

Information paper

Quality and Methodology Information

General details

Title of output:	Alcohol-related deaths in the United Kingdom
Designation:	National Statistics
Geographic coverage:	United Kingdom, England, Wales, Regions of England
Date of last SQR or QMI*:	January 2012
Contact details:	mortality@ons.gov.uk

Executive summary

[Alcohol-related deaths in the United Kingdom](#) presents statistics on the number of deaths and the age-standardised mortality rates for deaths from alcohol-related causes. [Alcohol-related deaths in the United Kingdom](#) 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-related is extracted from ONS's Death Registrations Database.

Alcohol-related deaths in Scotland and Northern Ireland are published by [National Records of Scotland \(NRS\)](#) and the [Northern Ireland Statistics and Research Agency \(NISRA\)](#) respectively. For the UK, the number of deaths and mid-year population estimates for the 4 UK countries are combined and used to produce age-standardised mortality rates, standardised using the 2013 European Standard Population.

This document contains the following sections:

- 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.

Output quality

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

ONS has developed [Guidelines for Measuring Statistical Quality](#); these are based upon the 5 European Statistical System (ESS) Quality Dimensions. This document addresses these quality dimensions and other important quality characteristics, which are:

- Relevance
- Timeliness and punctuality

* 'Quality and Methodology Information' (QMI) replaced 'Summary Quality Reports' (SQR) from 04/11

- 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 sections below.

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-related 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](#) 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-related deaths are used to monitor and develop policies to protect the health of the general 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 White Paper highlights the harmful effects of alcohol abuse and the associated cost to the NHS.

The White Paper introduced a [Public Health Responsibility Deal](#) in which public, private and voluntary organisations sign up and work collaboratively to address key 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-related deaths in the United Kingdom](#) is announced on the [ONS Release Calendar](#) and [.GOV.uk website](#) 12 months in advance. The date is then finalised at least 1 month to publication.

Alcohol-related deaths data are published in January or February each year (12 to 13 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](#) is available online and 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 Official Statistics](#).

How the output is created

Alcohol-related deaths in the United Kingdom is compiled using information supplied when a death is registered. Information on deaths registered in England and Wales is held on the ONS Death Registrations Database while those registered in Scotland and Northern Ireland are held by NRS and NISRA respectively. Further details about the information held on the ONS Death Registrations Database, as well as the methods used to quality assure the data, can be found in [Mortality Statistics: Metadata](#).

All deaths in England and Wales are coded by ONS according to the [International Classification of Diseases \(ICD\)](#) produced by the [World Health Organisation](#). Alcohol-related deaths are defined using the Ninth and Tenth Revision (ICD-9 and ICD-10 respectively) of the ICD. Mortality data for 1979 to 2000 are coded by ONS using ICD-9 while ICD-10 has been used since 2001. Alcohol-related deaths were defined using the ICD codes in Box 1 in the Concepts and Definitions section. The number of alcohol-related deaths split by sex and age group (<1, 1-4, 5-9...85-89, 90 and over) for England and Wales (combined and separately) and English regions, for the latest calendar year are extracted from ONS's 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 the Population Estimates Unit at ONS. 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 4 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.

A Microsoft Excel [template](#) which demonstrates how age-standardised rates and 95% confidence intervals are calculated is available on ONS's website.

The ESP used in the previous publications of alcohol-related deaths statistics was first introduced in 1976 but it is no longer representative of the age-structure of the population of European Union Member States. In light of this, Eurostat, the statistical office of the European Union, implemented a new version of the ESP in 2013. ONS implemented the 2013 ESP in 2014/15 financial year.

The 2013 ESP takes into account changes in the EU population, providing a more current, methodologically sound and widely acceptable basis for the calculation of age standardised rates (Eurostat, 2013). The 1976 and 2013 ESPs differ in 2 ways. First, the 2013 ESP gives the populations in older age groups greater weighting than the 1976 ESP. Second, the age distribution of the 1976 ESP has an upper limit of 85 years and over, while the 2013 ESP is further disaggregated to include age groups 85-89, 90-94 and 95+.

Age-standardised rates are calculated as follows:

$$\frac{\sum_i w_i r_i}{\sum_i w_i} \times 100,000 \quad (\text{expressed per } 100,000 \text{ population})$$

where:

- i is the age group (<1, 1-4, 5-9, 10-14....85-89, 90+)
- 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

Further information about the [impact of changing the ESP on mortality statistics](#) can be found on the ONS website. ONS recommends the use of an abridged version of the ESP in the table with an upper age limit of 90+. This is because official population denominators for the oldest age group in the ESP (95+) are not available for all geographical area levels. Previously published age-standardised rates for 1994 to 2012 have been revised in light of the 2013 ESP. Rates for 1991 to 1993 have not been revised due to a lack of official population denominators for the oldest age group (90+) in the abridged ESP for these years. Figures for 1994 onwards are therefore not comparable with those before 1994.

The 2013 European Standard Population

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

Source: Eurostat

Validation and quality assurance

Accuracy

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

The National Statistics definition of alcohol-related deaths only includes those causes regarded as being most directly due to alcohol consumption. 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 definition includes all deaths from chronic liver disease and cirrhosis (excluding biliary cirrhosis), even when alcohol is not specifically mentioned on the death certificate. Despite this, the actual number of alcohol deaths in each year is likely to be greater than those reported in the bulletin. This is because the causal relationship between alcohol and causes of death such as mouth cancer and road traffic accidents may be difficult to establish. 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 held by ONS to ensure their quality can be found in [Mortality Statistics: Metadata](#). Rates were not calculated where there were fewer than 3 deaths in a cell for age-specific rates or 10 deaths in a year for age-standardised rates. It is ONS 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.

The methods used in previous bulletins to calculate standard errors and 95% CIs have now been modified. Data from 2013 onwards will now be based on the methods described below.

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.

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

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-related deaths are normally distributed. However, if the annual number of alcohol-related 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 et al., \(1991\)](#) as described in [APHO, \(2008\)](#). 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:

$ASR_{LL/UL}$ 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.

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

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-related death statistics are based on death registrations data. Data for England and Wales are held by ONS and data for Scotland and Northern Ireland are supplied by the NRS, formerly the General Register Office for Scotland (GROS), and NISRA respectively. Information on death registration processes in each country can be found in the following links:

[England and Wales](#)

[Scotland](#)

[Northern Ireland](#)

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.

In the UK, causes of death are coded according to the ICD produced by [WHO](#). The Ninth Revision of ICD was used in Scotland until 1999 and in England and Wales and Northern Ireland until 2000. The Tenth Revision has since been in use. Consequently, for the year 2000, results for Scotland are not directly comparable with those for other UK countries.

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

Alcohol-related death statistics are not currently produced for areas smaller than regions as there are too few deaths to produce statistically robust rates. A one-off study was carried out by ONS in 2007 to calculate age-standardised rates for local areas in the UK using data aggregated over the periods 1991–1997 and 1998–2004. More information on that study is available in an article titled [Trends and geographical variations in alcohol-related deaths in the United Kingdom, 1991–2004](#) and [accompanying data](#) are available on the ONS website.

With the exception of year 2000, figures for individual UK countries have been calculated using consistent methods and definitions over time and are therefore comparable.

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 ONS in 3 ways:

- firstly, only deaths from liver cirrhosis and road traffic accidents are included in WHO's alcohol-related deaths definition while 12 causes of death are included in ONS's definition (see Box 1)
- secondly, the age-standardised mortality rates presented by WHO are standardised using the World Standard Population, while ONS's uses the European Standard Population
- thirdly, the WHO's age-standardised mortality rates are based on those aged 15 years and over while ONS's rates are based on persons at all ages

The age-standardised alcohol-related death rates published by the WHO and ONS are therefore not comparable.

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. The tenth revision has been used by ONS 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-related deaths across the UK is shown in Box 1. This definition includes only those causes regarded as being most directly due to alcohol consumption. It does not include deaths due to other diseases where alcohol has been shown to have some causal relationship, such as cancers of the mouth, oesophagus and liver. The definition includes all deaths from chronic liver disease and cirrhosis (excluding biliary cirrhosis), even when alcohol is not specifically mentioned on the death certificate. 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.

Box 1: National Statistics definition of alcohol-related deaths

International Classification of Diseases, Ninth Revision (ICD-9)

291 Alcoholic psychoses
303 Alcohol dependence syndrome
305.0 Non-dependent abuse of alcohol
425.5 Alcoholic cardiomyopathy
571 Chronic liver disease and cirrhosis
(Excluding 571.6 – Biliary cirrhosis)
E860 Accidental poisoning by alcohol

International Classification of Diseases, Tenth Revision (ICD-10)

F10 Mental and behavioural disorders due to use of alcohol
G31.2 Degeneration of nervous system due to alcohol
G62.1 Alcoholic polyneuropathy
I42.6 Alcoholic cardiomyopathy
K29.2 Alcoholic gastritis
K70 Alcoholic liver disease
K73 Chronic hepatitis, not elsewhere classified
K74 Fibrosis and cirrhosis of liver
(Excluding K74.3–K74.5 – Biliary cirrhosis)
K86.0 Alcohol induced chronic pancreatitis
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

Information about deaths registered is 100% complete since it is a legal requirement that all deaths are registered. The legislation that requires this is the Births and Deaths Registration Act (1836) which came into force from 1 July 1837.

Other information

Output Quality Trade-Offs

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

[Alcohol-related deaths in the United Kingdom](#) is published 12 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 produced by ONS. Coding and quality assurance of death registration data is time consuming and final figures for the whole of the UK are not available until 12 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 5 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-related 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. The majority of alcohol-related 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 on the ONS website.

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.)

ONS's 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. The ONS 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 the ONS website but not produced by the ONS, or referenced on the ONS website but stored elsewhere, may vary. For further information please refer to the contact details at the beginning of this document.

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

- [Terms and conditions \(for data on the website\)](#)
- [Copyright and reuse of published data](#)
- [Pre-release access \(including conditions of access\)](#)
- [Access to microdata via the Virtual Microdata Laboratory](#)
- [Accessibility](#)

In addition to this Quality and Methodology Information, Basic Quality Information relevant to each release is available in the background notes of the relevant [Statistical Bulletin](#).