

Alcohol Outlet Availability and Harm in Scotland

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Key findings

Across the whole of Scotland, neighbourhoods with the highest alcohol outlet availability had significantly higher rates of alcohol-related health harm and crime.

- **Alcohol-related death rates in neighbourhoods with the most alcohol outlets were double** those in neighbourhoods with the least.
- **Alcohol-related hospitalisation rates in neighbourhoods with the most alcohol outlets were almost double** those in neighbourhoods with the least.
- **Crime rates were more than four times higher in neighbourhoods with the most alcohol outlets** as compared to the least.
- Alcohol outlet availability was found to be related to health and crime outcomes for **both on-sales and off-sales outlets, and in both urban and rural** local authorities.
- The relationships between availability and harm **were found even when other possible explanatory factors**, such as age, sex, urban/rural status and levels of income deprivation, **had been taken into account**.
- There were **40% more alcohol outlets in the most deprived neighbourhoods** than in the least deprived neighbourhoods.
- From 2012 to 2016, the **total number of alcohol outlets in Scotland increased by 472** to 16,629 (11,522 on-sales outlets and 5,107 off-sales outlets). This increase was driven by an increase in off-sales outlets.

Introduction

Alcohol availability refers to the ease of access to alcohol, whether to drink on the premises (e.g. pubs, clubs or restaurants) or to drink off the premises (e.g. shops and supermarkets). Alcohol availability includes the number, capacity and opening hours of alcohol outlets. Studies from other countries have consistently found an association between alcohol availability and alcohol-related problems, particularly outlet availability (the number of alcohol outlets in a given area). [Previous research](#) carried out in 2014 by this research team (the Centre for Research on Environment, Society and Health at the Universities of Edinburgh and Glasgow) suggests that this relationship is also true for Scotland. This profile provides a summary of the updated analysis for Scotland. Local profiles are also [available](#) for 30 local areas: 29 individual local authorities and the three islands local authorities combined.

Information was gathered on the number of places selling alcohol, health harms and crime rates within neighbourhoods across the whole of Scotland and for each local authority area. Researchers compared data zones (small areas representing neighbourhoods that have between 500 and 1000 residents) to see if there was a relationship between the number of alcohol outlets in a neighbourhood and the rates of alcohol-related deaths and hospitalisations. The profiles also consider, for the first time, the relationships between alcohol outlet availability and crime and deprivation rates.

Alcohol Outlet Availability in Scotland

Alcohol outlet availability within neighbourhoods

Alcohol outlet availability was calculated by measuring the number of outlets within 800m (approximately a ten minute walk) of each neighbourhood's population centre (the most populated area). In 2016, the 6,976 neighbourhoods within Scotland had an average of 16.8 outlets (11.4 on-sales and 5.4 off-sales outlets) within 800m of their population centre.

Some neighbourhoods had no outlets within this distance, while the most outlets found in a neighbourhood was 449 outlets (for Edinburgh's Royal Mile). Figure 1 shows the local authorities that ranked the highest for alcohol outlet availability, by mean number of outlets in neighbourhoods within each area, with the mean for Scotland highlighted.

Figure 1. Top 10 Local Authorities Ranked by Neighbourhood Alcohol Outlet Availability for Total, On-Sales and Off-Sales Outlets

Mean no. of total outlets within 800m of the neighbourhood centre		Mean no. of on-sales outlets within 800m of the neighbourhood centre		Mean no. of off-sales outlets within 800m of the neighbourhood centre	
City of Edinburgh	48.3	City of Edinburgh	34.3	City of Edinburgh	14.0
Glasgow City	31.0	Glasgow City	21.9	Glasgow City	9.2
Aberdeen City	27.5	Aberdeen City	19.3	Aberdeen City	8.2
Dundee City	21.1	Dundee City	14.3	Dundee City	6.8
Scotland	16.8	Scotland	11.4	Scotland	5.4
Inverclyde	14.4	South Ayrshire	9.6	Inverclyde	5.1
South Ayrshire	14.2	Perth and Kinross	9.4	West Dunbartonshire	5.1
Renfrewshire	13.3	Inverclyde	9.2	Clackmannanshire	4.9
Perth and Kinross	12.5	Angus	8.9	Renfrewshire	4.8
Stirling	12.5	Renfrewshire	8.5	Falkirk	4.7
Angus	12.3	Stirling	8.5	North Lanarkshire	4.5

It is clear from the above table that the areas with the highest alcohol outlet availability are a **mix of urban and rural local authorities**. The table also shows that the four cities which have the highest outlet availability elevate the Scottish average; most local authorities therefore have lower availability in their neighbourhoods than the Scottish average. The figures presented are the **average** number of outlets for each local authority but all **will have pockets of high availability at the neighbourhood level**. This more detailed information is available in the [local profiles](#) and from the [CRESH WebMap](#).

As well as looking at rates of availability, it is important to look at trends over time, particularly to highlight areas where availability has increased.

Alcohol outlet availability increased across Scotland from 2012 to 2016

In 2016, there were **16,629 places selling alcohol in Scotland** (11,522 on-sales and 5,107 off-sales outlets). This was a **2.9% increase of 472 outlets** from 16,157 in 2012, made up of a **1.5% increase of 165 on-sales outlets** and a **6.4% increase of 307 off-sales outlets**.

When taking population into account, this represents an increase in the number of places selling alcohol in Scotland of 0.6% per adult population. This increase was driven by a **rise in off-sales outlets of 4%**, with **on-sales outlets decreasing by 0.8%**.

Over half of the local areas examined experienced an overall increase in the number of alcohol outlets. Whereas **most areas experienced a decrease in the number of on-sales outlets**, over **two thirds of local authority areas saw an increase in off-sales outlets**.

Figure 2. Top 10 Local Authorities with the Largest Increases in Total, On-Sales and Off-Sales Outlets from 2012-2016

Number of additional <u>total</u> outlets		Number of additional <u>on-sales</u> outlets		Number of additional <u>off-sales</u> outlets	
City of Edinburgh	212	City of Edinburgh	111	City of Edinburgh	101
Glasgow City	118	Glasgow City	89	Fife	33
Stirling	28	Stirling	28	Glasgow City	29
Highland	26	Highland	23	Aberdeenshire	20
Aberdeen City	17	Renfrewshire	15	North Lanarkshire	15
Perth and Kinross	17	Perth and Kinross	13	South Lanarkshire	15
North Lanarkshire	14	Argyll and Bute	9	Falkirk	11
Renfrewshire	14	Aberdeen City	8	East Renfrewshire	10
Argyll and Bute	13	Dundee City	8	Angus	10
Fife	13	Scottish Borders	5	Aberdeen City	9
Scotland	472	Scotland	165	Scotland	307

Figure 2. shows that the local authorities that experienced the largest increases in the number of alcohol outlets from 2012 to 2016 were a **mix of urban and rural areas**. To ensure a full understanding of the local picture in relation to alcohol outlet availability, please refer to the **relevant [local profile](#)**.

The increase in total outlets displayed in the table is made up of changes across both on-sales and off-sales outlets in each area; this means that the number of total outlets may be smaller than the increase in one type of outlet due to decreases in the other.

Alcohol-Related Death Rates Increase with Alcohol Outlet Availability

Results show that across Scotland, **alcohol-related death rates were higher in neighbourhoods with more alcohol outlets**. This relationship was found for total outlets, on-sales outlets and off-sales outlets.

Total Outlets

- Across Scotland, **neighbourhoods with the most alcohol outlets had double the alcohol-related death rate** than neighbourhoods with the least.
- In some local authority areas, **alcohol-related death rates were up to 4.9 times higher in neighbourhoods with the most alcohol outlets** than in neighbourhoods with the least.

On-Sales Outlets (e.g. pubs, clubs and restaurants)

- Across Scotland, **neighbourhoods with the most on-sales outlets had almost double the alcohol-related death rate** than those with the least
- In some local authority areas, **alcohol-related death rates were up to 4.4 times higher in neighbourhoods with the most on-sales outlets** than in neighbourhoods with the least.

Off-Sales Outlets (e.g. supermarkets and shops)

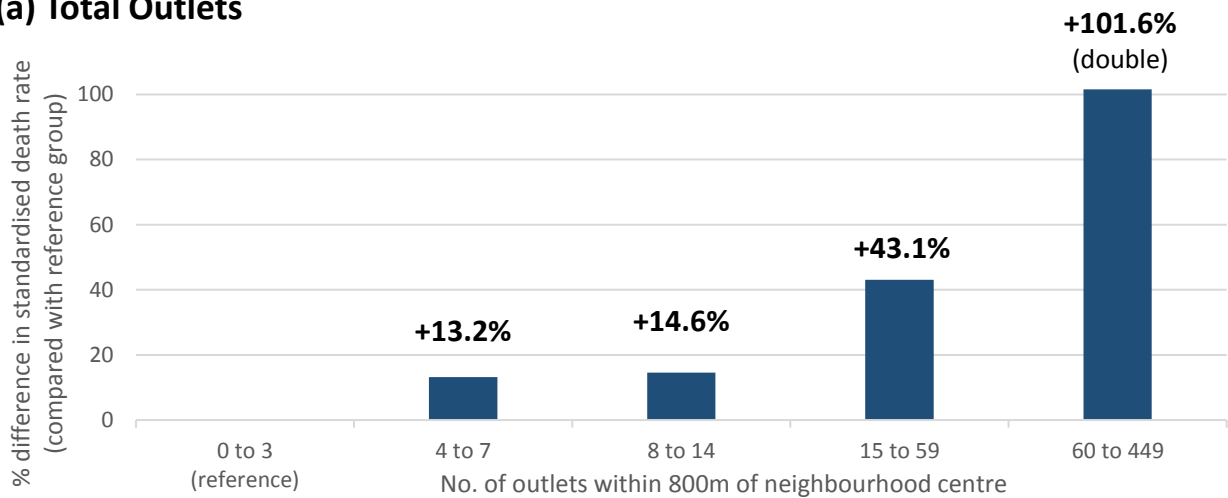
- Across Scotland, **neighbourhoods with the most off-sales outlets had double the alcohol-related death rate** than those with the least
- In some local authority areas, **alcohol-related death rates were up to 4.5 times higher in neighbourhoods with the most off-sales outlets** than in neighbourhoods with the least.

The above relationships were found even when other explanatory factors were accounted for, namely income deprivation, urban/rural status and the age and sex demographics of the population. This means that **the association between outlet availability and alcohol-related deaths is not explained by the level of income deprivation, how urban or rural an area is, or the demographics of those living in an area**.

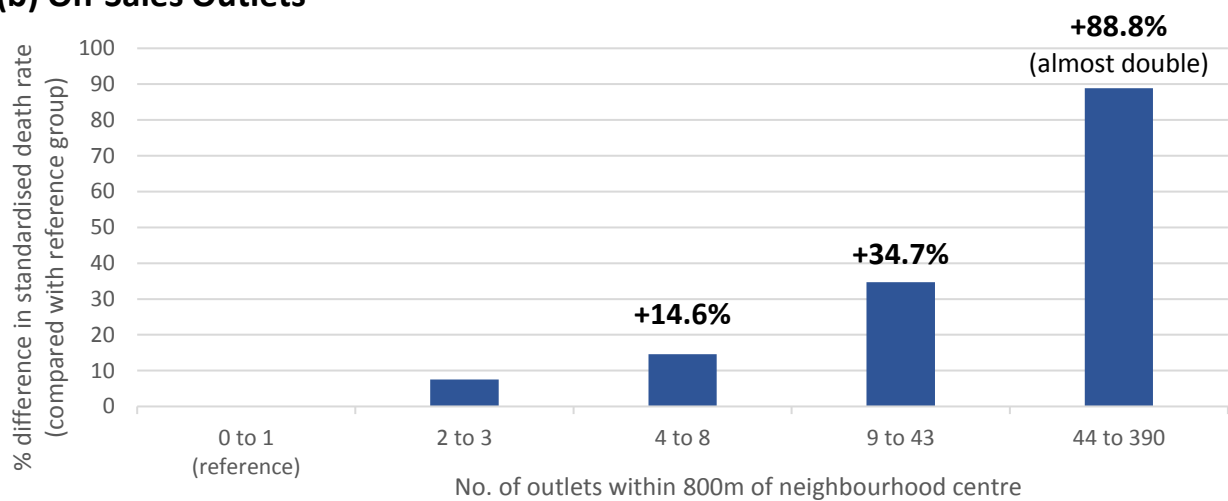
This analysis compared five groups of neighbourhoods with different levels of outlet availability. The highest outlet availability group contained the 5% of data zones with the greatest availability of outlets. The following charts (Figure 3) show these relationships in more detail, **highlighting that alcohol-related death rates increase with the number of alcohol outlets in a neighbourhood**. The bars indicate the percentage difference in alcohol-related death rate for the different availability groups compared with the lowest availability group. More detail on the ranges contained in the availability groups can be found in the charts and the [Methodology](#) section. Where there was a statistically significant difference between the availability group and the reference group, the number is given.

Figure 3. Scotland-wide alcohol-related death rate differences (%) between (a) total outlet, (b) on-sales outlet and (c) off-sales outlet availability groups, and the lowest availability group

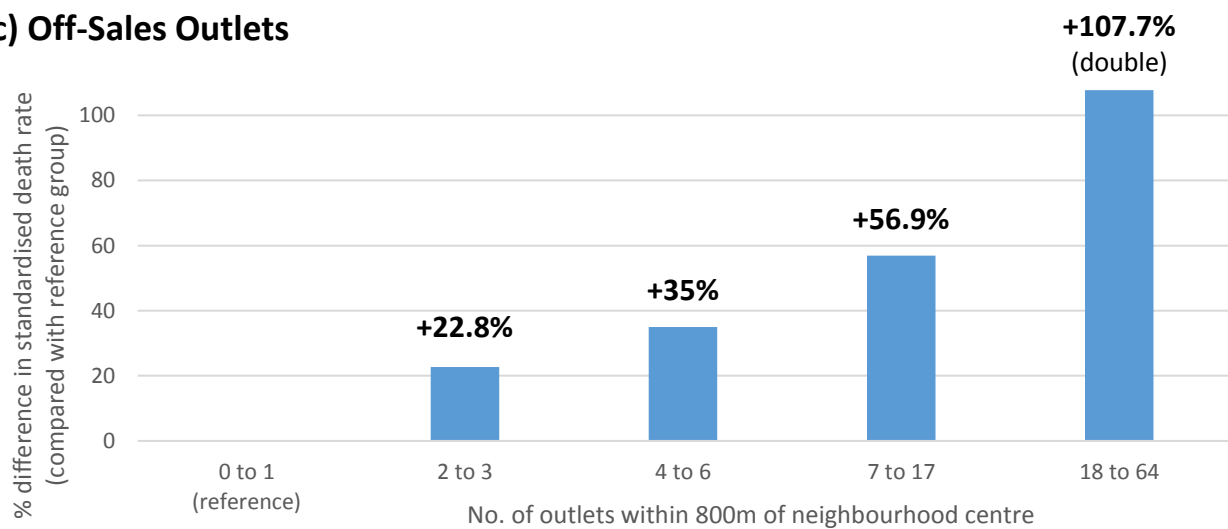
(a) Total Outlets



(b) On-Sales Outlets



(c) Off-Sales Outlets



Alcohol-Related Hospitalisation Rates Increase with Alcohol Outlet Availability

Results show that across Scotland, **alcohol-related hospitalisation rates were higher in neighbourhoods with more alcohol outlets**. This relationship was found for total outlets, on-sales outlets and off-sales outlets.

Total Outlets

- Across Scotland, **neighbourhoods with the most alcohol outlets had almost double the alcohol-related hospitalisation rates** of neighbourhoods with the least.
- In some local authority areas, **alcohol-related hospitalisation rates were up to 4.2 times higher in neighbourhoods with the most alcohol outlets** than in neighbourhoods with the least.

On-Sales Outlets (e.g. pubs, clubs and restaurants)

- Across Scotland, **neighbourhoods with the most on-sales outlets had alcohol-related hospitalisation rates 75% higher** than neighbourhoods with the least.
- In some local authority areas, **alcohol-related hospitalisation rates were up to 3.7 times higher in neighbourhoods with the most on-sales outlets** than in neighbourhoods with the least.

Off-Sales Outlets (e.g. supermarkets and shops)

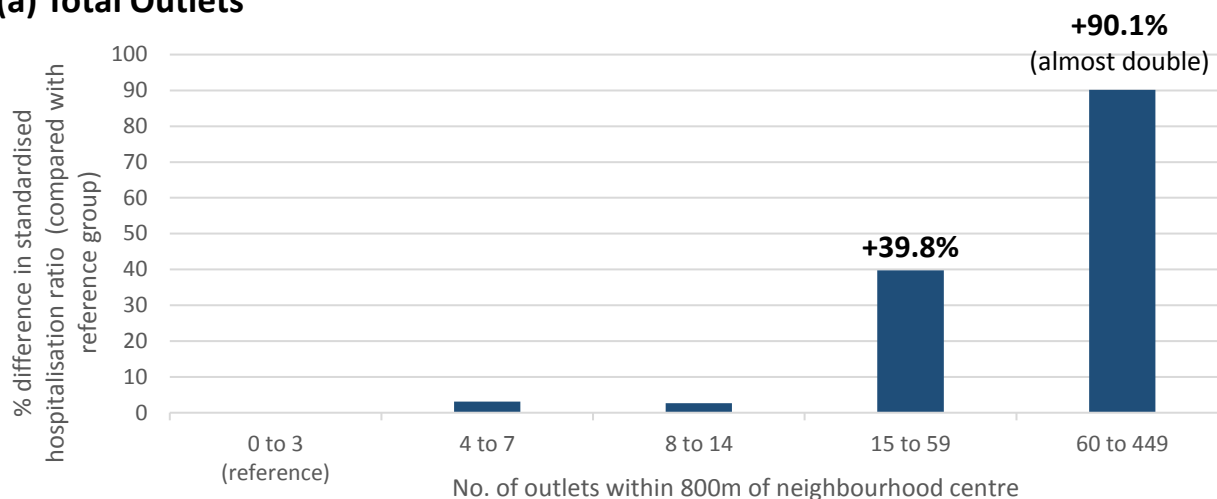
- Across Scotland, **neighbourhoods with the most off-sales outlets had almost double the alcohol-related hospitalisation rates** of neighbourhoods with the least.
- In some local authority areas, **alcohol-related hospitalisation rates were up to 4.7 times higher in neighbourhoods with the most off-sales outlets** than in neighbourhoods with the least.

The above relationships were found even when other explanatory factors were accounted for, namely income deprivation, urban/rural status and the age and sex demographics of the population. This means that **the association between outlet availability and alcohol-related hospitalisations is not explained by the level of income deprivation, how urban or rural an area is, or the demographics of those living in an area**.

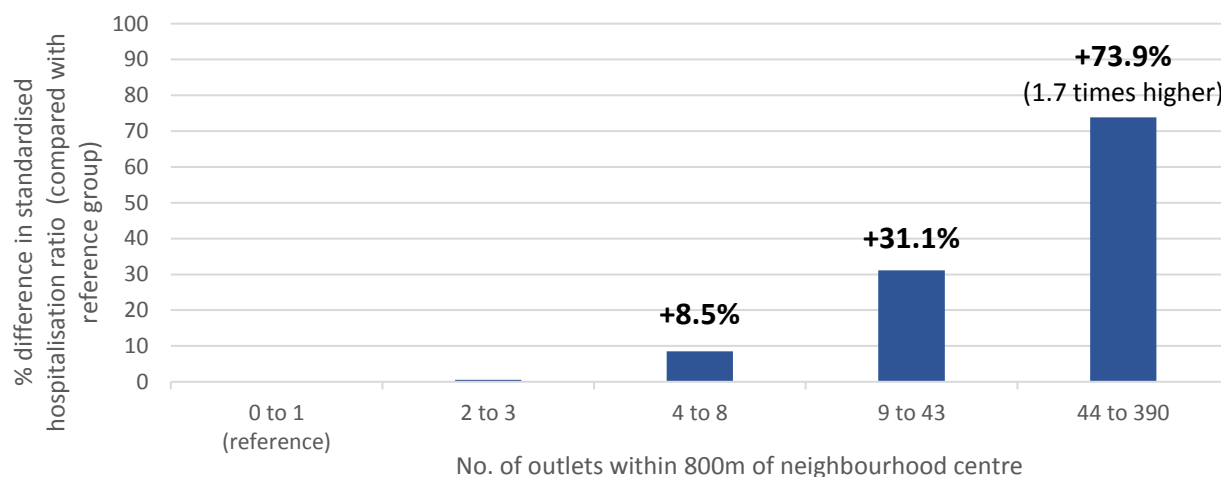
This analysis compared five groups of neighbourhoods with different levels of outlet availability. The highest outlet availability group contained the 5% of data zones with the greatest availability of outlets. The following charts (Figure 4) show these relationships in more detail, **highlighting that alcohol-related hospitalisation rates increase with the number of alcohol outlets in a neighbourhood**. The bars indicate the percentage difference in alcohol-related hospitalisation rate for the different availability groups compared with the lowest availability group. More detail on the ranges contained in the availability groups can be found in the charts and the [Methodology](#) section. Where there was a statistically significant difference between the availability group and the reference group, the number is given.

Figure 4. Scotland-wide alcohol-related hospitalisation rate differences (%) between (a) total outlets, (b) on-sales outlet and (c) off-sales outlet availability groups, and the lowest availability group

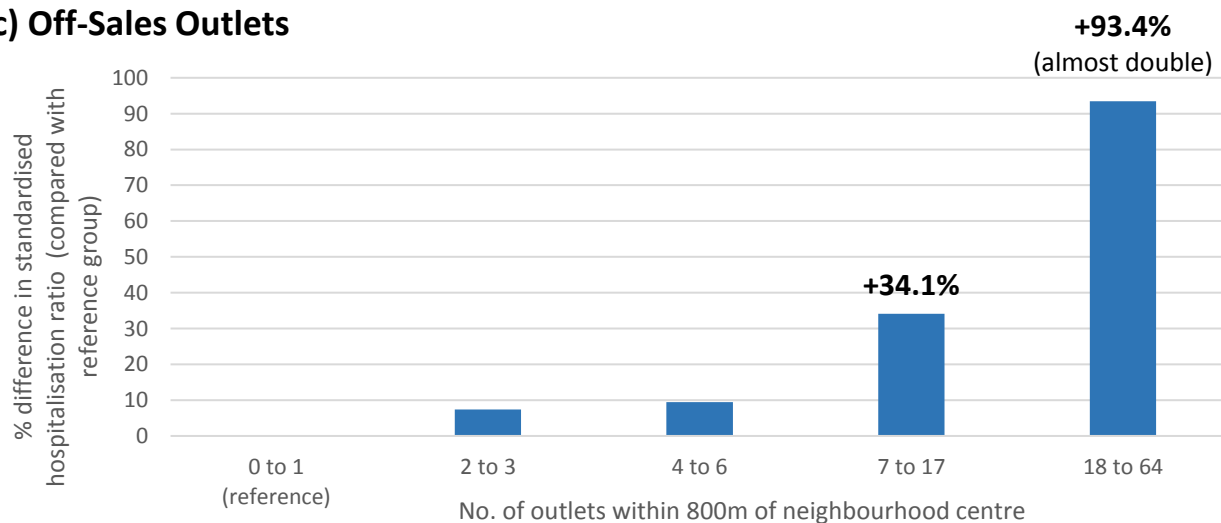
(a) Total Outlets



(b) On-Sales Outlets



(c) Off-Sales Outlets



Crime Rates Increase with Alcohol Outlet Availability

Results show that across Scotland, **crime rates were consistently and significantly higher in areas with more alcohol outlets**. This relationship was found for total outlets, on-sales outlets and off-sales outlets.

The data used was from the Crime Domain of the Scottish Index of Multiple Deprivation, which includes crimes of violence, sexual offences, domestic house breaking, vandalism, drug offences and common assault. The data however does not record whether the perpetrators of crime had consumed alcohol and excludes some offences which are commonly associated with alcohol consumption, such as breach of the peace, or anti-social behaviour.

Total Outlets

- Across Scotland, **neighbourhoods with the most alcohol outlets had crime rates over 4 times higher** than neighbourhoods with the least.
- In local authority areas, **crime rates were up to 7.9 times higher in neighbourhoods with the most alcohol outlets** than in neighbourhoods with the least.

On-Sales Outlets (e.g. pubs, clubs and restaurants)

- Across Scotland, **neighbourhoods with the most on-sales outlets had crime rates almost 4 times higher** than neighbourhoods with the least.
- In local authority areas, **crime rates were up to 8.5 times higher in neighbourhoods with the most on-sales outlets** than in neighbourhoods with the least.

Off-Sales Outlets (e.g. supermarkets and shops)

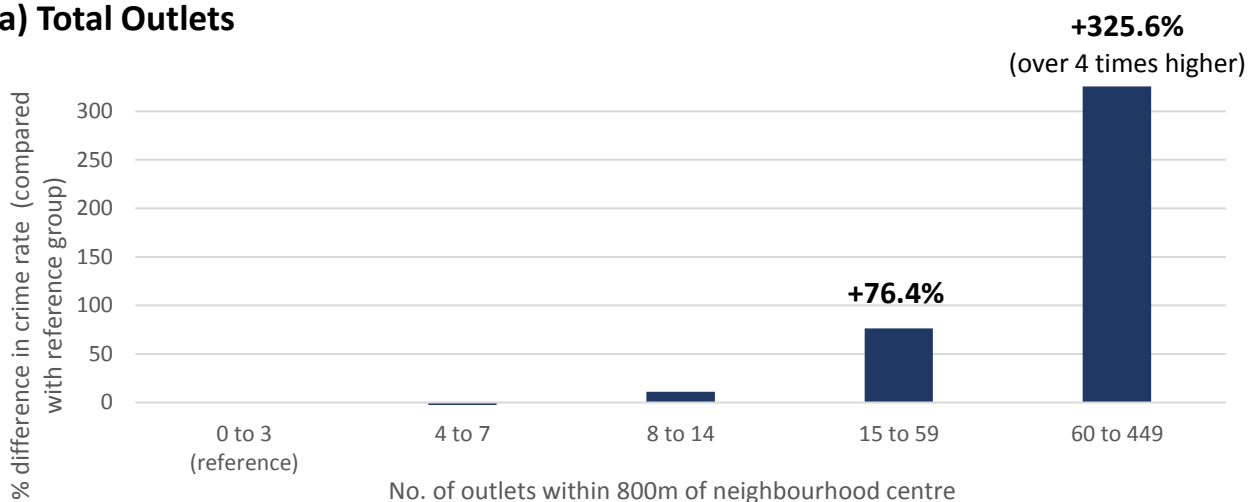
- Across Scotland, **neighbourhoods with the most off-sales outlets had crime rates 4 times higher** than neighbourhoods with the least.
- In local authority areas, **crime rates were up to 8.6 times higher in neighbourhoods with the most off-sales outlets** than in neighbourhoods with the least.

The above relationships were found even when other explanatory factors were accounted for, namely urban/rural status of the neighbourhoods and level of income deprivation. **This means that the association between outlet availability and crime rate is not explained by more crime being committed in more urban or deprived areas.**

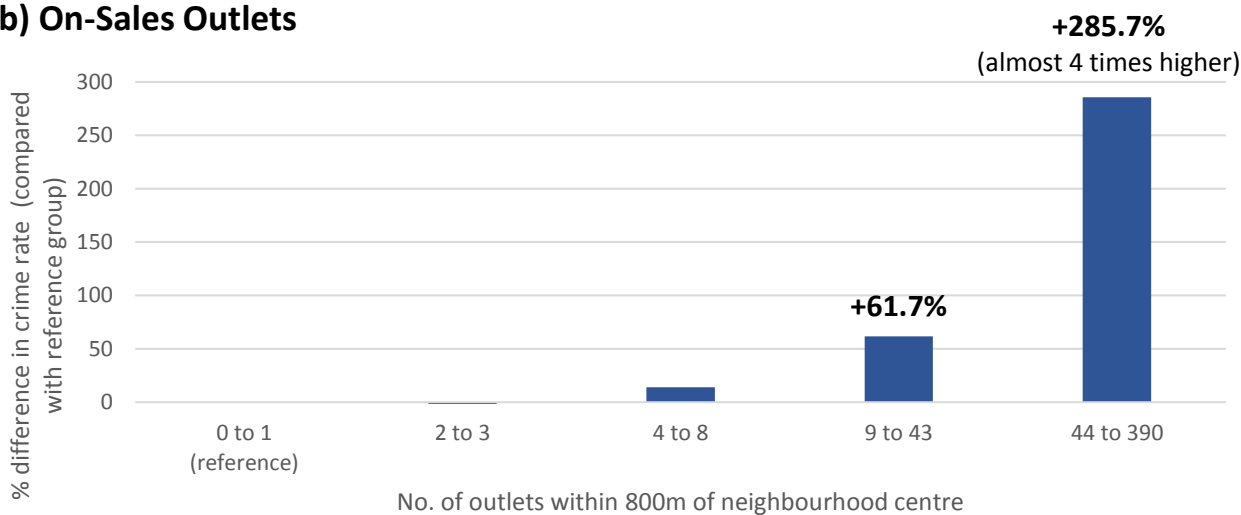
This analysis compared five groups of neighbourhoods with different levels of outlet availability. The highest outlet availability group contained the 5% of data zones with the greatest availability of outlets. The following charts (Figure 5) show these relationships in more detail, **highlighting that crime rates increase with the number of alcohol outlets in a neighbourhood**. The bars indicate the percentage difference in crime rate for the different availability groups compared with the lowest availability group. More detail on the ranges contained in the availability groups can be found in the charts and the [Methodology](#) section. Where there was a statistically significant difference between the availability group and the reference group, the number is given.

Figure 5. Scotland-wide crime rate differences (%) between (a) total outlet, (b) on-sales outlet and (c) off-sales outlet availability groups, and the lowest availability group

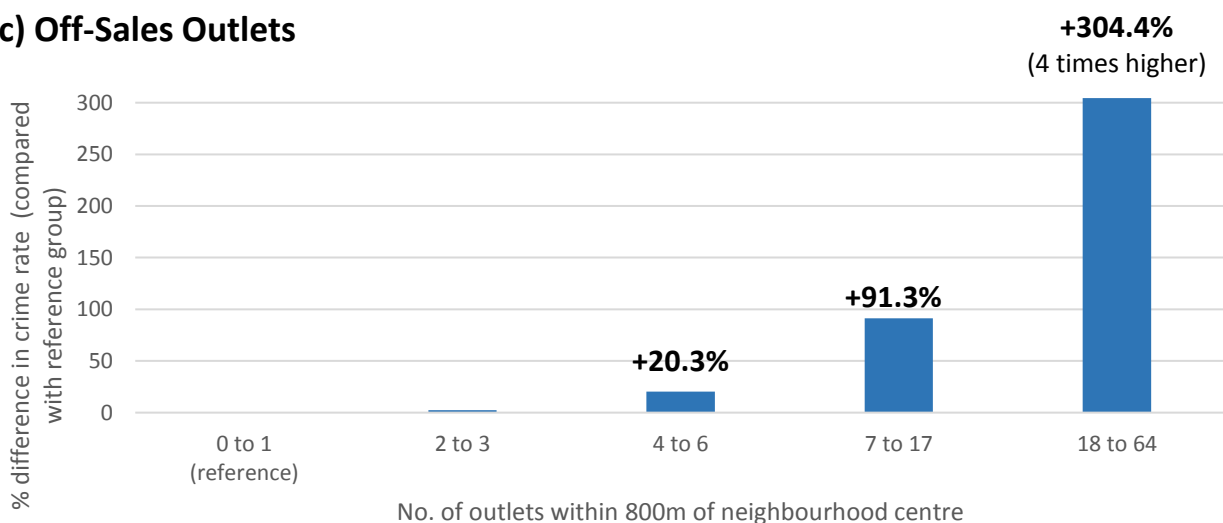
(a) Total Outlets



(b) On-Sales Outlets



(c) Off-Sales Outlets



Alcohol Outlet Availability is Related to Income Deprivation

Results show that across Scotland, there were **more places to buy alcohol in the most deprived neighbourhoods** than in the least deprived neighbourhoods for total outlets and off-sales outlets.

Total Outlets

- Across Scotland, **the most deprived neighbourhoods had 40% more alcohol outlets** than the least deprived neighbourhoods.
- In some local authority areas, there were **up to 7.9 times the number of alcohol outlets in the most deprived neighbourhoods** than in the least deprived neighbourhoods.

On-Sales Outlets (e.g. pubs, clubs and restaurants)

- Across Scotland, there were **more on-sales outlets in the most deprived areas as compared to the least**, but this relationship was **not statistically significant**. **A statistically significant relationship was found between income deprivation and on-sale outlet availability in a number of local authority areas.**
- In some local authority areas, there were **up to 8.4 times the number of on-sales outlets in the most deprived neighbourhoods** than in the least deprived neighbourhoods.

Off-Sales Outlets (e.g. supermarkets and shops)

- Across Scotland, **the most deprived neighbourhoods had almost double the number of off-sales outlets** than the least deprived neighbourhoods.
- In some local authority areas, there were **up to 6.9 times the number of off-sales outlets in the most deprived neighbourhoods** than in the least deprived neighbourhoods.

The above relationships were found even when other explanatory factors were accounted for, namely population levels. This means that **the association between outlet availability and income deprivation is not explained by the size of populations in a neighbourhood.**

Interpreting the Findings

The relationship between alcohol outlet availability and health and social harms

The strong relationship found in Scotland between the number of alcohol outlets, crime rates and alcohol-related health outcomes suggests that the local availability of alcohol may influence drinking behaviours and associated alcohol-related problems. This relationship meets the criteria of statistical tests and is termed **statistically significant**. Judgements as to statistical significance of each result were made throughout by applying a 95% significance level ($p < 0.05$).

These results agree with findings from other studies in Scotland and beyond showing that there is an association between alcohol outlet availability and many types of health and social harms, such as violence, hospital attendance, underage drinking, and drink driving. See Section 5 of the [Alcohol Focus Scotland Licensing Resource Pack](#) for more detailed evidence.

A relationship was found between outlet availability and harm in both urban and rural areas

There is a significant relationship between outlet availability and harm in both the urban and the rural areas of Scotland. However, in some very rural local authorities (e.g. Orkney Islands, Shetland Islands and Eilean Siar) no statistically significant relationship between alcohol outlet availability and alcohol-related health harm was found. These areas have relatively low population and fewer data zones, which could make it difficult to find a statistically significant relationship between any two factors.

Other explanatory factors were taken into account

When assessing whether there is a relationship between alcohol outlet availability and harm, a number of other factors that may explain the results were taken into account in the analysis. When looking at whether alcohol outlet availability was related to alcohol-related deaths, alcohol-related hospitalisations and crime, the degree of income deprivation and the rural/urban status of the area were taken into account. For alcohol-related deaths and hospitalisations, the analysis also took into account the age and sex demographics of the population. This means that the relationships found are not explained by levels of deprivation, how populated an area is, or the demographics of the population. When looking at the relationship between income deprivation and outlet availability, population levels were taken in account. This means that the relationships found are not explained by the size of populations in a neighbourhood.

Developing the most accurate picture of alcohol availability

The number of alcohol outlets in an area tells us something about the amount of alcohol available in an area but there are other factors that affect how readily accessible alcohol is. For example, the size of the premises (a supermarket will provide a greater volume and variety of alcohol than a small corner shop), the opening hours of the premises and how far people travel to buy alcohol. Currently, the number of alcohol outlets is the only information available for the whole of Scotland.

If more detailed information on the alcohol capacity of premises, their opening hours, alcohol sales and the catchment of the customers were collected this would enable further improvements in our understanding of the relationship between alcohol outlet availability and alcohol-related harm. Even without this more detailed information, a clear and statistically significant relationship between the availability of alcohol outlets and alcohol-related harm was found for Scotland as a whole.

Methodology

Summary

We investigated whether alcohol outlet availability was associated with alcohol-related health outcomes (hospitalisations and deaths) and overall crime rates for Scottish data zones. This analysis builds on [previous research](#), updating analysis of the relationship between alcohol outlet availability and harm in Scotland using more recent outlet availability, mortality and hospitalisation data. It also expands the analysis of alcohol-related harms to include crime data, and assesses whether the availability of alcohol outlets found in Scottish neighbourhoods is related to the degree of income deprivation in these areas. This builds upon [analysis published in 2015](#), using a similar methodology.

Geographical units

The data zone is the key small-area (neighbourhood) geographical unit used by the Scottish Government in the dissemination of official statistics, with populations of between 500 and 1000. There are 6,976 data zones in Scotland; the data zones used were devised for the 2011 census. Differences for data zones were compared across Scotland as a whole, and within 30 local authority areas. Twenty-nine of the local authority areas in place since 1996 were used. The three island local authorities (Shetland Islands, Orkney Islands and Eilean Siar) were grouped together as separately they have too few data zones to be able to carry out these analyses.

Alcohol outlet availability

The locations of outlets licensed to sell alcohol for consumption on the premises (on-sales) and off the premises (off-sales) were obtained in 2016 from each local licensing board. The datasets were checked for errors (e.g. duplications), resulting in verified locations for 11,522 on-sales alcohol outlets and 5,107 off-sales outlets. Outlets which sold alcohol both on and off the premises were counted as on-sales outlets. The resulting dataset corresponds closely with official figures (counts by local authority) from the Scottish Liquor Licensing Statistics 2015-16.

Alcohol outlet availability was measured for each data zone as the number of on-sales, off-sales, or total outlets within 800m of the population centre of the data zone (800m represents a 10-minute walk at average pace). This 800m zone (area 2.0 km²) was assumed to represent the typical neighbourhood experienced by the population of a data zone.

The example in Figure 5 shows that a circle with a radius of 800m around this data zone's population centre (red star) contains 73 on-sales outlets: including a number within neighbouring data zones. Data zones were grouped into five availability groups, from lowest (group 1) to highest (group 5). The highest availability group contains the 5% of data zones with the greatest outlet availability. Groups 2-4 were defined by dividing the remaining data zones into four groups containing equal numbers of neighbourhoods based on rank of outlet availability.

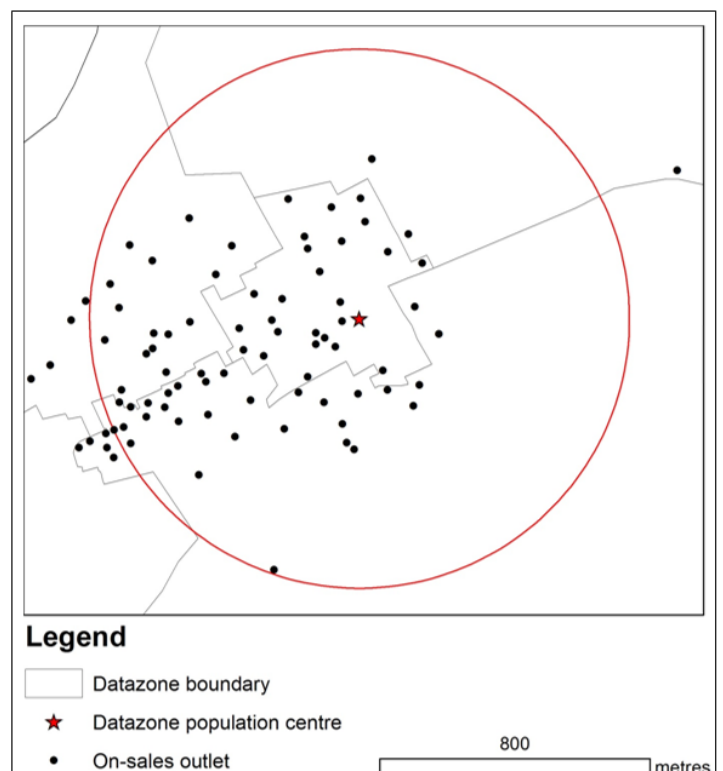


Figure 7. Calculating alcohol outlet availability for a data zone

For very rural areas, where the population is widely dispersed across the data zone, this measure might be a less accurate representation of numbers of outlets that are easily accessible.

Analysis

Multivariate regression models were used to assess whether alcohol outlet availability was related to alcohol-related deaths, alcohol-related hospitalisations and crime within data zones, independent of the degree of income deprivation in the areas and their rural/urban status. For both alcohol-related deaths and hospitalisations, the analysis also took into account the age and sex structure of the population. The models estimated the risk of alcohol-related harms in each of the outlet availability groups relative to a reference group, the group containing the neighbourhoods with the lowest outlet availability.

In testing the relationship between outlet availability and income deprivation, a bivariate analysis was used to compare the mean alcohol outlet availability rates per 10,000 population over 18 years old in groups of data zones with different levels of income deprivation. The 'high' and 'low' income deprivation groups of areas compared in the analysis contained the fifth of data zone areas with the greatest and least income deprivation.

Population

Data zone population data was used in the analysis of the relationship between outlet availability and income deprivation, and between outlet availability and alcohol-related deaths. Population data from the National Records of Scotland was used to describe data zone populations from 2011-2016.

Mortality

The mortality data were supplied by the National Records of Scotland. These data were given for data zones for the period 2011-2016 combined. The definition of an alcohol-related death is based on [International Classification of Diseases codes](#), and the [2006 National Statistics definition](#) of alcohol-related deaths. The time period was set due to the availability of population estimates at 2011 data zone level.

Hospitalisations

The hospitalisations data were extracted from the [Scottish Index of Multiple Deprivation 2016](#) Health Domain. SIMD alcohol-related hospitalisation was based upon the number of continuous inpatient stays, 2011-2014, with a diagnosis of an alcohol-related condition. Hospitalisations are represented for each data zone as a ratio of the number of hospitalisations recorded in the data zone relative to the number that would have been 'expected' based upon the average rates for Scotland, standardised by age and sex.

Crime

The crime data were extracted from the [Scottish Index of Multiple Deprivation 2016](#) Crime Domain. Crimes included in the domain are crimes of violence, sexual offences, domestic house breaking, vandalism, drug offences and common assault recorded during 2014-15, per 10,000 population.

Income Deprivation

Data for income deprivation were obtained from the [Scottish Index of Multiple Deprivation 2016](#) Income Domain. The Income Domain is a count of the number of people claiming selected means-tested benefits in 2013-14 and 2015 divided by the total population in 2014. It is therefore a percentage of the total population in receipt of benefits. The benefit data originates from the Department of Work and Pensions and HMRC.

Urban/Rural

The urban/rural status of data zones were defined using the [Scottish Government 6 Fold Urban Rural Classification](#). In this analysis the six classifications were combined into three categories: 'urban' (combining 'large urban areas' and 'other urban areas'), 'small towns' (combining 'accessible small towns' and 'remote small town') and 'rural' (combining 'accessible rural' and 'remote rural').

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