 2021 (January to May) than the average for January to May 2017–19.
- On-trade alcohol sales were 66% lower in 2020 than the 2017–19 annual average, and 95% lower between January and May 2021 than the average for the same period of 2017–19.
- Over the same time period, alcohol sales for consumption off the premises (supermarkets and shops; off-trade) increased by 13% in 2020 and 15% in 2021 (January to May), compared with the average for 2017–19.
- On-trade sales accounted for around 27% of total sales in 2017–19. This diminished to around 10% in 2020 and less than 2% in January to May 2021. Off-trade sales increased from around 73% to 98% of total sales over the same time period.
- Around two-thirds of the reduction in total combined sales (litres of pure alcohol per adult) was attributable to lower beer sales (71% in 2020 and 60% in January to May 2021). This is because nearly half of all beer sales typically occur in on-trade premises. Sales of spirits, wine, cider and perry also decreased following the start of the pandemic and associated restrictions, while sales of fortified wine and ready-to-drink beverages increased.

- Alcohol sales indicate that population-level consumption was above recommended levels. Between the start of COVID-19 restrictions in March 2020 and May 2021, 17 units (171 ml) of pure alcohol have been sold per adult each week on average, 16 (162 ml) of which have been from off-trade premises. This represents enough alcohol to put every adult in Scotland over the Chief Medical Officer's low-risk weekly drinking guideline of 14 units.[1]

Alcohol-related health harms

- Following the start of the pandemic, there were fewer hospital stays involving a diagnosis entirely attributable to alcohol ('alcohol-related hospital stays') than average. Rates were 7.3% (95% CI: 5.9% to 8.6%) lower in 2020 than the 2017–19 average.

- Alcohol-related hospital stays fell by the largest amount during the periods when the most stringent COVID-19 restrictions were in place.

- Rates of alcohol-related hospital stays decreased most for males, those aged over 45 years, and those living in deprivation quintiles 1 (most deprived), 2 and 4. In general, these groups had the highest rates of alcohol-related stays in 2017–19.

- Deaths from causes wholly attributable to alcohol ('alcohol-specific deaths') increased following the start of the pandemic. This was driven primarily by an increase in alcohol-specific death rates among males and those aged 45 to 64 years.

Conclusion

- Population-level alcohol consumption in Scotland was lower following the start of the COVID-19 pandemic than in 2017–19. The pandemic and related restrictions, particularly to on-trade premises, are likely to have contributed to this decrease.

- While alcohol-related hospital stays decreased during the pandemic for some population groups, alcohol-specific deaths also increased for these groups. These same groups already had among the highest alcohol-specific death rates before the pandemic.

- Increased rates of alcohol-specific death for some groups may support existing evidence that drinking at hazardous and harmful levels may have increased for some groups, despite consumption reducing at the population level. Of concern is the potential that groups with high levels of alcohol consumption before the pandemic may have increased their alcohol consumption, had reduced access to hospital treatment for alcohol-related conditions, and potentially experienced higher rates of mortality as a consequence.

- Tackling alcohol consumption and harms, particularly among high-risk groups, should be a critical objective of any COVID-19 recovery plans.

Introduction

In this report we look at trends in alcohol sales and related health harms in Scotland and how these have been impacted since the start of the COVID-19 pandemic. We present data on alcohol sales up to 8 May 2021, hospital stays up to 31 March 2021 and deaths up to 31 December 2020.

The UK and Scottish governments' responses to the pandemic included social and physical restrictions to prevent the spread of the virus. These restrictions changed how and where alcohol could be purchased, and there is evidence that alcohol consumption and related harms have also changed. This report aims to update this research for Scotland.

Background

From March 2020, COVID-19 and the restrictions introduced to limit its spread have affected the way in which alcohol can be purchased in Scotland and the rest of the UK. More broadly, the restrictions have impacted on the psychological, social and economic circumstances of much of the population.

Sales-based consumption across the Scottish population decreased during the first lockdown: from 15 March to 11 July 2020 we previously found a 6% reduction in alcohol sales (litres of pure alcohol per adult) compared to the level we would have expected given seasonal and other underlying trends.[2]

Other research, however, suggests that this was not because every adult was drinking less. A number of surveys have suggested that while some people reported drinking less than they did before the start of the pandemic, a proportion of people reported drinking more; some sources suggested that drinking at potentially hazardous or harmful levels may also have increased.[3,4,5,6]

In this report we examine trends in per-adult alcohol sales and alcohol-related health harms since the start of the pandemic in 2020 and compare these with trends in 2017 to 2019.

Data and methods

Data sources and methods are described in detail in the appendices, and are briefly summarised here.

Restrictions to on-trade sales

The COVID-19 restrictions placed on on-trade premises (pubs, clubs, and restaurants) had a marked influence on how and where alcohol was available for purchase in Scotland. The stringency and geographical coverage of the restrictions changed over time. To summarise how the scale of the restrictions changed over the period, we used various sources of information about national and local restrictions. We used National Records of Scotland (NRS) population data and calculated the proportion of the population subject to the different restriction levels each day (see Appendix 1).

Sales-based alcohol consumption

We obtained alcohol retail sales data for 1 January 2017 to 8 May 2021, and converted these to the volume of pure alcohol sold per adult per week (see Appendix 2). This is commonly recognised as the most accurate way of estimating population-level alcohol consumption.[7] We obtained data for the volume of alcohol sold from on-trade premises, and that sold for consumption off the premises (from supermarkets and off-licences; 'off-trade'). In this report we compared sales for 2020 (full calendar year) and 2021 (January to May) with pooled average figures for the same periods in 2017–2019, which represent sales in more typical recent years.

Alcohol-related hospital stays

We obtained counts of stays in general acute hospitals due to any condition defined as wholly attributable to alcohol ('alcohol-related hospital admissions': see Appendix 3) in line with the National Statistics definition.[8] The data included patients discharged up to 31 March 2021.

Alcohol-specific deaths

We obtained records of deaths registered up to 31 December 2020 from National Records of Scotland (see Appendix 4). We extracted those defined as being wholly attributable to alcohol ('alcohol-specific deaths') in line with the National Statistics definition.[9]

Comparing health harms over time and between groups

The change from one year to the next can be an unreliable indicator of the underlying trend, due to random fluctuations from year to year.[10] In this report we therefore compare rates during 2020 and 2021 with average rates for the three previous years, 2017 to 2019.

To enable numbers of deaths or hospital stays to be compared over time and between groups with differing age and/or sex composition we calculated age-sex-standardised rates per 100,000 population. We used 95% confidence intervals to indicate the uncertainty around each age-sex standardised rate.[11,12] These are presented on the charts. The level of uncertainty is indicated by the width of the confidence interval (the greater the width of the confidence interval the greater the uncertainty) and is influenced by three things: the size of the sample, or in this case the size of the population; the degree of natural variation in the outcome of interest in the population; and the degree of confidence required, in this case 95%.[12]

To assess whether the rates during the pandemic differed significantly from the average rates for 2017–19 we calculated standardised rate ratios (SRR) and their 95% confidence intervals.[13] SRR have been converted to percentage change estimates and these, along with their 95% confidence intervals, are presented in the text and graphically. Statistical significance is implied when the confidence interval does not cross zero.

Findings

Alcohol retail sales

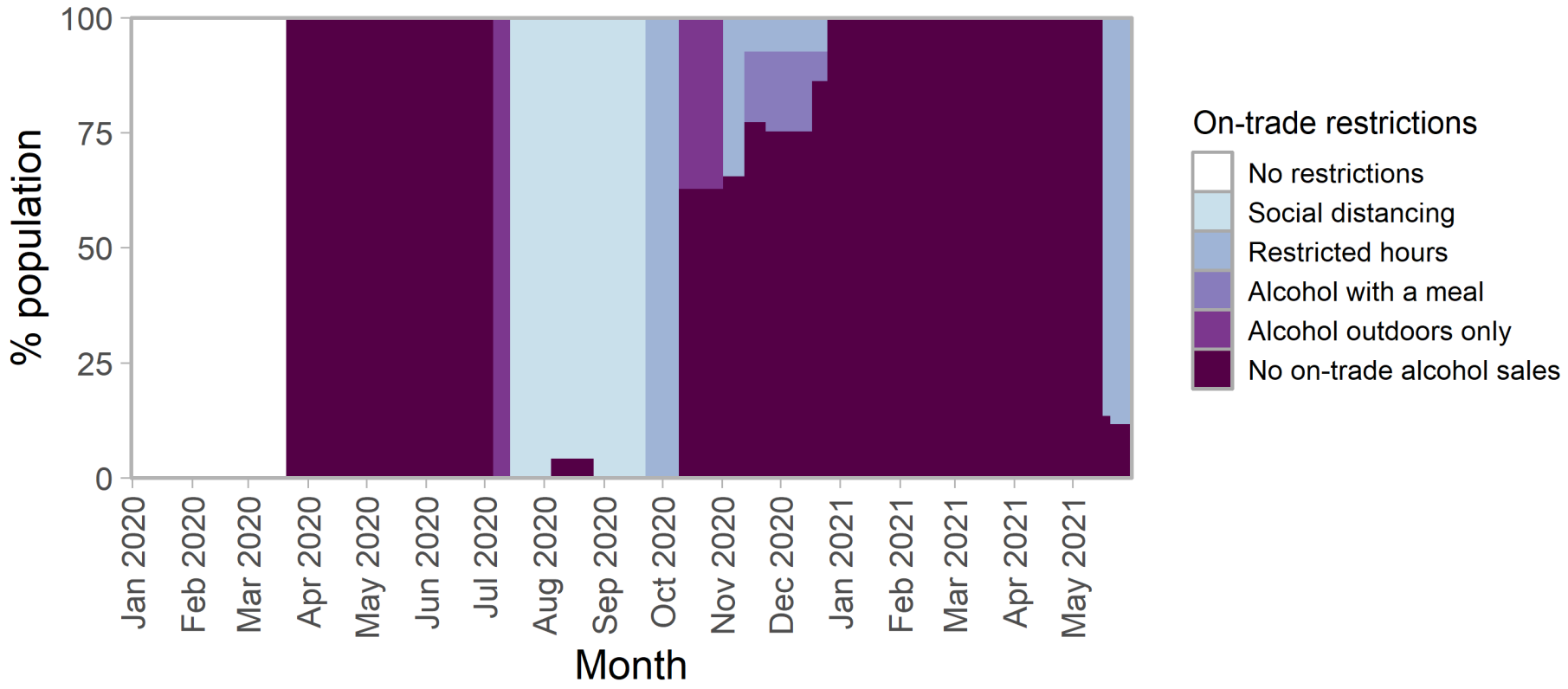
Restrictions to on-trade sales

We combined information about national restrictions directly affecting on-trade alcohol sales (Table 1) with information about local restrictions (Appendix 1) to calculate the proportion of the Scottish population living under different on-trade sales restrictions (Figure 1). The chart shows that, during the two lockdowns (the first starting 23 March 2020 and the second starting 5 January 2021), the strictest restriction – under which no on-trade alcohol sales were permitted – applied to 100% of the population. At other times less strict restrictions were in place, or restrictions varied across the population.

Table 1. National restrictions to on-trade alcohol sales, Scotland

Year	Month	Date of introduction	Restrictions
2020	Mar	21/03/2020[14]	No sales permitted
2020	Mar	23/03/2020[15]	National lockdown begins
2020	Jul	06/07/2020[16]	Outdoors only
2020	Jul	15/07/2020[16]	Social distancing
2020	Sep	25/09/2020[17]	Restricted hours
2020	Oct	09/10/2020[18]	Outdoors only
2020	Nov	02/11/2020[19,20]	Restricted hours
2020	Dec	26/12/2020[21]	No sales permitted
2021	Jan	05/01/2021[21]	National lockdown begins
2021	May	17/05/2021[22,23]	Restricted hours

Figure 1. Population coverage of national and local restrictions to on-trade sales; Scotland, January 2020 to May 2021



Alcohol sales: annual estimates

Per-adult sales of alcohol in 2020 (1 January to 31 December) and 2021 (1 January to 8 May) were compared with the averages for the same periods of 2017 to 2019, the most recent years before the COVID-19 pandemic (Figures 2 and 3). We also examined the contribution of on- and off-trade sales to the overall total in each time period and by drink category (Table 2).

On-trade sales for all categories combined were 66% and 95% lower in 2020 and 2021, respectively, than the 2017–19 averages, while total off-trade sales increased by 13% in 2020 and 15% in 2021. As a result, combined per-adult sales were 9% lower in 2020, and 16% lower in the first 18 weeks of 2021, than the average per-adult sales in 2017–19 (Figure 3). Between 2017 and 2019, approximately 73% of per-adult alcohol sales were through off-trade premises; in 2020, with the closure of on-trade premises due to lockdown, this increased to around 90% and in January to May of 2021 virtually all (98.3%) sales were through the off-trade (Table 2).

Decreases in per-adult sales of beer (20% lower in 2020, and 30% lower in 2021), spirits (3% and 11% lower), cider (21% and 34% lower), and wine (2% and 5% lower) were the main contributors to the lower sales in 2020 and 2021, compared with 2017–19 (Figure 3). The biggest contributor to the combined decrease was beer sales: accounting for 71% of the reduced sales in 2020, and 60% in 2021. This occurred because almost half (47% in 2017–19) of all beer sales by pure volume typically occur in on-trade premises, compared with the 27% average across all drink types. Perry sales decreased while fortified wine and ready to drink* (RTD) beverage sales increased in 2020 and 2021: these differences were minor in absolute terms and made very little contribution to the change in total per-adult alcohol sales (Table 2).

* Ready to drink beverages are packaged and sold in a form ready for immediate consumption; in relation to alcoholic beverages these would typically refer to bottled or canned pre-mixed drinks or cocktails.

On-trade sales of each drink type were around two-thirds lower in 2020 than in 2017–19, and over 90% lower in 2021 (Figure 3). Sales of cider and perry from off-trade premises were also lower than the average in these years, whereas off-trade sales of other drink types increased. Per-adult off-trade sales of RTD beverages increased by a half in 2020 and three-quarters in 2021, explaining the increase in total sales of these products in these years.

Figure 2: Alcohol sales (litres of pure alcohol per adult) in Scotland in 2020 (1 January to 31 December, top row) and 2021 (1 January to 8 May, bottom row), compared with the 2017–2019 average for the same periods, by trade sector and drink category.

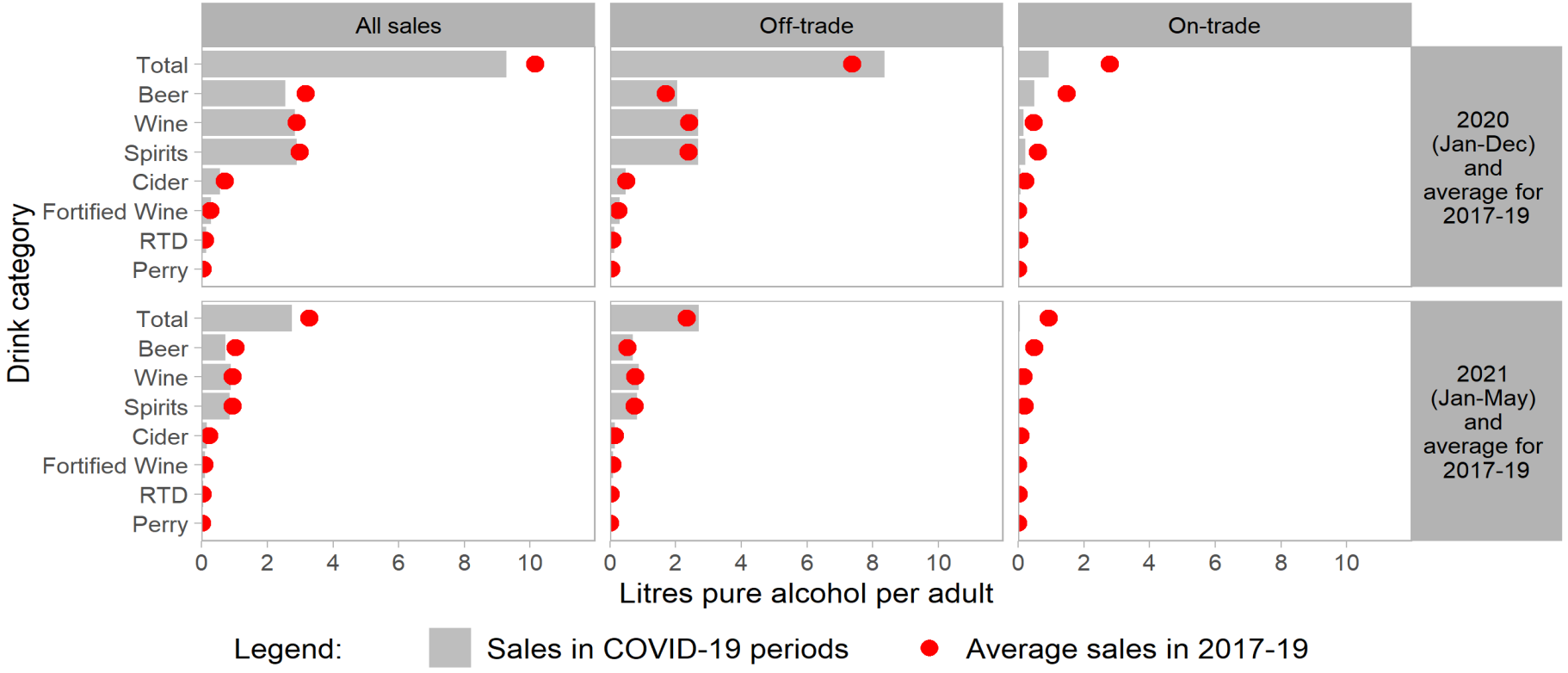


Figure 3. Percentage difference of alcohol sales (litres of pure alcohol per adult) in Scotland in 2020 (1 January to 31 December, top row) and 2021 (1 January to 8 May, bottom row), compared with the 2017–2019 average for the same periods, by trade sector and drink category.

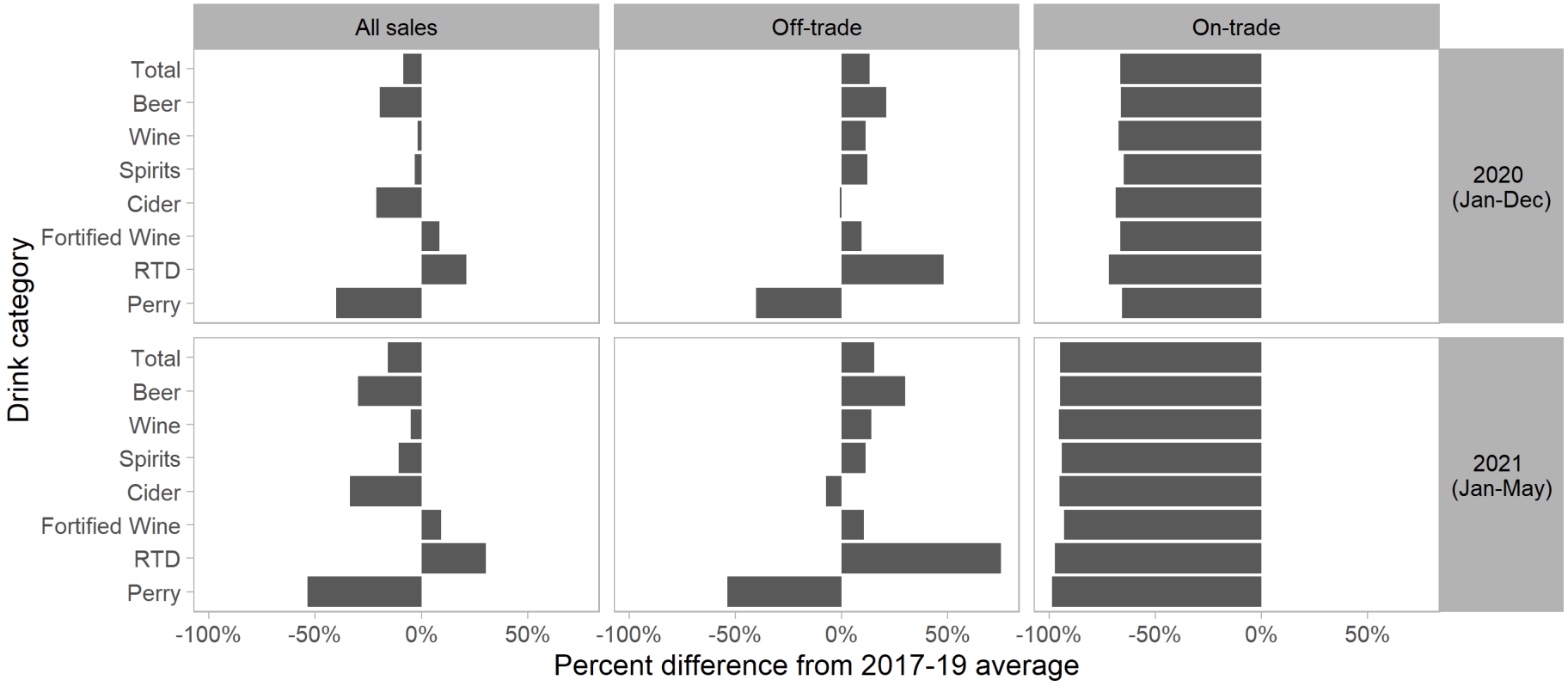


Table 2: Absolute volume (litres of pure alcohol per adult) and relative share (percentage) of total alcohol sales (on- and off-trade), Scotland, 2017–19 annual average, 2020 and 2021 (January to May), by trade sector and drink category.

All sales	2017–19 Litres per adult	2017–19 Percentage of all sales	2020 Litres per adult	2020 Percentage of all sales	2021 (Jan to May) Litres per adult	2021 (Jan to May) Percentage of all sales
Total	10.17	100.0%	9.29	100.0%	2.75	100.0%
Beer	3.17	31.2%	2.55	27.4%	0.72	26.1%
Wine	2.89	28.5%	2.84	30.6%	0.89	32.4%
Spirits	2.98	29.3%	2.89	31.1%	0.85	30.7%
Cider	0.70	6.9%	0.55	5.9%	0.15	5.5%
FW	0.27	2.6%	0.29	3.1%	0.09	3.4%
RTD	0.11	1.1%	0.13	1.4%	0.04	1.6%
Perry	0.03	0.3%	0.02	0.2%	0.01	0.2%

Off-trade	2017–19 Litres per adult	2017–19 Percentage of all sales	2020 Litres per adult	2020 Percentage of all sales	2021 (Jan to May) Litres per adult	2021 (Jan to May) Percentage of all sales
Total	7.38	72.6%	8.35	89.9%	2.70	98.3%
Beer	1.69	16.7%	2.05	22.1%	0.69	25.2%
Wine	2.42	23.8%	2.69	29.0%	0.89	32.2%
Spirits	2.39	23.5%	2.68	28.8%	0.83	30.3%
Cider	0.49	4.8%	0.48	5.2%	0.15	5.3%
FW	0.26	2.6%	0.29	3.1%	0.09	3.4%
RTD	0.09	0.8%	0.13	1.4%	0.04	1.6%
Perry	0.03	0.3%	0.02	0.2%	0.01	0.2%

On-trade	2017–19 Litres per adult	2017–19 Percentage of all sales	2020 Litres per adult	2020 Percentage of all sales	2021 (Jan to May) Litres per adult	2021 (Jan to May) Percentage of all sales
Total	2.78	27.4%	0.94	10.1%	0.05	1.7%
Beer	1.48	14.5%	0.50	5.4%	0.03	0.9%
Wine	0.48	4.7%	0.16	1.7%	0.01	0.3%
Spirits	0.59	5.8%	0.21	2.2%	0.01	0.4%
Cider	0.21	2.1%	0.07	0.7%	<0.01	0.1%
FW	<0.01	0.0%	<0.01	0.0%	<0.01	0.0%
RTD	0.02	0.2%	0.01	0.1%	<0.01	0.0%
Perry	<0.01	0.0%	<0.01	0.0%	<0.01	0.0%

Note: FW = Fortified wine. RTD = Ready to drink beverages.

Sales-based alcohol consumption: weekly trends

Weekly trends to 11 July 2020 are described in detail in our earlier report,[2] and more briefly here. The weekly trends for on-trade, off-trade and all sales combined up to the start of May 2021 are shown in Figure 4. The background of Figure 4 is shaded to show the degree of restrictions on on-trade alcohol sales in each week.

On-trade sales decreased sharply in the weeks before the first lockdown (23 March 2020). Around this time COVID-19 was spreading in the UK and had been declared a global pandemic. On-trade sales were effectively zero during the 2020 lockdown* (Figure 4; first dark-grey panel). Once on-trade restrictions began to be eased from 6 July 2020 (Figure 4; light grey panel), on-trade sales increased and peaked at 59% of their 2017–19 average level in the week of 16–22 August 2020. Then, with increasing COVID-19 case numbers, restrictions to on-trade sales began to be tightened from September 2020 (e.g. restricted hours, or outdoor sales only), and on-trade sales began to fall. On-trade premises were closed again during the second national lockdown (starting 5 January 2021), and on-trade sales were therefore reduced to zero again.

Off-trade sales in January and February 2020 were around the average for the time of year (Figure 4), but spiked in the week before the first national lockdown. It is likely this was a consequence of the closure of on-trade premises on 21 March 2020, and stockpiling due to a national lockdown looking likely. Off-trade sales then remained markedly higher than the 2017–19 average throughout most of the first lockdown. Once on-trade premises could sell alcohol again (6 July 2020), off-trade sales decreased slightly, but were higher than the 2017–19 average for the remainder of the time series. Sales over the 2020 festive period appear to have diverged from

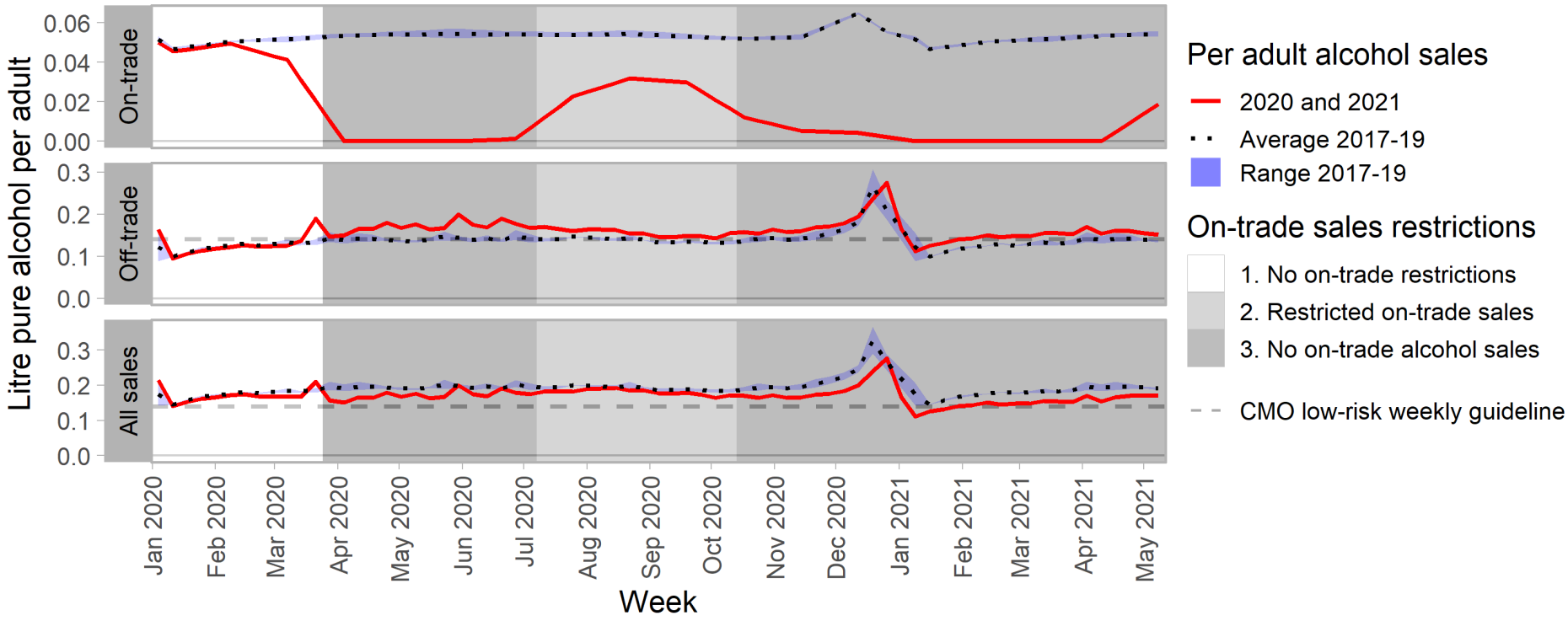
* The interpolation used to produce weekly estimates from 4-weekly on-trade sales data has resulted in non-zero sales volumes at either end of the lockdown period.

this trend in Figure 4, but this is an artefact caused by Christmas and New Year falling into later calendar weeks* in 2020 than in 2017–19. From January until May 2021, when on-trade premises were closed, off-trade sales per adult were consistently higher than average, but the difference was smaller (and less variable) than in the first lockdown. Throughout much of the pandemic, sales through the off-trade alone have been sufficient for every adult to, on average, exceed the Chief Medical Officer's (CMO) low-risk weekly drinking guideline of 14 units (140 ml pure alcohol) per adult per week.[1] Off-trade sales have averaged 16 units (162 ml pure alcohol) per adult per week since March 2020.

All sales combined (on- plus off-trade) were trending slightly lower than average at the start of 2020, decreased in March, before spiking just before the first lockdown began. Through the first lockdown, combined sales remained lower than the average for the time of year in most weeks. With the easing of restrictions in the summer months, per-adult alcohol sales increased gradually, and briefly returned to within their pre-pandemic range in August 2020. Restrictions then began to tighten and to affect an increasing proportion of the population (Figure 1). The gap between weekly per-adult alcohol sales in 2020 and the 2017–19 average increased up to the festive period, and remained relatively constant from January to May 2021. Between January 2020 and May 2021, combined per-adult sales of alcohol exceeded the CMO low-risk weekly drinking guideline[1] in all weeks except for the first three weeks of January 2021. Sales of alcohol between the start of the COVID-19 restrictions in March 2020 and May 2021 have averaged 17 units (171 ml pure alcohol) per adult per week.

* International Organization for Standardisation (ISO) week numbering is used here, as in National Records of Scotland reporting. 2020 has 53 weeks by this standard, compared to the 52 weeks in 2017, 2018, 2019 and 2021.

Figure 4. Weekly alcohol sales (litres of pure alcohol per adult) by trade sector; Scotland, 1 January 2020 to 8 May 2021 and 2017–2019 average.



See next page for notes.

Notes:

1. Shaded panels indicate the level of on-trade sales restrictions that most of the Scottish population was subject to that week.

2. On-trade sales are presented on a different scale, as sales were lower in volume.

3. The Chief Medical Officer's (CMO) low-risk weekly guideline of 14 units (0.14 litres pure alcohol) per adult per week[1] is shown by a grey dashed line.

4. The interpolation used to produce weekly estimates from 4-weekly on-trade sales data has resulted in non-zero sales volumes at either end of the lockdown period.

Sales-based alcohol consumption: weekly trends by drink category

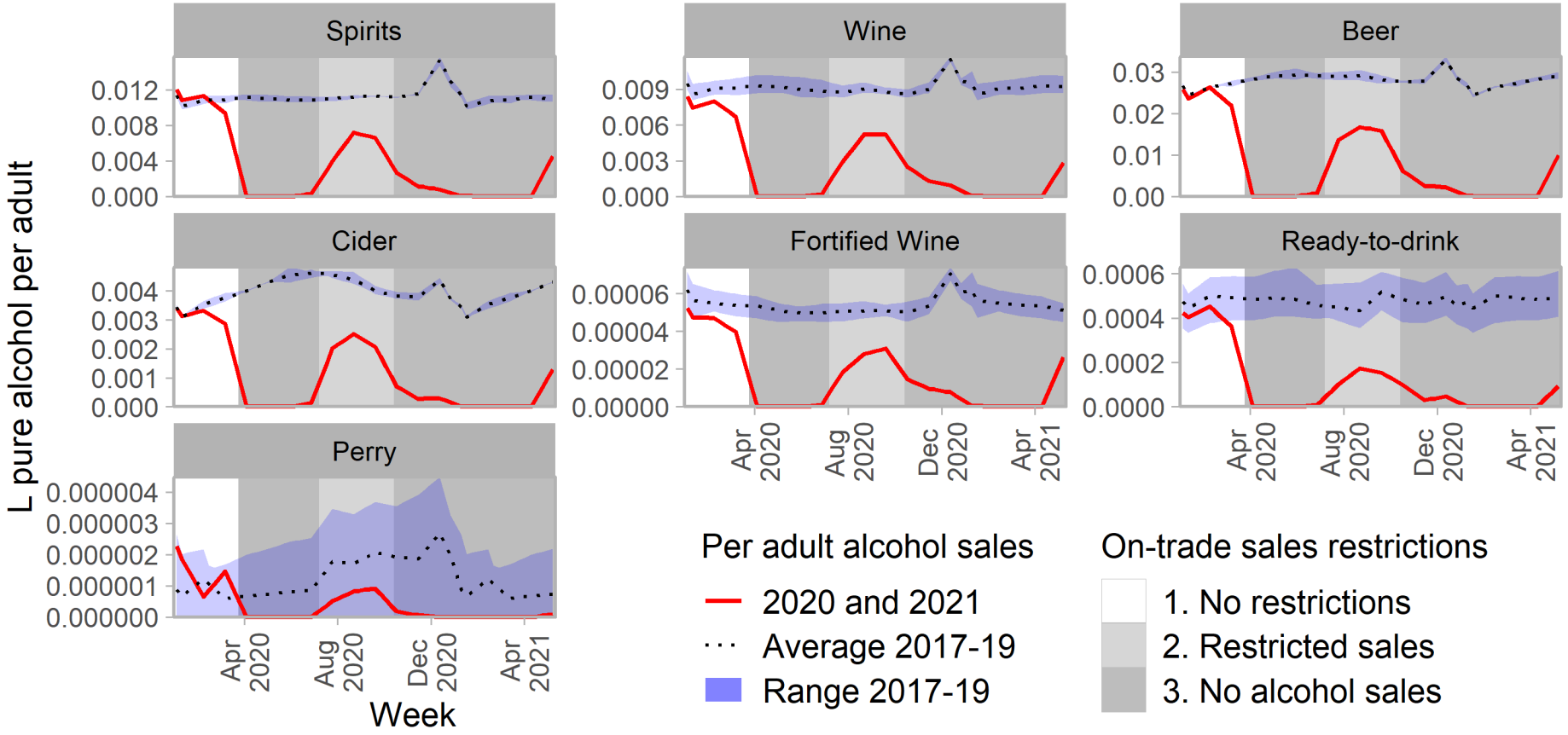
On-trade sales of each drink category fluctuated widely between January 2020 and May 2021 (Figure 5). At the start of 2020, per-adult on-trade sales of spirits and perry were above average, sales of beer and cider were around average, and sales of wine, fortified wine and ready-to-drink beverages were below average. As the epidemic became a pandemic and Scotland moved into the first lockdown, on-trade sales of all categories reduced to zero. When restrictions were eased (but not removed) on-trade sales of each drink category increased over the summer months of 2020, but none reached more than two-thirds of their 2017–19 average sales volumes. Sales of all drink types from on-trade premises subsequently declined in line with the increasing coverage of tighter restrictions to on-trade sales through the autumn and winter of 2020, reducing to zero in the second lockdown.

Off-trade sales trends for the different drink categories are shown in Figure 6. At the start of 2020 per-adult off-trade sales of spirits, wine and beer were around average, while fortified wine and ready-to-drink beverage sales were above average, and sales of cider and perry were below average. Off-trade sales of beer and RTD beverages tracked substantially higher than the 2017–19 average through the first and second lockdowns, and remained elevated during the partial relaxation of restrictions in mid- to late-2020. Off-trade sales of spirits and wine also tracked above average from the first lockdown onwards. Off-trade cider sales were above average for much of the first lockdown, but subsequently fell to below average, and within the 2017–19 range. Off-trade sales of fortified wine appear to have been minimally affected by the restrictions, as they were tracking above average and within the 2017–19 range before the first lockdown, and largely continued this trend throughout the remainder of 2020 and into 2021. Off-trade perry sales were also not noticeably affected: they remained substantially lower than the 2017–19 average throughout 2020 and 2021. Fortified wine and perry are almost exclusively purchased from off-trade rather than on-trade outlets

(>=99% by volume), hence why sales of these categories were largely unaffected by the timing and stringency of on-trade restrictions.

On- and off-trade sales combined for the drink categories are shown in Figure 7. Weekly sales of spirits and wine were generally slightly lower than average during the periods when most or all of the Scottish population was subject to the tightest restrictions to on-trade sales (dark-grey panels), but were around the 2017–19 average at other times. Weekly sales of beer fell below the 2017–19 average before the first lockdown, and remained low for the remainder of 2020 and into 2021. Cider sales followed a similar low trajectory, although they increased to within the 2017–19 range at a few points in the first lockdown. Combined trends in fortified wine and perry sales mirror the weekly off-trade trends, given the dominance of sales of these categories through the off-trade. The marked increase in weekly off-trade sales of RTD beverages is also reflected in the net sales trend for this category.

Figure 5. Weekly on-trade alcohol sales (litres of pure alcohol per adult), by drink category; Scotland, 1 January 2020 to 8 May 2021 and 2017–2019 average.



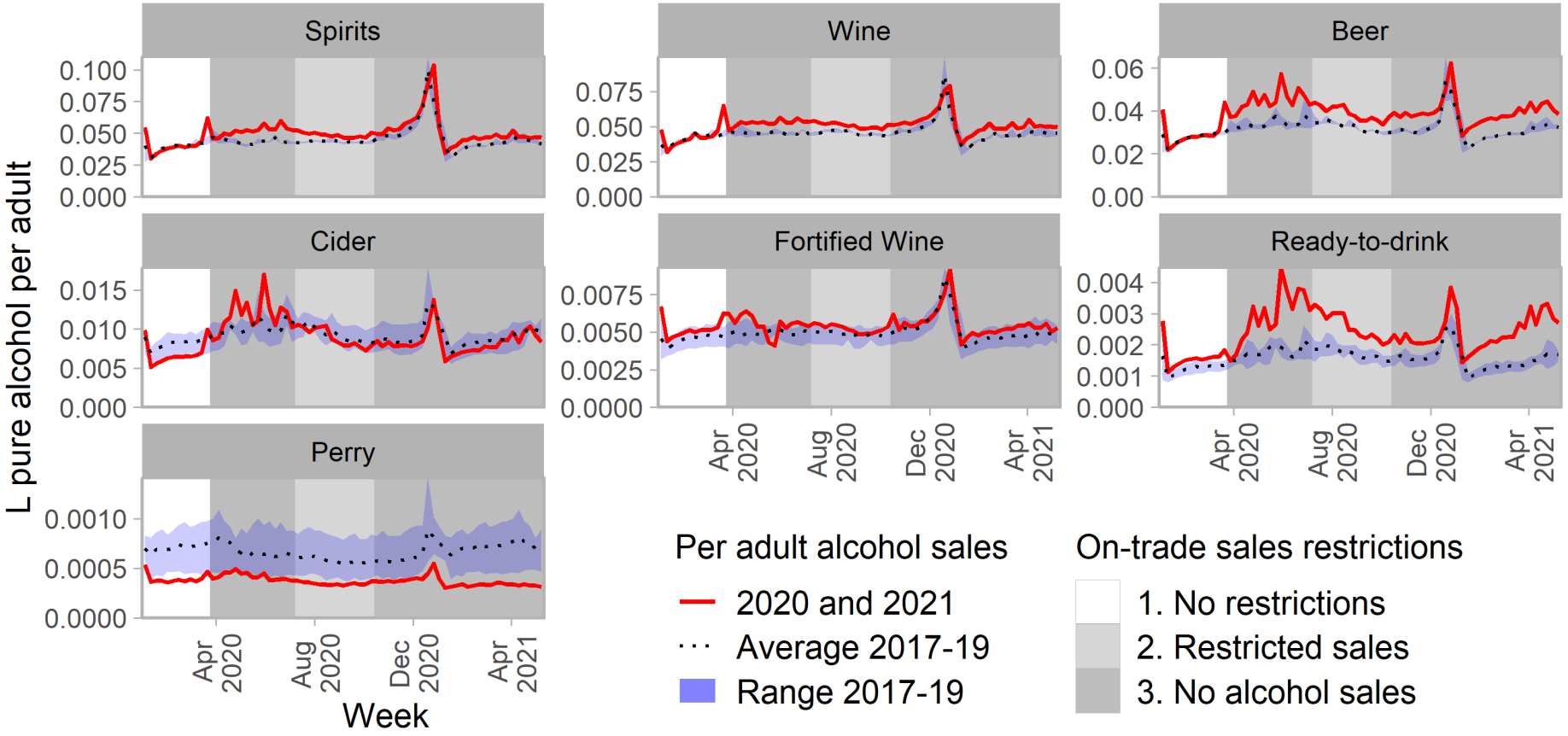
See next page for notes.

Notes:

1. Shaded panels indicate the level of on-trade sales restrictions that most of the Scottish population was subject to that week.

2. Different scales are used for the vertical axis due to marked differences in sales volumes.

Figure 6. Weekly off-trade alcohol sales (litres of pure alcohol per adult), by drink category; Scotland, 1 January 2020 to 8 May 2021 and 2017–2019 average.



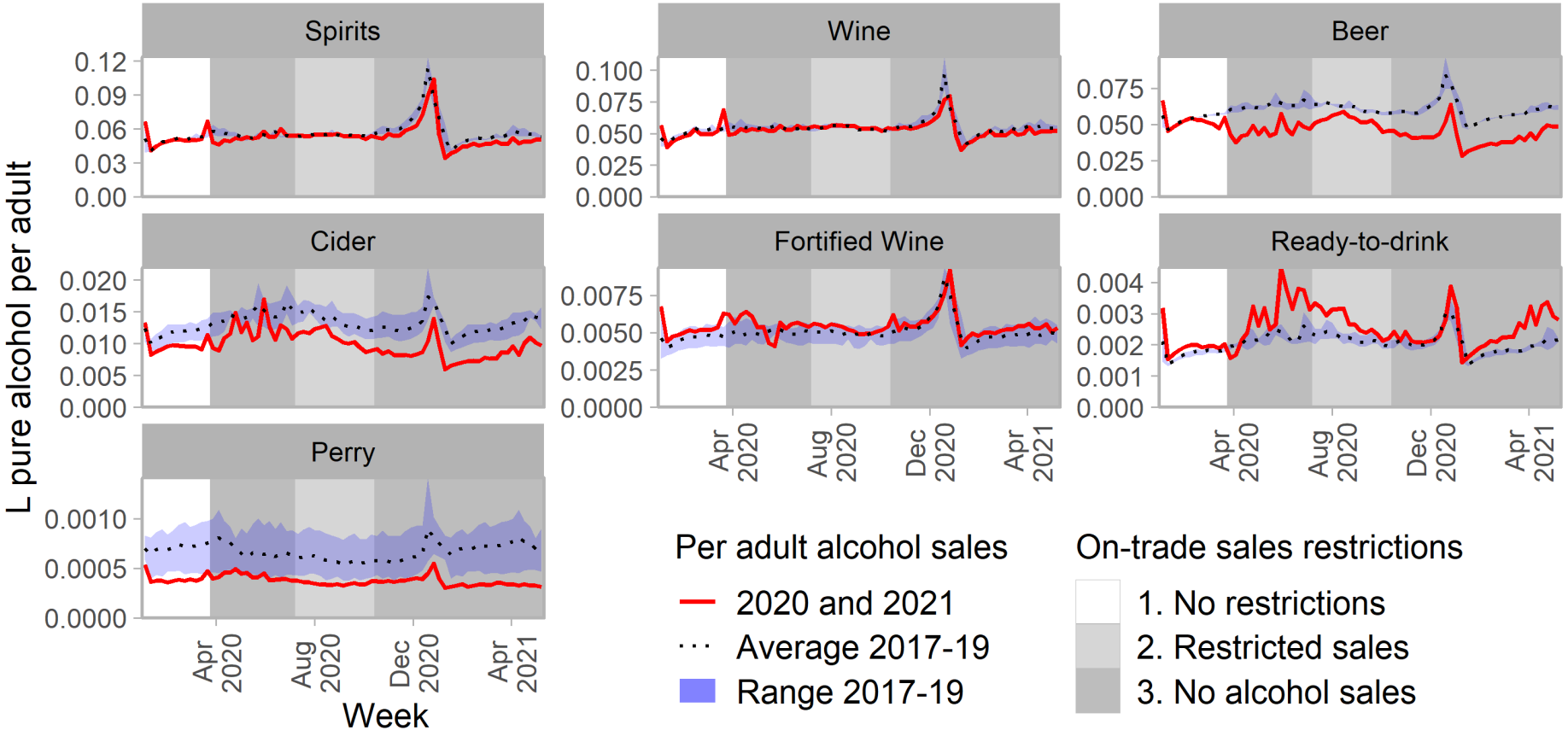
See next page for notes.

Notes:

1. Shaded panels indicate the level of on-trade sales restrictions that most of the Scottish population was subject to that week.

2. Different scales are used for the vertical axis due to marked differences in sales volumes.

Figure 7. Weekly alcohol sales (litres of pure alcohol per adult; on- and off-trade combined) by drink category; Scotland, 1 January 2020 to 8 May 2021 and 2017–2019 average.



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1. Shaded panels indicate the level of on-trade sales restrictions that most of the Scottish population was subject to that week.

2. Different scales are used for the vertical axis due to marked differences in sales volumes.

Alcohol-related hospital stays

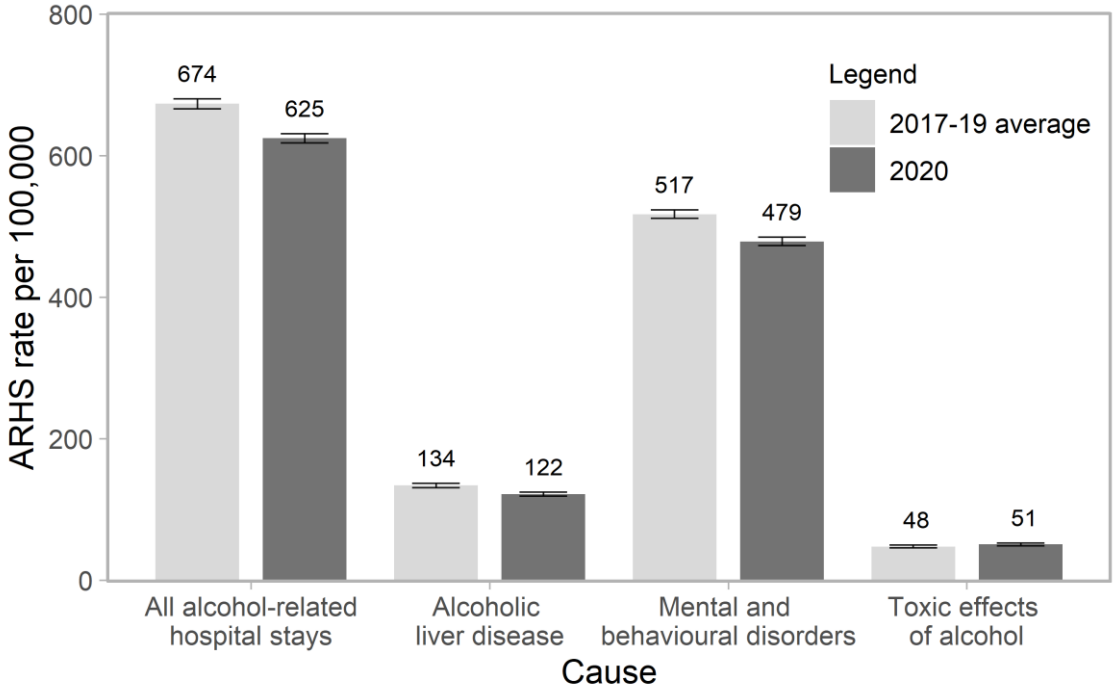
Annual data: 2020 and comparison to 2017–2019

In 2020, there were 33,637 general acute hospital stays in Scotland with an alcohol-related diagnosis. This was 6% lower than the 2017–19 annual average of 35,946, and alcohol-related hospital stays had not been trending downwards between 2017 and 2019. A diagnosis of mental and behavioural disorders due to alcohol use was noted for 76% of these stays (77% in 2017–19).

The age-sex standardised rate of alcohol-related hospital stays in 2020 was 625 per 100,000 population (Figure 8), 7.3% (95% confidence interval (CI): 5.9% to 8.6%) lower than the 2017–19 average (Figure 12). Hospital stay rates for alcoholic liver disease were 9.2% (6.1% to 12.2%) lower and mental and behavioural disorders due to alcohol use were 7.5% (5.9% to 9.0%) lower in 2020 than in 2017–19. Hospital stay rates for the toxic effects of alcohol were 6.7% (1.1% to 12.5%) higher (Figure 12). All of these changes were statistically significant (Figure 12).

In general, the groups that had the highest alcohol-related hospital stay rates in 2017–19 saw the biggest decreases in 2020. Alcohol-related hospital stay rates decreased notably for males in 2020, by 10.0% (8.3% to 11.6%) compared to the 2017–19 average, but did not change for females (-0.4% (-3.1% to 2.3%)) (Figures 9 and 12). Alcohol-related hospital stay rates decreased for all but the youngest age group (Figure 10) but not all changes were statistically significant (Figure 12). The greatest decreases were seen in the oldest age groups: rates in the 55 to 64 year age group were 8.6% (5.7% to 11.4%) lower in 2020 than in 2017 to 2019 and for the 65 year and older group were 12.5% (9.7% to 15.3%) lower (Figures 10 and 12). By deprivation, reductions were seen in all but the least deprived quintile, with the most notable being in quintiles 1 (most deprived) (-9.0% (-6.8% to -11.1%)), 2 (-7.9% (-5.1% to -10.7%)) and 4 (-8.8% (-4.5% to -12.9%)) (Figures 11 and 12).

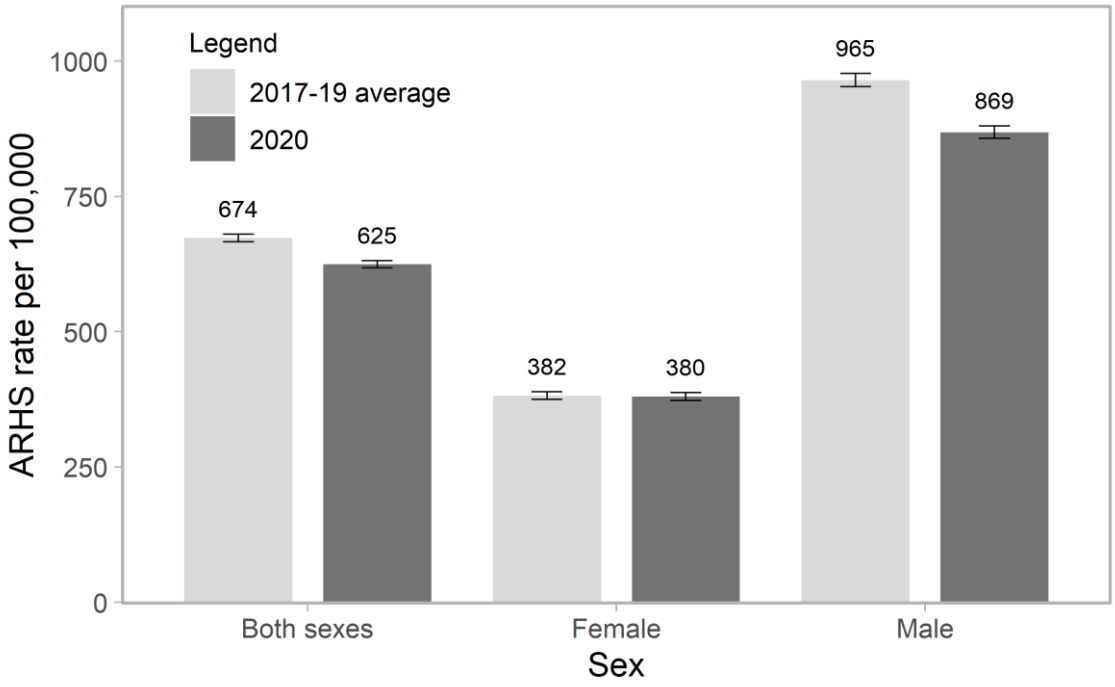
Figure 8. Alcohol-related hospital stay (ARHS) rates in Scotland by cause; 2020 and 2017–19 combined.



Notes:

1. European age-sex-standardised hospital stay rates per 100,000 people.
2. 95% confidence intervals are shown at the top of each bar: these represent the degree of uncertainty around the point estimate.

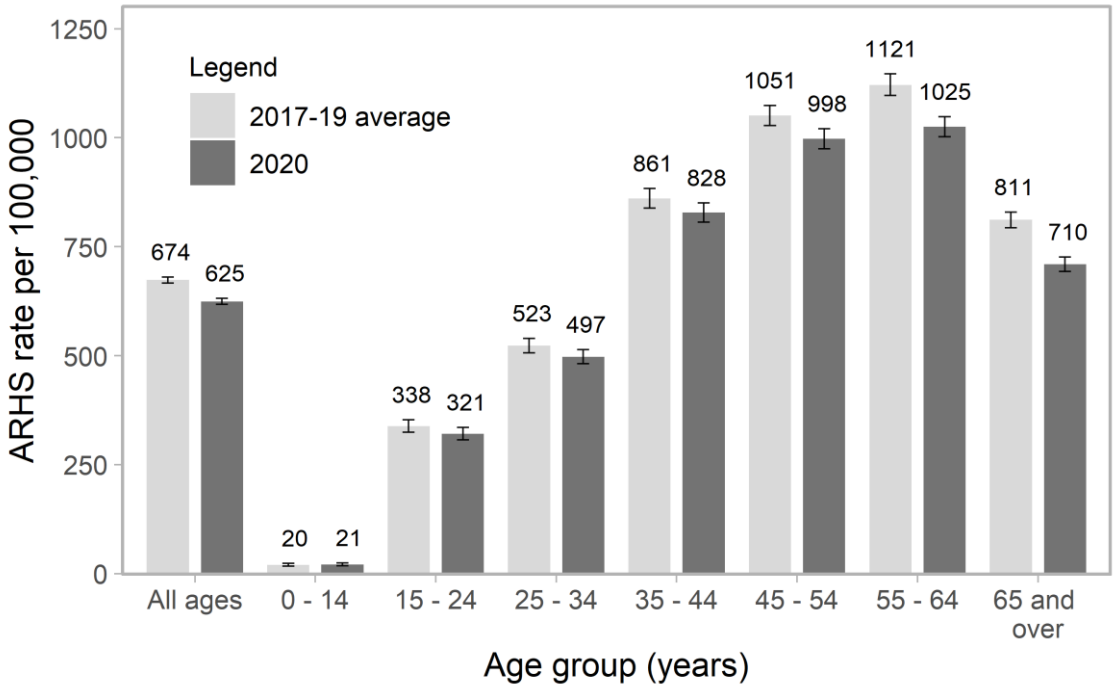
Figure 9. Alcohol-related hospital stay (ARHS) rates in Scotland by sex; 2020 and 2017–19 combined.



Notes:

1. European age-sex-standardised hospital stay rates per 100,000 people.
2. 95% confidence intervals are shown at the top of each bar: these represent the degree of uncertainty around the point estimate.

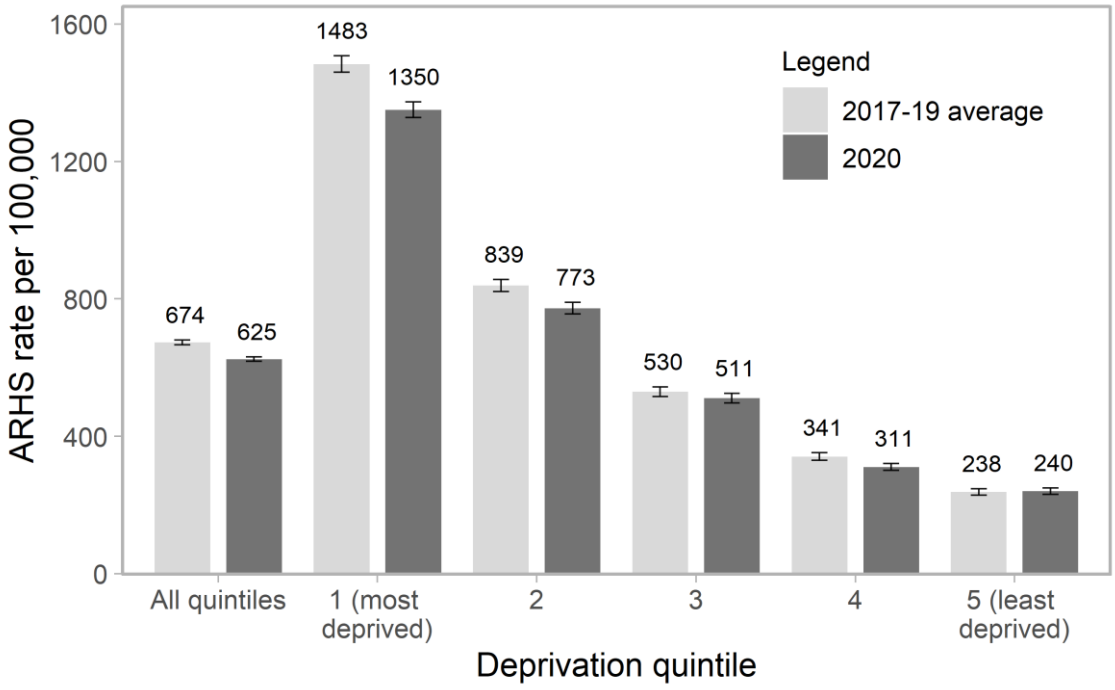
Figure 10. Alcohol-related hospital stay (ARHS) rates in Scotland by age group; 2020 and 2017–19 combined.



Notes:

1. European age-sex-standardised hospital stay rates per 100,000 people.
2. 95% confidence intervals are shown at the top of each bar: these represent the degree of uncertainty around the point estimate.

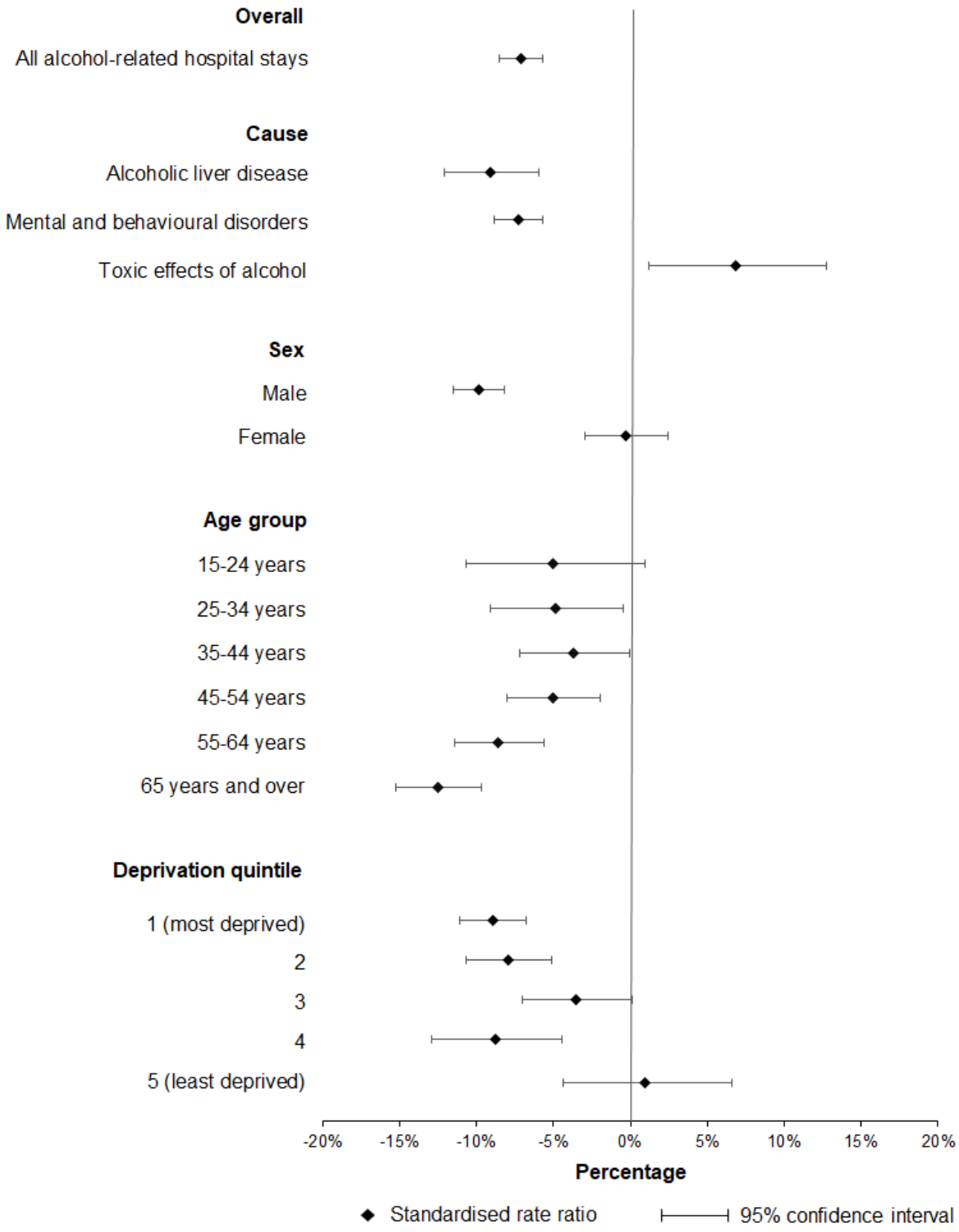
Figure 11. Alcohol-related hospital stay (ARHS) rates in Scotland by SIMD deprivation quintile; 2020 and 2017–19 combined.



Notes:

1. European age-sex-standardised hospital stay rates per 100,000 people.
2. 95% confidence intervals are shown at the top of each bar: these represent the degree of uncertainty around the point estimate.

Figure 12. Change (standardised rate ratio as a percentage) in alcohol-related hospital stay rates, 2020 compared to the 2017–19 average, Scotland.



See next page for notes.

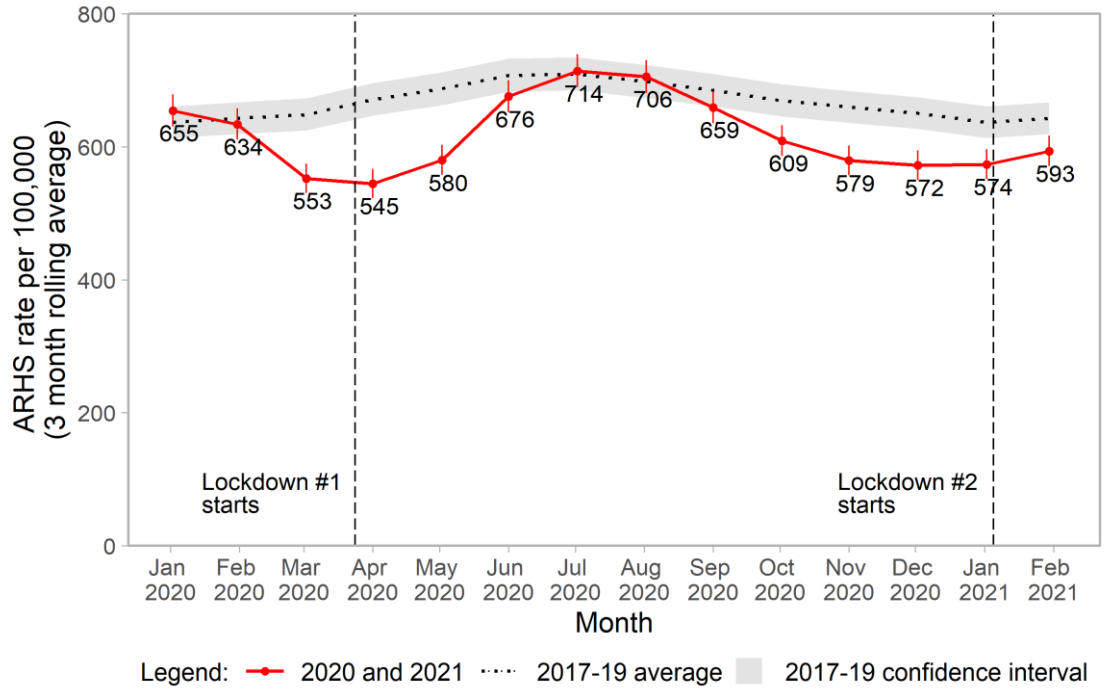
Notes:

1. The SRR, or percentage change in standardised rates, can be deemed statistically significant where the 95% confidence interval does not cross zero.

Monthly trend

At the start of the pandemic, hospital stay rates for alcohol-related conditions dropped substantially compared with the 2017–19 average: from March to May 2020 rates were at least 15% lower than the average for 2017–19 (Figure 13). Between June and September 2020 alcohol-related hospital stay rates returned to a similar level for the average for the time of year, before decreasing from October 2020 onwards.

Figure 13. Monthly trend in alcohol-related hospital stays (ARHS) in Scotland; January 2020 to February 2021 and 2017–2019 average.



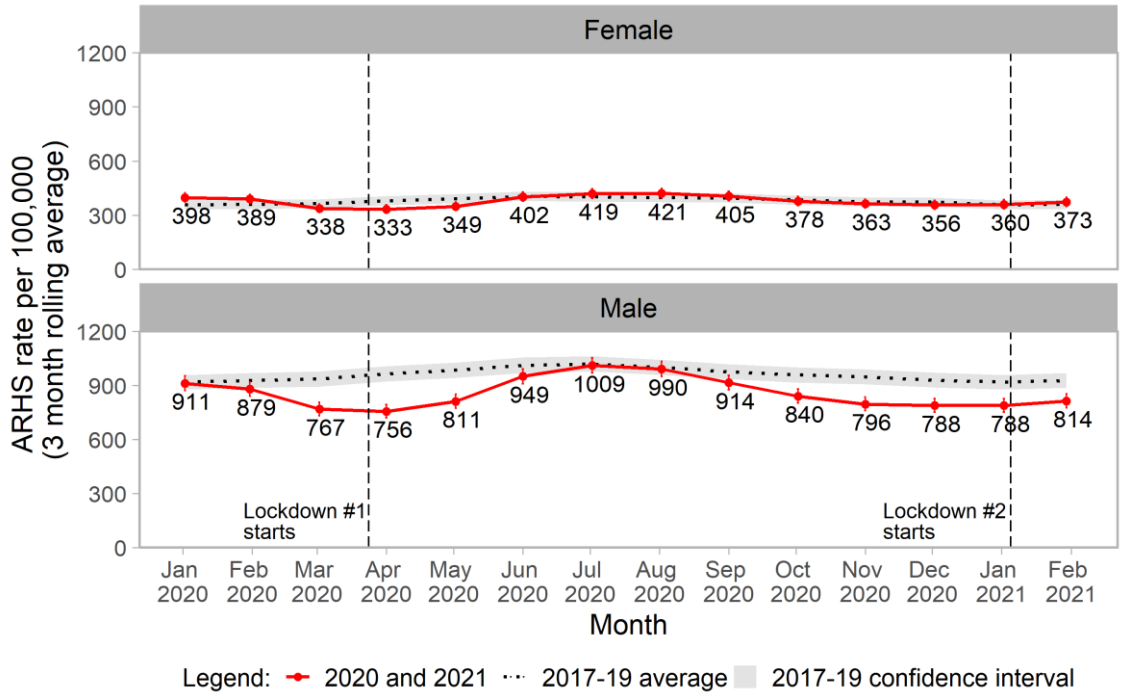
Notes:

1. European age-sex standardised hospital stay rates per 100,000 people, calculated from the rolling averages.

2. 95% confidence intervals are shown in red for 2020, and by the grey band for the 2017–19 average.

From March 2020 alcohol-related hospital stay rates for males followed a similar pattern to that already described. Rates fell substantially during the first period of lockdown before rising over the summer months and then falling below average from October 2020 onwards. However, alcohol-related hospital stay rates for females were much more similar to the average for 2017–19; the exception was in April and May 2020 when rates fell below the average for the same period in 2017–19 (Figure 14).

Figure 14. Monthly trend in alcohol-related hospital stays (ARHS) in Scotland, by sex; January 2020 to February 2021 and 2017–2019 average.



Notes:

1. European age-sex standardised hospital stay rates per 100,000 people, calculated from the rolling averages.

2. 95% confidence intervals are shown in red for 2020, and by the grey band for the 2017–19 average.

Alcohol-specific deaths

Annual data: 2020 and comparison to 2017–2019

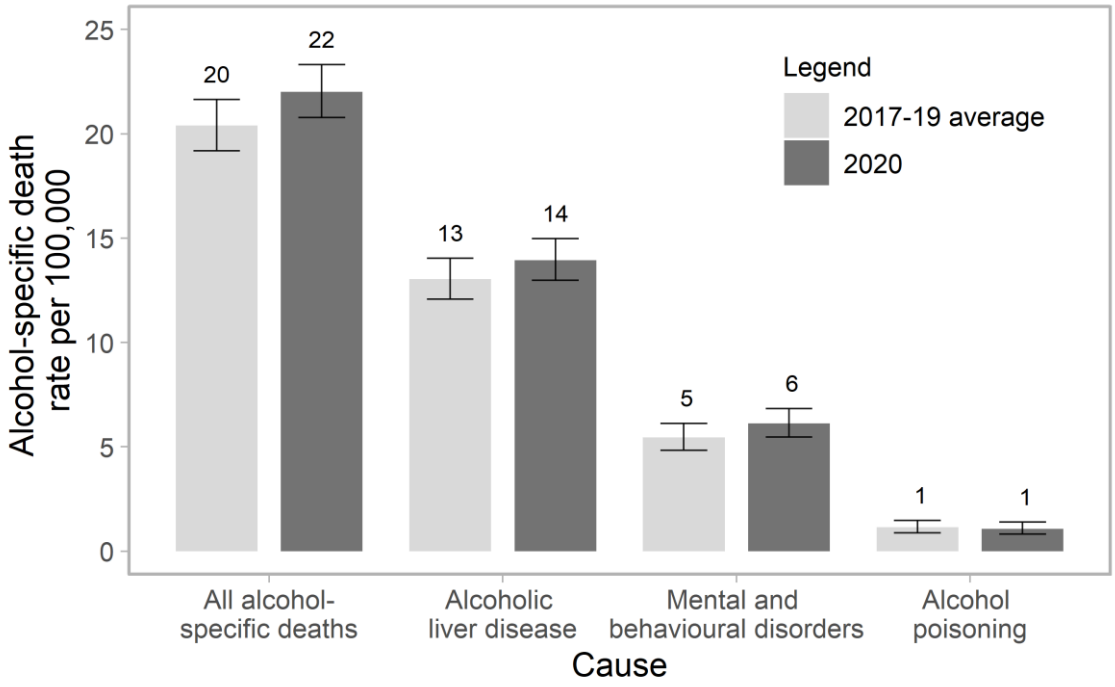
In 2020, 1,190 deaths that were wholly attributable to alcohol (alcohol-specific deaths) were registered in Scotland.[9] This was 9% higher than the 2017–19 annual average of 1,093 alcohol-specific deaths.

The age-sex standardised rate of alcohol-specific deaths in 2020 was 22.0[*] deaths per 100,000 population (Figure 15), 8.0% (-0.6% to 17.3%) higher than the average of 20.4 deaths per 100,000 observed from 2017 to 2019 (Figure 19) and higher than any individual annual rate in the study period (21.0 deaths per 100,000 in 2017; 21.2 in 2018; 18.9 in 2019).

Most alcohol-specific deaths in 2020 and 2017–19 were due to alcoholic liver disease (64% in both periods) and mental and behavioural disorders due to alcohol use (27% in 2020, 26% in 2017–19). Rates of death from these causes were 7.0% (-3.5% to 18.7%) and 12.1% (-4.4% to 31.6%) higher in 2020 than the 2017–19 average, respectively (Figure 19). Alcohol poisoning death rates were 5.9% (-34.2% to 34.6%) lower in 2020 than the 2017–19 average. (Figure 19). None of these changes were found to be statistically significant (Figure 19).

[*] In the NRS 'Alcohol-specific deaths 2020' publication, the age-standardised alcohol-specific death rate for 2020 is 21.5 per 100,000 population. Our calculation gives 22.0 per 100,000 because it is standardised for sex as well as age.

Figure 15. Alcohol-specific death rates in Scotland by cause; 2020 and 2017–19 combined.

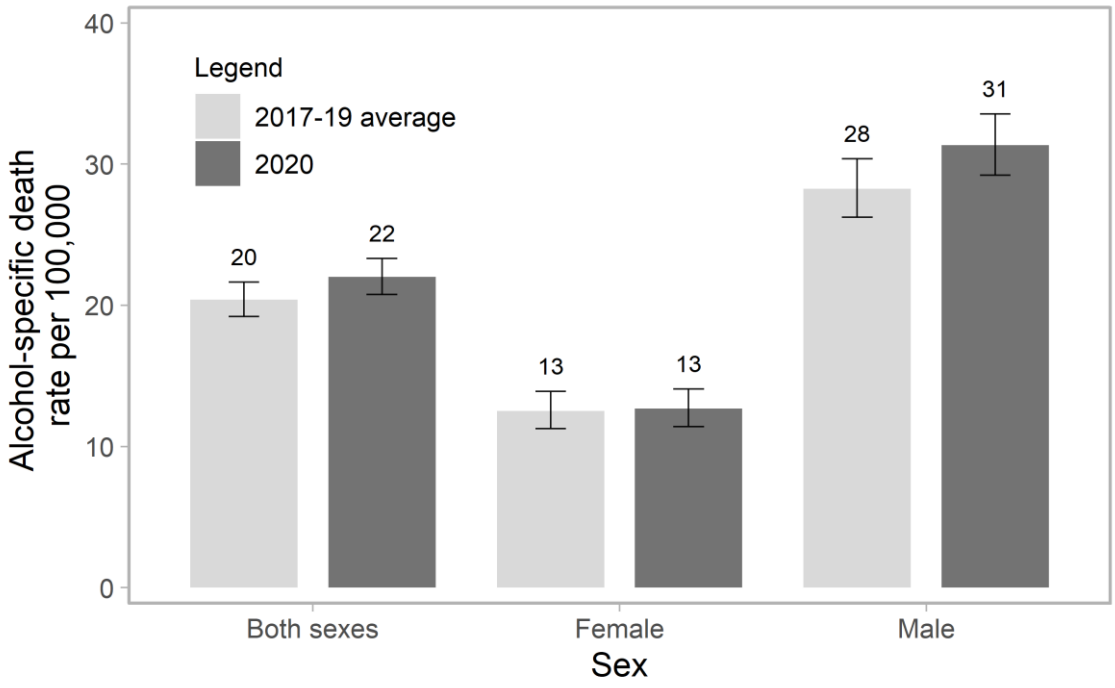


Notes:

1. European age-sex standardised mortality rates per 100,000 people.
2. 95% confidence intervals are shown at the top of each bar: these represent the degree of uncertainty around the point estimate.

Alcohol-specific death rates for males were 2.3 times higher than those for females in 2020: this was a bigger difference than the 2017–19 average (2.1 times). The gap widened because rates for females in 2020 barely changed compared to 2017–19, whereas rates for males increased (Figure 16). Rates for men were 31.3 per 100,000 in 2020 compared to 28.3 per 100,000 on average in 2017–19 (Figure 16). This meant rates for men were 10.9% (0.4% to 22.6%) higher in 2020 than in 2017–19.

Figure 16. Alcohol-specific death rates in Scotland by sex; 2020 and 2017–19 combined.



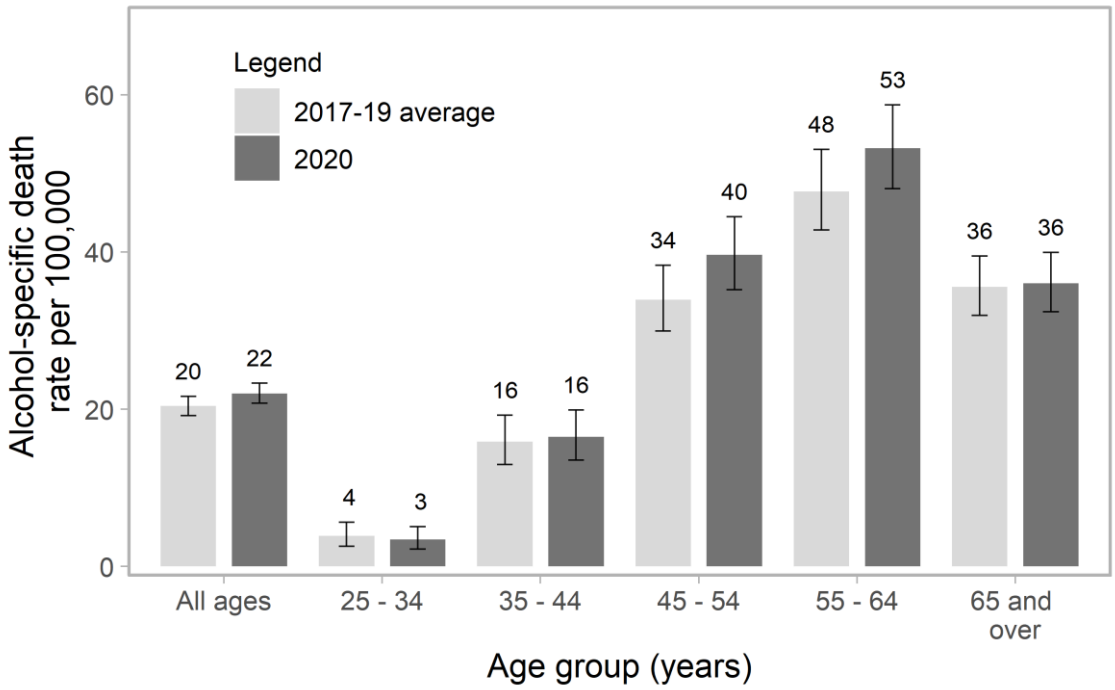
Notes:

1. European age-sex-standardised mortality rates per 100,000 people.
2. 95% confidence intervals are shown at the top of each bar: these represent the degree of uncertainty around the point estimate.

Alcohol-specific death rates in 2020 were higher than in 2017–19 for those in the 45 to 54 and 55 to 64 year age groups – groups in which 2017–19 rates were already substantially higher than the population-wide average (Figures 17 and 19). Deaths in those aged 65 years and over, who also typically have relatively high rates of alcohol-specific death, showed no change between 2017–19 and 2020. None of these changes were found to be statistically significant (Figure 19).

Rates calculated by age group and sex show that the increase in the 45 to 54 and 55 to 64 year age groups is driven by deaths in males (data not shown).

Figure 17. Alcohol-specific death rates in Scotland by age group; 2020 and 2017–19 combined.

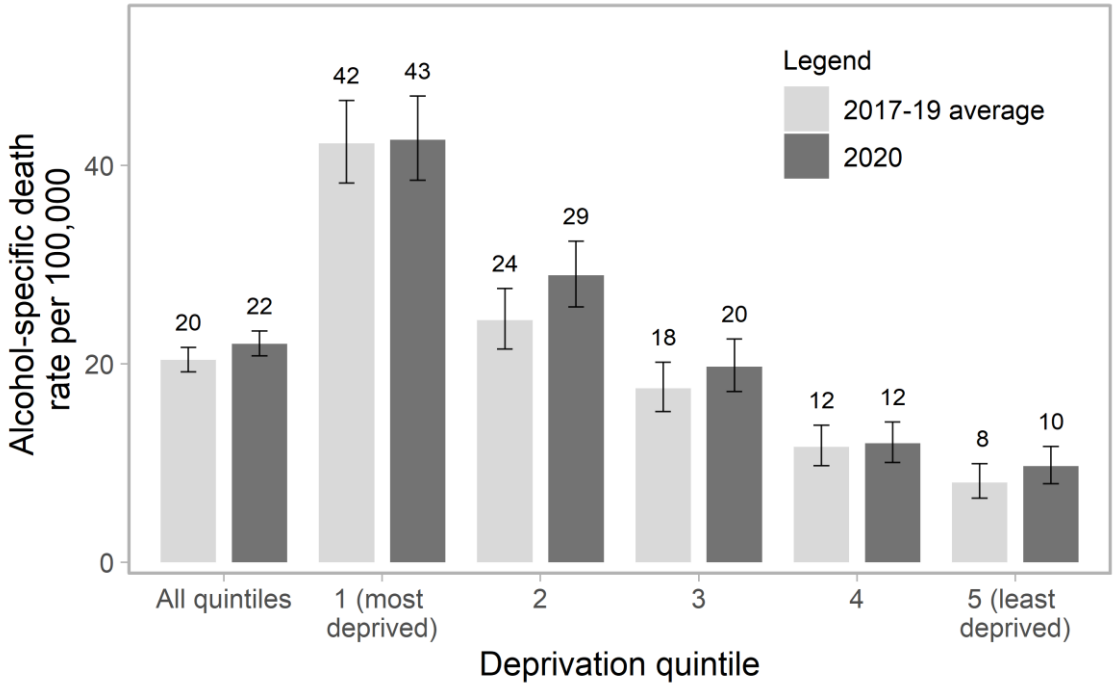


Notes:

1. Deaths in under 25s not presented separately due to small numbers; deaths in this age range are included in the 'All ages' category.
2. European age-sex standardised mortality rates per 100,000 people.
3. 95% confidence intervals are shown at the top of each bar: these represent the degree of uncertainty around the point estimate.

The socioeconomic gradient in alcohol-specific deaths was clear in 2020, as in 2017-19 (Figure 18). The alcohol-specific death rate for people living in the 20% most deprived areas of Scotland (quintile 1) in 2020 was 42.6 per 100,000; although each quintile represented 20% of the Scottish population, 34% of all alcohol-specific deaths occurred among those living in quintile 1. The gap between rates in the most and least deprived areas in 2020 was slightly smaller than in 2017–19, in both absolute (32.9 deaths per 100,000 difference in 2020, compared with 34.0 in 2017–19) and relative terms (4.4-fold difference, compared with a 5.2-fold difference in 2017–19). Between 2017–19 and 2020, increases were seen in quintile 2 (18.6% (0.3% to 40.2%)), quintile 3 (12.4% (-7.3% to 36.2%)) and quintile 5 (20.1% (-9.6% to 59.5%)) but, as indicated by the confidence intervals, not all of these increases were found to be statistically significant (Figure 19).

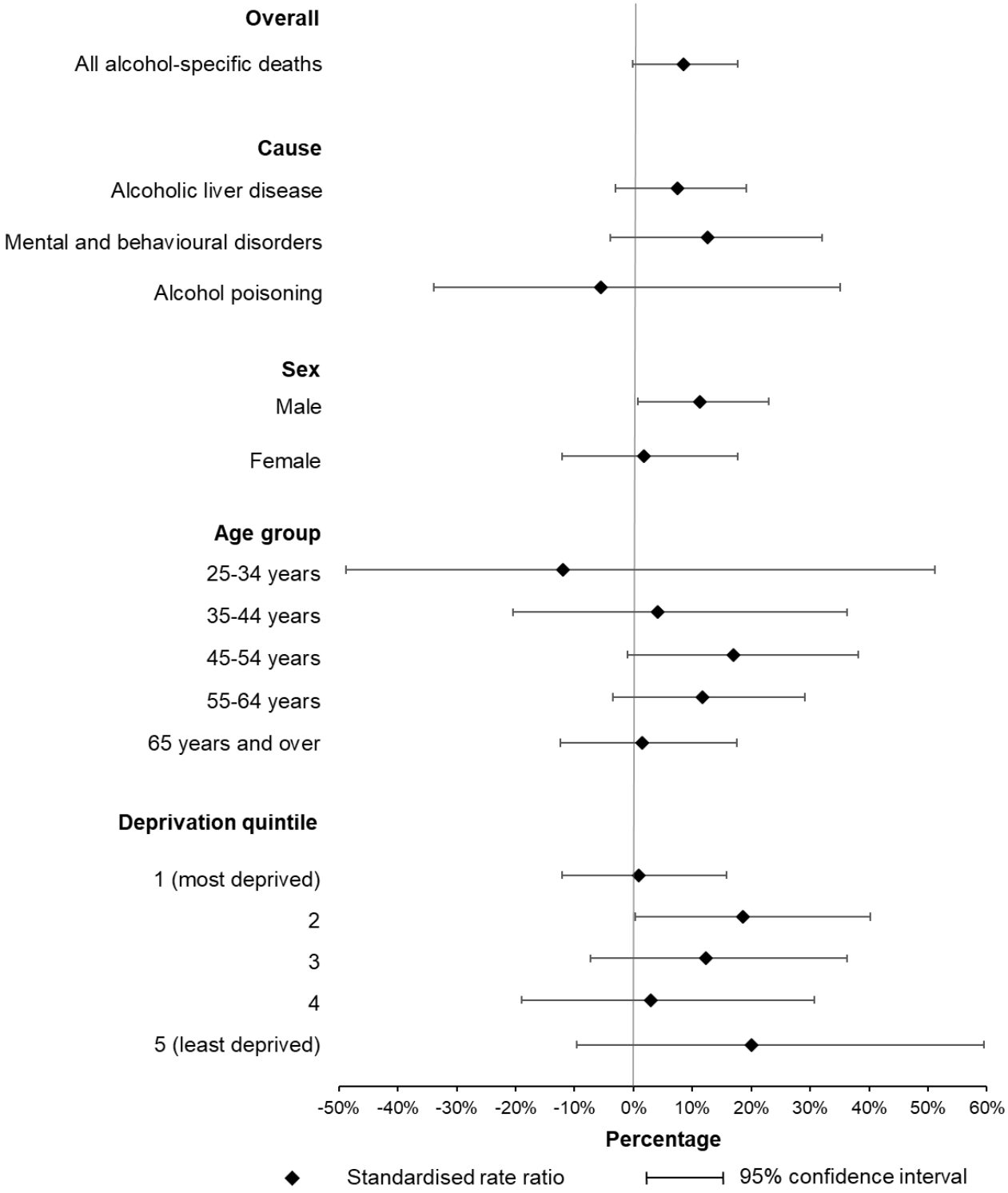
Figure 18. Alcohol-specific death rates in Scotland by SIMD deprivation quintile; 2020 and 2017–19 combined.



Notes:

1. European age-sex standardised mortality rates per 100,000 people.
2. 95% confidence intervals are shown at the top of each bar: these show the degree of uncertainty around the point estimate.

Figure 19. Change (standardised rate ratio as a percentage) in alcohol-specific death rates, 2020 compared to the 2017–19 average, Scotland.



See next page for notes.

Notes:

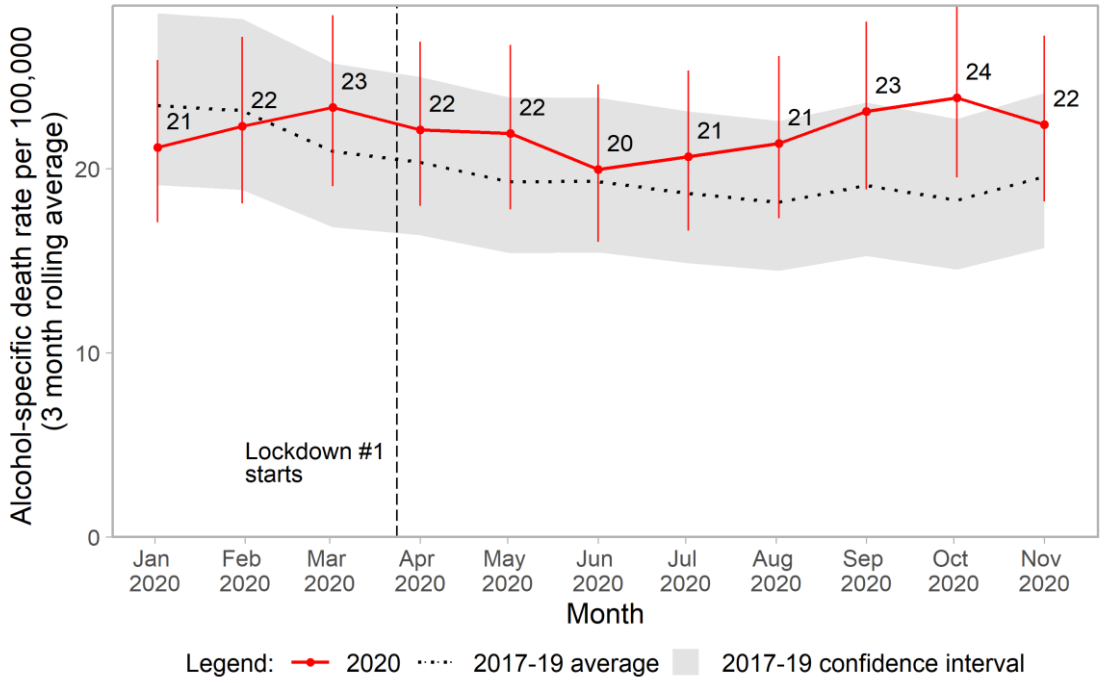
1. Deaths in under 25s not presented separately due to small numbers; deaths in this age range are included in the ‘All alcohol-specific deaths’ category.

2. The SRR, or percentage change in standardised rates, can be deemed statistically significant where the 95% confidence interval does not cross zero.

Monthly trend

At the start of 2020 alcohol-specific death rates were lower than the average for the same months of 2017–19 (Figure 20). Monthly rates rose above average from March, staying higher than average throughout the time period and rising particularly high from August onwards. Rates peaked in October, when they were approximately 30% higher than the 2017–19 average for October.

Figure 20. Monthly trend in alcohol-specific death rates in Scotland; January to November 2020 and 2017–2019 average.



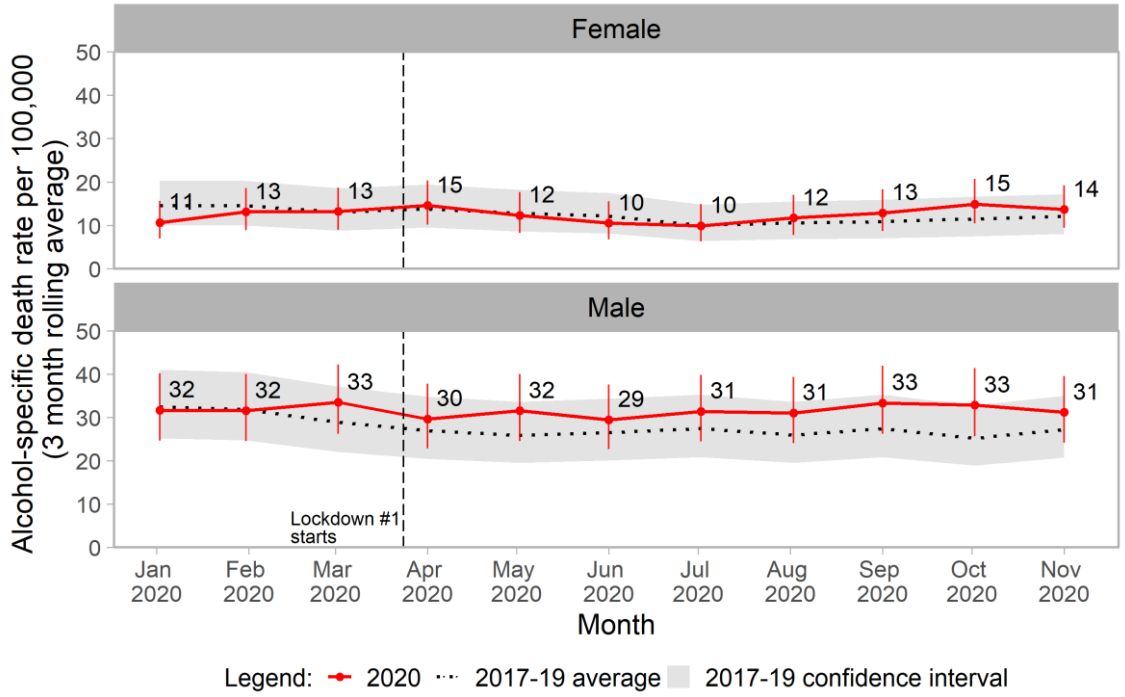
Notes:

1. European age-sex standardised mortality rates per 100,000 people, calculated from the rolling averages.

2. 95% confidence intervals are shown in red for 2020, and by the grey band for the 2017–19 average.

Alcohol-specific death rates for females during 2020 fluctuated closely around the 2017–19 average, and within the likely range of values calculated for the average (Figure 21). Alcohol-specific death rates for males remained higher than the 2017–19 average from March to November, peaking in September and October.

Figure 21. Monthly trend in alcohol-specific death rates in Scotland, by sex; January to November 2020 and 2017–2019 average.



Notes:

1. European age-sex standardised mortality rates per 100,000 people, calculated from the rolling averages.

2. 95% confidence intervals are shown in red for 2020, and by the grey band for the 2017–19 average.

Discussion

Main findings

In this report we have presented an overview of trends in alcohol sales and harms in Scotland since the start of the COVID-19 pandemic in 2020. We used data on retail alcohol sales, alcohol-related hospital stays and alcohol-specific deaths.

We found that on-trade alcohol sales in 2020 and 2021 were substantially lower than the average for 2017–19, while off-trade sales increased throughout the pandemic. Consequently, combined sales of alcohol were 9% lower in 2020, and 16% lower in 2021 (January to May) than the average for 2017–19. However, population-level alcohol consumption remained above the CMO low-risk weekly drinking guideline of 14 units per adult[1] in almost every week since the start of the pandemic.

Hospital stays with a diagnosis wholly attributable to alcohol fell markedly. Rates were 7.3% (95% CI: 5.9% to 8.6%) lower in 2020 than the average for 2017 and 2019. Hospital stay rates did not fall across all alcohol-related conditions; while rates for alcoholic liver disease and mental and behavioural disorders were lower in 2020 than the average for 2017–19, rates for toxic effects of alcohol were found to have increased. Rates of alcohol-related hospital stays decreased most for males, those aged over 45 years, and those living in deprivation quintiles 1 (most deprived), 2 and 4. In general, these groups had the highest rates of alcohol-related stays in 2017–19. Our month-by-month analysis showed that alcohol-related hospital stays fell by the largest amount in the periods when COVID-19 restrictions were most stringent.

The death rate for causes that were wholly attributable to alcohol was higher (8.0% (-0.6% to 17.3%)) in 2020 compared to the average for 2017–19; this increase was driven particularly by males and those aged 45 to 64 years. These groups already had among the highest alcohol-specific death rates before the pandemic, and had reduced alcohol-related hospital stay rates during the pandemic.

Strengths

The work presented in this briefing has a range of strengths. We used alcohol sales data to estimate population-level alcohol consumption trends; the World Health Organization (WHO) considers this the most objective and reliable approach for this purpose.[7] We have investigated the validity and reliability of the available sales data in previous studies and found them to be a robust source of data for estimating per-adult consumption of alcohol. [24,25] The health harms data we used has complete population coverage for Scotland and diagnosis is coded according to WHO standards using International Classification of Disease Tenth Revision (ICD-10) codes. Standard definitions of alcohol-related hospital stays and alcohol-specific deaths were used, ensuring comparability with other work. We calculated standardised rates so that they could be compared between different population subgroups, and used recognised methods for rate calculation and comparisons. We have commented on statistical significance based on the confidence intervals around the standardised rate ratios but have not opted to make this a particular focus of this work. There are a number of instances where changes are not statistically significant but may nonetheless be of clinical and public health importance.

Limitations

The limitations of the work must also be acknowledged. Data pertaining to some alcohol sales, such as some takeaway alcohol sold from on-trade premises and sales from some online specialists* such as majestic.com, could not be obtained. We are currently unable to estimate the magnitude of these gaps. The definitions of alcohol-related hospital stays and alcohol-specific deaths used did not include conditions that could be partially attributed to alcohol, and therefore will underestimate the true scale of alcohol-attributable health harms in Scotland during the pandemic. Finally, while our analyses compared alcohol sales and related health

* It should be noted that online sales from the major supermarkets are included in the alcohol retail sales data used in this work.

harms during the pandemic with those in 2017–19, this will not have fully accounted for underlying trends: further work will be required to more robustly isolate the impact of the pandemic on these outcomes.

Interpretation

We sought to compare our analysis to other data sources that can be used to monitor population level consumption and to contextualise against other sources of information.

To contextualise the reduction in Scotland, the alcohol retail data we analysed in this report showed that per-adult alcohol sales in England & Wales fell by 4% in 2020 (data not shown), compared with average per-adult sales in 2017–19. This was less than the 9% reduction we have shown in Scotland in 2020. Further work needs to be done to understand the reasons for the difference.

Minimum Unit Pricing (MUP) was introduced in Scotland in May 2018 (part-way through the comparison period). We have previously shown that MUP was associated with a 3.5% reduction in off-trade alcohol sales in its first year of implementation.[26] Our previous study looking at alcohol sales during the first lockdown period (March to July 2020) showed that the closure of on-trade premises combined with an increase in off-trade sales resulted in an overall reduction of 6% in per-adult sales of pure alcohol in both Scotland and England & Wales.[2] The analysis presented here suggests that this trend has continued but with a greater reduction being observed in Scotland than in England & Wales over the longer term. It is important to note that the modelling in the previous studies adjusted for underlying trends in Scotland and in a geographical control (England & Wales), whereas in the present study we have made simple descriptive comparisons between years. Further work is needed to fully examine the combined effects of MUP and the restrictions associated with the COVID-19 pandemic on population-level alcohol consumption in Scotland compared to other areas.

We have previously shown that MUP impacted different drink categories in different ways. In the first year after implementation we observed reductions in per-adult sales of spirits, cider and perry while there were increases in sales of fortified wine and

ready-to-drink beverages.[27] It is likely that some of the drink-category-specific changes described here are down to changes, at least in part, resulting from the impact of MUP. For example, we have shown a reduction in per-adult sales of perry. Given that perry sales were heavily impacted by MUP[27] and were shown to be reduced in the period January to March 2020 (compared to the 2017–19 average), it is likely that the reduction throughout 2020 and beyond is largely the sustained impact of MUP, rather than the impact of COVID-19 restrictions. Similarly, sales of fortified wine were increasing prior to the implementation of MUP and increased more rapidly in the first year following implementation[27]; the sustained increase in fortified wine sales throughout 2020 and 2021, compared to the 2017–2019 average, is likely to be influenced by the existing upward trend and the continued impact of MUP.

Her Majesty's Revenue and Customs (HMRC) alcohol duty receipts[27] show that per-adult pure alcohol volume in the UK* in 2020 was just 1% lower than the 2017–19 average (comprised of 17% and 10% reductions for cider and beer, respectively, and 5% and 10% increases for wine and spirits, respectively)†. The difference between this reduction and our estimate of a 9% reduction could in part be due to alcohol consumption in Scotland falling by more than in the rest of the UK during the pandemic, as also suggested by the retail sales data. In addition, the absence of some online alcohol sales from the retail sales data (if those sales have not been processed or delivered from a local store) could mean that the decrease in

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* HMRC duty data is only available for the UK and not separately for the constituent nations.

† We converted natural product volumes for cider and wine into pure alcohol volumes using data for the average strength of off-trade wine (11.9%) and cider (4.9%) consumed in Britain (source: Public Health England (2020) 'Review of typical ABV levels in beer, cider and wine purchased for the "in home" market'. Available from: **www.gov.uk/government/publications/abv-levels-in-beer-cider-and-wine-for-the-in-home-market**). To calculate the pure alcohol volume in the duty-paid natural volume of 'made-wine' (wine produced by fermentation of foodstuffs other than fresh grapes) we used an ABV of 5.5%: taxed made-wine ranges in strength from 1.2% to over 15%, but 86% of the natural volume recorded by HMRC in 2020 was in the 1.2 to 5.5% range.

overall sales indicated by our analysis is an overestimate. While online sales from stores other than supermarkets are estimated to represent a relatively small proportion of total sales, there is evidence that there has been growth in this area during the pandemic.[28]

The weekly trends presented here show that overall sales-based alcohol consumption fell furthest from the 2017–19 average when pubs, restaurants, and other on-trade premises were closed, and recovered somewhat when they were opened. Sales-based consumption in 2021 (January to May) was 16% lower than the 2017–19 average: it is likely that this difference was bigger than that observed in 2020 (9%) because on-trade premises were closed for a greater proportion of the months included in 2021 than in 2020.

Our analyses suggest reduced total alcohol consumption for the population of Scotland as a whole, but these high-level findings may disguise a variety of different individual and sub-group responses to the pandemic. A range of surveys from Scotland and the rest of the UK (summarised by Stevely et al and Public Health England[29,30]) showed that similar proportions of people reported drinking more during the pandemic as reported drinking less. Survey data also showed that those that reported drinking more during the pandemic tended to have been heavy drinkers before the pandemic. The UCL Alcohol Toolkit data analysed for the Public Health England report[29] showed a marked increase in people in England drinking at increasing-risk and higher-risk levels around the start of the pandemic.

Alcohol-related hospital stays were around 7% lower in Scotland in 2020 than the 2017–19 average. In England, rates of emergency admissions with an alcohol-specific diagnosis were 3% lower in 2020 than in 2019.[28] These reductions should be interpreted in the context of substantially reduced admissions overall: there was a 30% reduction in all admissions to general acute hospitals in Scotland between 2019/20 and 2020/21.[31] From the start of the pandemic, there was a range of reasons why people may not have accessed clinical services, including temporary suspension of some services, and individuals choosing to avoid clinical settings unless absolutely necessary, primarily to either ease pressure on the NHS or to avoid settings where the risk of becoming infected with COVID-19 was increased. Our month-by-month analysis showed that the biggest drops in alcohol-related

hospital stays occurred during the most stringent COVID-19 restrictions, which in turn occurred when COVID-19 infections were at their highest and hospitals were under most pressure. We suggest, therefore, that reduced access to treatment services was a factor in those reduced rates of alcohol-related hospital stay during periods of lockdown.

The increase in alcohol-specific deaths during the pandemic suggests that health harms due to alcohol have not reduced. Alcohol-specific death rates increased overall, an increase that was driven by deaths among males and those aged 45 to 64 years old. Self-reported consumption was high for males, and particularly older males, before the pandemic,[32] as were rates of alcohol-specific death in this group.

Taken together, the evidence presented here and in other studies suggests an uneven effect of the pandemic on alcohol consumption and related health harms. Of concern is the potential that groups with high levels of alcohol consumption before the pandemic may have increased their alcohol consumption further, not had access to or presented at hospital for treatment for alcohol-related conditions, and potentially experienced higher rates of mortality as a consequence. This work sought to present insights into the impact of the COVID-19 pandemic and associated restrictions on trends in alcohol sales and alcohol-attributable health harms. Further work is needed to fully explore the mechanisms that underlie the effects outlined here.

Conclusion

Our analysis suggests that population-level alcohol consumption in Scotland was lower during the COVID-19 pandemic than in 2017–19. The pandemic and related restrictions have been the key drivers behind this decrease. While overall rates of hospitalisation from causes wholly attributable to alcohol also decreased, reduced access to clinical settings was most likely a factor. There are signs that deaths from causes wholly attributable to alcohol increased during the pandemic for some population groups. This finding gives further weight to the evidence from elsewhere that drinking at hazardous and harmful levels may have increased for some groups, despite consumption reducing at the population level. To echo the conclusion of Public Health England's study,[28] tackling alcohol consumption and harms, particularly among high-risk groups, should be a critical objective of any COVID-19 recovery plans.

Appendix 1: Quantifying the level of COVID-19 restrictions to on-trade alcohol sales

We created a bespoke indicator of the COVID-19 restrictions to on-trade sales for Scotland. A number of key information repositories were used to identify primary sources about the restrictions affecting on-trade alcohol sales in Scotland between March 2020 and May 2021:

- Scottish Parliament Information Centre (SPICe)
  Timeline of Coronavirus (COVID-19) in Scotland
- University of Oxford Blavatnik School of Government
  COVID-19 Government Response Tracker (OxCGRT)
- Wikipedia COVID-19 timelines for **Scotland** and UK
  (**Jan to June 2020**, **July to Dec 2020**, **Jan to June 2021**)

After the initial UK-wide lockdown (starting 23 March 2020) the Scottish Government introduced different national and local restrictions for Scotland. Information about the type and duration of these restrictions was obtained from the key sources above, and these additional sources:

- **https://en.wikipedia.org/wiki/The_Health_Protection_(Coronavirus,_Restrictions)_(All_Tiers)_(England)_Regulations_2020**
- **www.gov.scot/news/changes-to-covid-19-protection-levels/**
- **www.gov.scot/news/updated-covid-19-protection-levels/**
- **www.gov.scot/news/changes-to-coronavirus-levels/**
- **www.gov.scot/news/glasgow-and-moray-to-remain-in-level-3/**
- **www.webarchive.org.uk/wayback/archive/20201024055025/https://www.gov.scot/publications/coronavirus-covid-19-protection-levels/pages/overview/**

The various restriction categories used during the study period were as follows:

- No restrictions (i.e. on-trade sales as usual)
- Social distancing (table service, wearing face masks, signing in, etc.)
- Restricted opening hours
- Alcohol can only be purchased with a substantial/main meal
- Alcohol can only be consumed in outdoor parts of the premises
- No on-premises alcohol sales allowed

Mid-year population estimates for 2020 for the local authorities were obtained from the Office for National Statistics.[33] The population and percentage of the total population of Scotland subject to each restriction type each week was then calculated for use in this report.

Appendix 2: Alcohol retail sales data

Data on alcohol retail sales in Scotland were obtained from market research specialists Nielsen and CGA Strategy (CGA), for January 2017 to May 2021. The volume of alcohol sold (litres) was provided for the on-trade by CGA and for the off-trade by Nielsen across seven alcoholic drink categories: spirits, wine, beer, cider, ready-to-drink beverages (RTDs), perry, and fortified wine.

Nielsen provided weekly off-trade sales volumes, whereas CGA provided the on-trade data for four-week periods. To produce comparable weekly on-trade figures the CGA data were interpolated* between the mid-points of each period. On-trade sales data were not available for 12 weeks of 2020 (22 March to 13 June 2020 inclusive) and eight weeks of 2021 (24 January to 27 March 2021 inclusive), because the data provider had insufficient data to model sales between these dates (due to low on-trade sales during periods of lockdown). For the purposes of our analyses, therefore, on-trade sales in these weeks were assumed to be zero.

Nielsen were unable to estimate off-trade sales by discount retailers Aldi and Lidl. To ensure that the alcohol sales estimates we produce account for these retailers' changing share of the alcohol retail market each year we obtained market share estimates from Kantar Worldpanel consumer panel data. Kantar Worldpanel data are collected by a panel of households (participants aged ≥18 years) who record their grocery purchases, including alcohol, using a barcode reader. We obtained annual discounter market share estimates for 2017 to 2020, and for the first 20 weeks of 2021 (to 16 May 2021). We calculated adjustment factors based on these estimates, and interpolated these between period mid-points to estimate weekly adjustment factors. We used the factors to adjust off-trade pure volumes.

The volume of each drink category sold was converted into pure alcohol volume using a category-specific percentage alcohol by volume (ABV). The ABV used was based on the typical strength of drinks sold in that category (except for wine where

* Interpolation is the process of estimating unknown values that fall between known values.

the same standard ABV was applied across all years due to the complexity of the wine market) and was provided by the data suppliers.

Per-adult alcohol sales were calculated by dividing pure alcohol volumes (litres of pure alcohol) by the total population aged ≥16 years. Mid-year population estimates[34] and projections[35] were obtained from the National Records of Scotland (NRS). We interpolated the population data between the mid-points of each year (30 June) to estimate weekly populations.

We estimated litres of pure alcohol sold per adult (on-trade, off-trade and combined; by type) each week from week 1 of 2017 to the end of the time series in 2021 (week 18).

Both Nielsen and CGA improve their data retrospectively, therefore estimates reported here may differ slightly to those we have published previously. We consider the most recent data provided by Nielsen and CGA to be the best available as they provide the most robust view of the alcohol market.

Appendix 3: Alcohol-related hospital stays

Grouped counts of alcohol-related inpatient and day case activity taking place within general acute hospitals in Scotland were obtained from Public Health Scotland's Scottish Morbidity Record 01 (SMR01) dataset. A stay (also known as a 'continuous inpatient stay') is a distinct alcohol-related hospital admission: one individual can have multiple stays in a time period. If a condition defined as being entirely attributable to alcohol misuse (Table A1)[8] was diagnosed during the stay it is defined as an alcohol-related hospital stay. We obtained alcohol-related hospital stays where the patient was discharged between 1 January 2016 and 31 March 2021, inclusive. Only records from Scottish residents are included in these analyses, determined by their postcode within the Scottish NHS Board boundaries.

The number of alcohol-related hospital stays are presented as European age-sex standardised rates (EASR) per 100,000 population; the EASR was calculated using the 2013 European Standard Population. Mid-year population estimates[32] and projections[33] were obtained from NRS. We interpolated the population data between the mid-points of each year (30 June) to estimate monthly populations. Monthly populations were adjusted for the proportion of the year in each month, so that monthly rates were comparable with annual rates. We used three-month rolling averages to examine monthly trends in alcohol-related hospital stays. Confidence intervals around the rates were calculated using Byar's method.[36] To assess whether rates in 2020 and 2021 differed significantly from the 2017–19 averages we calculated standardised rate ratios with approximate confidence intervals.[10]

Table A1: Diagnostic (ICD-10) codes used for reporting alcohol-related stays in Scottish hospitals

ICD-10 code	Condition
E24.4	Alcohol-induced pseudo-Cushing syndrome
E51.2	Wernicke encephalopathy
F10	Mental and behavioural disorders due to the use of alcohol
G31.2	Degeneration of nervous system due to alcohol
G62.1	Alcoholic polyneuropathy
G72.1	Alcoholic myopathy
I42.6	Alcoholic Cardiomyopathy
K29.2	Alcoholic gastritis
K70	Alcoholic liver disease
K85.2	Alcohol-induced acute pancreatitis
K86.0	Alcohol-induced chronic pancreatitis
O35.4	Maternal care for (suspected) damage to fetus from alcohol
P04.3	Fetus and newborn affected by maternal use of alcohol
Q86.0	Fetal alcohol syndrome (dysmorphic)
R78.0	Finding of alcohol in blood
T51.0	Ethanol
T51.1	Methanol
T51.9	Alcohol, unspecified
X45	Accidental poisoning by and exposure to alcohol
X65	Intentional self-poisoning by and exposure to alcohol
Y15	Poisoning by and exposure to alcohol, undetermined intent
Y57.3	Alcohol deterrents
Y90	Evidence of alcohol involvement determined by blood alcohol level

ICD-10 code	Condition
Y91	Evidence of alcohol involvement determined by level of intoxication
Z50.2	Alcohol rehabilitation
Z71.4	Alcohol abuse counselling and surveillance
Z72.1	Alcohol use

Appendix 4: Alcohol-specific deaths

Records of deaths that were registered between 1 January 2017 and 31 December 2020, inclusive, were obtained from the National Records of Scotland (NRS). We extracted those defined as being wholly attributable to alcohol misuse ('alcohol-specific deaths'; Table A2), based on the International Classification of Disease Tenth Revision (ICD-10) code of their underlying cause.* The National Statistics definition of alcohol-specific deaths[9] includes only those cases that are a direct consequence of alcohol misuse, otherwise known as wholly attributable. Most of the conditions included in the definition are chronic (longer-term) conditions associated with prolonged misuse of alcohol. The definition of alcohol-specific deaths does not include diseases that are partially attributable to alcohol, such as certain cancers, where the evidence shows that only a proportion of the deaths are caused by alcohol. The definition for alcohol-specific deaths is therefore a more conservative measure than the total harm to health caused by alcohol.

To enable numbers of deaths to be compared between groups of differing age and/or sex composition we calculated European age-sex standardised rates (EASR) per 100,000 population, using the 2013 European Standard Population. Mid-year population estimates[32] and projections[33] were obtained from NRS. We interpolated the population data between the mid-points of each year (30 June) to estimate monthly populations. Monthly populations were adjusted for the proportion of the year in each month, so that monthly rates were comparable with annual rates. We used three-month rolling averages to examine monthly trends in alcohol-specific deaths. Confidence intervals around the death rates were calculated using Byar's method.[35] To assess whether rates in 2020 and 2021 differed significantly from the 2017–19 averages we calculated standardised rate ratios with approximate confidence intervals.[10]

* 'Underlying cause' is defined as the disease or injury which initiated the train of morbid events leading directly to death, or the circumstances that produced the fatal injury.

Table A2: Causes of death wholly specific to alcohol consumption

ICD-10 code	Description
E24.4	Alcohol-induced pseudo-Cushing's syndrome
F10	Mental and behavioural disorders due to use of alcohol
G31.2	Degeneration of nervous system due to alcohol
G62.1	Alcoholic polyneuropathy
G72.1	Alcoholic myopathy
I42.6	Alcoholic cardiomyopathy
K29.2	Alcoholic gastritis
K70	Alcoholic liver disease
K85.2	Alcohol-induced acute pancreatitis
K86.0	Alcohol induced chronic pancreatitis
Q86.0	Fetal induced alcohol syndrome (dysmorphic)
R78.0	Excess alcohol blood levels
X45	Accidental poisoning by and exposure to alcohol
X65	Intentional self-poisoning by and exposure to alcohol
Y15	Poisoning by and exposure to alcohol, undetermined intent

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