Alcohol-specific deaths in the UK QMI

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Release date:
20 April 2018

Next release:
To be announced

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1 . Output information

- Accredited official statistic: yes
- Data collection: death registrations
- Frequency: annual
- How compiled: adminstrative data processing
- Geography: UK, England, Wales, Scotland, Northern Ireland, regions of England

2 . Important points

- Alcohol-specific deaths in the UK presents statistics on the number of deaths and the age-standardised mortality rates for deaths from causes known to be exclusively caused by alcohol consumption, otherwise known as wholly attributable deaths.
- The output excludes causes of death where there is evidence showing that only a proportion of the deaths, for a given cause, are caused by alcohol (that is, partially attributable deaths).
- The National Statistics definition of alcohol-specific deaths, which is consistently used by government departments, agencies and the devolved administrations across the UK, was adopted in November 2017 in response to user consultation.
- The deaths included in the National Statistics definition are defined using the International Classification of Disease, 10th Revision (ICD-10); the time series for the output begins in 2001, when we first started to code deaths using ICD-10.
- The output is compiled using information supplied when a death is registered.
- The number of deaths in England and Wales, and English regions, where the underlying cause is considered to be alcohol-specific is extracted from our Death Registrations Database.
- Alcohol-specific deaths in Scotland and Northern Ireland are provided by National Records of Scotland (NRS) and the Northern Ireland Statistics and Research Agency (NISRA), respectively, using the same definition.
- For the UK, the number of deaths and mid-year population estimates for the four UK countries are combined and used to produce age-standardised mortality rates, standardised using the 2013 European Standard Population.

This report contains the following sections:

- Overview of the output
- Output quality
- About the output
- How the output is created
- Validation and quality assurance
- Concepts and definitions
- Other information, relating to quality trade-offs and user needs
- Sources for further information or advice

3 . Overview of the output

Alcohol-specific deaths in the UK presents statistics on the number of deaths and the age-standardised mortality rates for deaths from causes known to be exclusively caused by alcohol consumption. The output is based on the National Statistics definition of alcohol-specific deaths where each death is a direct consequence of alcohol misuse (that is, wholly-attributable deaths; see Table 2 in Section 8: Concepts and definitions). The definition is primarily based on chronic (longer-term) conditions associated with continued misuse of alcohol and, to a lesser extent, acute (immediate) conditions. The conditions included in the definition are defined using the International Classification of Diseases, 10th Revision (ICD-10); as such, the time series of this release begins in 2001, when we started coding deaths using ICD-10.

The misuse of alcohol is associated with a wide range of diseases, more than those included in the definition of alcohol-specific deaths (see Rehm and others, 2017 (PDF, 1MB) for examples). The definition does not include diseases where there is evidence showing that only a proportion of the deaths, for a given cause, are caused by alcohol (that is, partially-attributable deaths), such as cancers of the mouth, oesophagus and liver. Public health agencies, such as Public Health England, have developed separate measures that take into account these additional causes and will use these in addition to the National Statistics definition of alcohol-specific deaths.

The definition of alcohol-specific deaths is a conservative estimate on the harms related to alcohol misuse. However, the definition benefits from a consistent methodology across the UK, making it useful for robust and comparable estimates of trends in alcohol mortality. The statistics are reported for the UK, England, Northern Ireland, Wales, Scotland and the English regions.

4 . Output quality

This report provides a range of information that describes the quality of the data and details any points that should be noted when using the output.

We have developed Guidelines for measuring statistical quality based on the five European Statistical System (ESS) Quality Dimensions. This report addresses these quality dimensions and other important quality characteristics, which are:

- relevance
- timeliness and punctuality
- coherence and comparability
- accuracy
- output quality trade-offs
- assessment of user needs and perceptions
- accessibility and clarity

More information is provided about these quality dimensions in the following sections.

5 . About the output

Relevance

(The degree to which statistical outputs meet users' needs)

There is widespread policy, professional and public interest in the prevalence of alcohol-specific deaths in the UK, as excessive consumption of alcohol is a major preventable cause of premature mortality. It was estimated by the Government's Alcohol Strategy, 2012 (PDF 2.3MB) to cost the NHS in England around £3.5 billion each year.

The main users of these statistics include the Department of Health (DH) and devolved government administrations, public health organisations and local government. The figures on alcohol-specific deaths are used to monitor and develop policies to protect the health of the public.

In November 2010, the government published a White Paper titled Healthy lives, healthy people: our strategy for public health in England. It outlines the government's commitment to protecting the population from serious health threats and helping people to live longer, healthier and more fulfilling lives. Among other lifestyle and behavioural factors, the paper highlights the harmful effects of alcohol abuse and the associated cost to the NHS.

The paper introduced a Public Health Responsibility Deal in which public, private and voluntary organisations sign up and work collaboratively to address important public health issues, including alcohol.

Although the White Paper and the Responsibility Deal apply to England only, it is made clear that DH will work closely with the devolved administrations on areas of shared interest. The Scottish Government, the Welsh Government and the Northern Ireland Executive each have similar alcohol policies. For example, the Scottish Government publishes information about minimum pricing, impact on health, drinking culture, economic impact, drinking limits and alcohol licensing.

Other users of these statistics include health professionals, academics and charity organisations. The figures are often used for research purposes and they are utilised to target support services for vulnerable groups.

Timeliness and punctuality

(Timeliness refers to the lapse of time between publication and the period to which the data refer. Punctuality refers to the gap between planned and actual publication dates.)

The provisional date for the annual release of Alcohol-specific deaths in the UK is announced on the ONS release calendar and GOV.UK website 12 months in advance. The date is then finalised at least one month to publication.

Alcohol-specific deaths data are published in November each year (11 months after the end of the reference period), following the release of final annual death registrations data and mid-year population estimates for each constituent country. Figures are released around the same time every year and have always been punctual.

For more details on related releases, the GOV.UK website provides 12 months' advance notice of release dates. In the unlikely event of a change to the pre-announced release schedule, public attention will be drawn to the change and the reasons for the change will be explained fully at the same time, as set out in the Code of Practice for Statistics.

6 . How the output is created

Alcohol-specific deaths in the UK is compiled using information supplied when a death is registered. Information on deaths registered in England and Wales is held on our Death Registrations Database while those registered in Scotland and Northern Ireland are held by National Records of Scotland (NRS) and Northern Ireland Statistics and Research Agency (NISRA) respectively. Further details about the information held on our Death Registrations Database, as well as the methods used to quality assure the data, can be found in Mortality statistics: metadata.

We code all deaths in England and Wales according to the International Classification of Diseases (ICD) produced by the World Health Organisation. Alcohol-specific deaths are defined using the 10th Revision of the ICD (ICD-10), using the ICD codes in Table 2 in Section 8: Concepts and definitions. The number of alcohol-specific deaths split by sex and age group (less than one year, one to four years, five to nine years and so on up to 85 to 89 years, and 90 years and over) for England and Wales (combined and separately) and English regions, for the latest calendar year, are extracted from our Death Registrations Database. These data are combined with those for Scotland and Northern Ireland to produce statistics for the UK.

Mortality rates are calculated using the number of deaths and mid-year UK population estimates provided by our Population Estimates Unit. Population estimates are based on the decennial UK census estimates and use information on births, deaths and migration to estimate the mid-year population in non-census years. Further information about the methods used to calculate mid-year population estimates can be found in the Mid-year population estimates short methods guide.

The statistical bulletin presents age-specific and age-standardised rates. The former are for the UK as a whole, while the latter are for the UK, its four constituent countries and English regions.

Age-standardised rates are calculated using the direct method of standardisation, while the 2013 European Standard Population (ESP) is used as the standard population. Age-standardised rates make allowances for the differences in the age structure of a population, over time and between sexes. The age-standardised rate for a particular cause of death is that which would have occurred if the observed age-specific rates for that cause had applied in the given standard population.

Age-standardised rates allow for differences in the age structure of populations and therefore allow valid comparisons to be made between geographical areas, the sexes and over time. Age-standardisation is carried out using the direct method of standardisation. In this method, the age-specific rates for each year are applied to a standard population structure to obtain the number of cases expected in each age group in the standard population. The numbers of expected cases are then added up across all age groups and divided by the total standard population to obtain a summary rate figure.

This Microsoft Excel template demonstrates how age-standardised rates and 95% confidence intervals are calculated.

Age-standardised rates are calculated as follows:

$$\frac{\sum_i w_i r_i}{\sum_i w_i} \times 100,000$$

where:

- i is the age group (less than one year, one to four years, five to nine years and so on up to 85 to 89 years, and 90 years and over) w_i is the number, or proportion, of individuals in the standard population in age group i

- r_i is the observed age-specific rate in the subject population in age group i, given by:

$$r_i = \frac{d_i}{n_i}$$

where:

- d_i is the observed number of deaths in the subject population in age group i
- n_i is the number of individuals in the subject population in age group i

We recommend the use of an abridged version of the ESP in the table with an upper age limit of 90 and over. This is because official population denominators for the oldest age group in the ESP (95 and over) are not available for all geographical area levels.

Table 1: The 2013 European Standard Population

Age group (years)	Population (number)	Abridged version
Under 1	1,000	1,000
1 to 4	4,000	4,000
5 to 9	5,500	5,500
10 to 14	5,500	5,500
15 to 19	5,500	5,500
20 to 24	6,000	6,000
25 to 29	6,000	6,000
30 to 34	6,500	6,500
35 to 39	7,000	7,000
40 to 44	7,000	7,000
45 to 49	7,000	7,000
50 to 54	7,000	7,000
55 to 59	6,500	6,500
60 to 64	6,000	6,000
65 to 69	5,500	5,500
70 to 74	5,000	5,000
75 to 79	4,000	4,000
80 to 84	2,500	2,500
85 to 89	1,500	1,500
90 to 94	800	-
95 and over	200	-
90 and over	-	1000
Total	100,000	100,000

Source: Eurostat

7 . Validation and quality assurance

Accuracy

(The degree of closeness between an estimate and the true value)

The National Statistics definition of alcohol-specific deaths only includes those causes known to be exclusively caused by alcohol, otherwise known as wholly attributable causes. The definition allows for consistent comparisons over time for those deaths most clearly associated with alcohol consumption. It does not include other diseases where alcohol has been shown to have some causal relationship, such as cancers of the mouth, oesophagus and liver. Apart from deaths due to poisoning with alcohol (accidental, intentional or undetermined), other external causes of death, such as road traffic and other accidents, are also excluded.

The actual number of alcohol deaths in each year is likely to be greater than those reported in the bulletin. This is because the definition of alcohol-specific deaths excludes partially attributable conditions, where only a proportion of the deaths, for a given condition, are caused by alcohol consumption. Partially attributable causes include conditions such as mouth cancer and road traffic accidents. For these causes, it is generally difficult to establish how many deaths are caused by alcohol misuse, and our recent consultation exercise supported the view that public health agencies, such as Public Health England, should monitor such causes.

Mortality statistics achieve 100% coverage, as it is a legal requirement that all deaths are registered. However, in some cases the registration of a death may not take place in the same calendar year as the death occurred. This is most likely to occur in cases where the death is referred to a coroner and an inquest is held. Deaths are referred to a coroner in cases including where the cause of death is unknown, where the deceased was not seen by a doctor before or after death or where the death was violent, unnatural or suspicious. If the coroner chooses to hold an inquest, the death can only be registered once the inquest has taken place.

The accuracy of mortality statistics is dependent on the quality of information supplied when the death is registered. An incorrect underlying cause of death may be provided by the doctor completing the death certificate. Many thousands of practising doctors complete death certificates and the nature and amount of training they have had in death certification varies greatly. Inaccurate information may also be supplied by the informant (usually a relative of the deceased) who must use the death certificate to register the death with the registrar. It is not possible to measure the magnitude of errors such as these.

Further information about the process involved in death registration and the checks carried out on the data we hold to ensure their quality can be found in Mortality statistics: metadata.

Rates were not calculated where there were fewer than three deaths in a cell for age-specific rates or 10 deaths in a year for age-standardised rates. It is our practice not to calculate rates based on such small numbers, as they are imprecise and susceptible to inaccurate interpretation. Age-standardised rates based on 10 to 19 deaths are marked with a “u” to warn users that their reliability is low.

Rates are published with 95% confidence intervals (CIs) to allow users to identify significant differences between geographical areas, the sexes and over time. Significance is assigned on the basis of non-overlapping CIs. While more formalised and accurate methods of significance testing are available, the non-overlapping CI method is used because it is both simple to calculate and easily understood.

Standard error

In previous publications, the standard error for age-standardised rates was calculated using a simple approximation method as shown below. The standard error is denoted as

SE(ASR) and calculated as:

$$SE(ASR) = \frac{ASR}{\sqrt{N}}$$

where:

- ASR is the age-standardised rate
- N is the total number of deaths in all age groups in each year

The age-standardised rate is a weighted sum of age-specific death rates where the age-specific weights represent the relative age distribution of the standard population (in this case the 2013 ESP). Therefore, it is more accurate to calculate its variance as the sum of the age-specific variances and to estimate its standard error as the square root of the variance as shown below.

$$SE(ASR) = \sqrt{\frac{\sum_i \left(w_i^2 \cdot \frac{r_i^2}{d_i} \right)}{\left(\sum_i w_i \right)}}$$

where:

- w_i is the number of individuals in the standard population in age group i
- r_i is the crude age-specific rate in the local population in age group i
- d_i is the number of deaths in the local population in age group i

The standard error calculation has now been modified so that it takes into account the variance of the weighted sum of age-specific rates.

Confidence intervals

The mortality data in this release are not subject to sampling variation as they were not drawn from a sample. Nevertheless, they may be affected by random variation, particularly where the number of deaths or probability of dying is small. To help assess the variability in the rates, they have been presented alongside 95% CIs.

The choice of the method used in calculating confidence intervals for rates will, in part, depend on the assumptions made about the distribution of the deaths data these rates are based on.

Traditionally, a normal approximation method has been used to calculate confidence intervals on the assumption that alcohol-specific deaths are normally distributed. However, if the annual number of alcohol-specific deaths is relatively small (fewer than 100), it may be assumed to follow a Poisson probability distribution. In such cases, it is more appropriate to use the confidence limit factors from a Poisson distribution table to calculate the confidence intervals instead of a normal approximation method.

The method now used in calculating confidence intervals for rates based on fewer than 100 deaths was proposed by Dobson and others (1991) as described in APHO, 2008 (PDF, 2MB). In this method, confidence intervals are obtained by scaling and shifting (weighting) the exact interval for the Poisson distributed counts (number of deaths in each year). The weight used is the ratio of the standard error of the age-standardised rate to the standard error of the number of deaths. The lower and upper 95% CIs are denoted as ASR lower and ASR upper, respectively, and calculated as:

$$ASR_{lower} = ASR + (D_l - D) \cdot \sqrt{\frac{v(ASR)}{v(D)}}$$

$$ASR_{upper} = ASR + (D_u - D) \cdot \sqrt{\frac{v(ASR)}{v(D)}}$$

Where:

D_l and D_u are the exact lower and upper confidence limits for the number of deaths, calculated using confidence limit factors from a Poisson probability distribution table

D is the number of deaths in each year

v(ASR) is the variance of the age-standardised rate

v(D) is the variance of the number of deaths

Where there are 100 or more deaths in a year the 95% confidence intervals for age-standardised rates are calculated using the normal approximation method shown below:

$$ASR_{LL/UL} = ASR \pm 1.96 \cdot SE$$

Where:

ASRLL/UL represents the upper and lower 95% confidence limits, respectively, for the age-standardised rate

Age-specific rates

For age-specific rates, the exact Poisson limit factors for the number of deaths is multiplied by the rate to calculate the 95% confidence intervals where there are fewer than 100 deaths in a particular age group.

$$LL\left(R\right) = L \cdot R \text{and} UL\left(R\right) = U \cdot R$$

Conversely, the normal approximation method below is used where there are 100 or more deaths.

$$R_{LL/UL} = R \pm 1.96 \cdot \frac{R}{\sqrt{N}}$$

Where:

LL and UL are the lower and upper 95% confidence limits, respectively

R is the age-specific rate

L and U are the exact lower and upper Poisson confidence limit factors for the age-specific number of deaths

Coherence and comparability

(Coherence is the degree to which data that are derived from different sources or methods, but refer to the same topic, are similar. Comparability is the degree to which data can be compared over time and domain, for example, geographic level.)

Alcohol-specific death statistics are based on death registrations data. We hold data for England and Wales and data for Scotland and Northern Ireland are supplied by the National Records of Scotland (NRS) and Northern Ireland Statistics and Research Agency (NISRA), respectively. NRS and NISRA produce annual updates on numbers of alcohol-specific deaths using the same definition as us; data for the UK countries can be found via the following links:

England and Wales

Northern Ireland

Scotland

Public health agencies, such as Public Health England, also produce local area estimates of alcohol-specific deaths, using the same definition.

Deaths of non-residents are included in the figures for England and Wales combined, but excluded for England and Wales when presented separately. Therefore, the sum of the number of deaths in England and Wales separately does not equal the figure for England and Wales combined. Deaths of non-residents are also included in deaths registrations data for Scotland and Northern Ireland. As such, for reasons of comparability, our UK estimate of alcohol-specific deaths also includes non-residents of England and Wales. In the UK, causes of death are coded according to the International Classification of Diseases (ICD) produced by the World Health Organization (WHO).

We have revised the mid-2002 to 2010 population estimates for the UK and its constituent countries in light of the 2011 Census. Consequently, alcohol-specific death rates relating to this period have now been revised.

Alcohol-specific death statistics are not currently produced for areas smaller than regions as there are too few deaths to produce statistically robust rates.

Internationally, WHO has developed the WHO Global Information System on Alcohol and Health, which contains several indicators to allow alcohol consumption and the effects of consumption, including mortality, to be compared on an international basis across continents. The age-standardised mortality rates produced by WHO differ from those produced by us in three ways:

- firstly, only deaths from liver cirrhosis and road traffic accidents are included in WHO's alcohol-related deaths definition while 15 causes of death are included in our definition (see Table 2)

- secondly, the age-standardised mortality rates presented by WHO are standardised using the World Standard Population, while ours uses the European Standard Population

- thirdly, the WHO's age-standardised mortality rates are based on those aged 15 years and over while our rates are based on persons at all ages

The age-standardised alcohol-related death rates published by WHO are therefore not comparable to those we produce.

8 . Concepts and definitions

(Concepts and definitions describe the legislation governing the output and a description of the classifications used in the output.)

ICD

The International Classification of Diseases is the standard diagnostic tool for epidemiology, health management and clinical purposes. It is used to classify diseases and other health problems recorded on many types of health and vital records including death certificates and health records. In addition to enabling the storage and retrieval of diagnostic information for clinical, epidemiological and quality purposes, these records also provide the basis for the compilation of national mortality and morbidity statistics by WHO member states. It is used for reimbursement and resource allocation decision-making by countries. We have been using the 10th revision since 2001.

Underlying cause

Defined by WHO as ”the disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury”, in accordance with the rules of the International Classification of Diseases.

The definition used to compile statistics on alcohol-specific deaths across the UK is shown in Table 2. This definition includes only those causes known to be exclusively caused by alcohol consumption. It does not include deaths from partially attributable conditions such as cancers of the mouth, oesophagus and liver. Apart from deaths due to poisoning with alcohol (accidental, intentional or undetermined), this definition excludes any other external causes of death, such as road traffic and other accidents. The definition allows for consistent comparisons over time for those deaths most clearly associated with alcohol consumption.

Previous releases were based on the National Statistics definition of alcohol-related deaths. Following user consultation, in November 2017 we adopted the new definition of alcohol-specific deaths. The new definition was adopted for several reasons (summarised fully in this response document (PDF 188KB) including harmonisation – the definition provides a single, harmonised, measure used by different government departments and agencies, in addition to the devolved administrations – and limitations of the other available options. For further information, we published an article on the new definition, the reasons for it and its impact on the existing time series of alcohol-related deaths.

Table 2: National Statistics definition of alcohol-specific deaths

ICD-10 code	Description of condition
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

Source: Office for National Statistics

9 . Other information

Output quality trade-offs

(Trade-offs are the extent to which different dimensions of quality are balanced against each other)

Alcohol-specific deaths in the UK is published 11 months after the reference period. The production of these statistics relies upon the availability of the annual deaths registrations data for each constituent country of the UK as well as the UK mid-year population estimates that we produce. Coding and quality assurance of death registration data is time-consuming and final figures for the whole of the UK are not available until several months after the reference period. For it to be published earlier, provisional data would need to be used and would need to be subsequently revised. Users have not indicated that they are unhappy with this balance between timeliness and quality.

In England and Wales, deaths should be registered within five days of the death occurring, but there are some situations that result in the registration of the death being delayed. Deaths considered unexpected, accidental or suspicious will be referred to a coroner who may order a post-mortem or carry out a full inquest to ascertain the reasons for the death.

Statistics on alcohol-specific deaths are presented based on the year these deaths were registered rather than the year of occurrence. This method is used because there is a requirement for consistent and timely data, despite a potential limitation in data quality caused by registration delays. Most alcohol-specific deaths registered in a particular year also occur in that year so the impact of registration delays on these statistics are considered to be negligible. Further information on the impact of registration delays on mortality statistics is available.

10 . Sources for further information or advice

Accessibility and clarity

(Accessibility is the ease with which users are able to access the data, also reflecting the format in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the release details, illustrations and accompanying advice.)

Our recommended format for accessible content is a combination of HTML webpages for narrative, charts and graphs, with data being provided in usable formats such as CSV and Excel. Our website also offers users the option to download the narrative in PDF format. In some instances other software may be used, or may be available on request. Available formats for content published on our website but not produced by us, or referenced on our website but stored elsewhere, may vary. For further information please refer to the contact details at the beginning of this report.

For information regarding conditions of access to data, please refer to the following links:

- Terms and conditions (for data on the website)
- Accessibility

In addition to this Quality and Methodology Information, basic quality information relevant to each release is available in the Quality and methodology section of the relevant statistical bulletin.

11 . Cite this methodology

Office for National Statistics (ONS), released 20 April 2018, ONS website, methodology,Alcohol-specific deaths in the UK quality and methodology information (QMI)