Suicide rates in the UK QMI

Quality and Methodology Information for suicides in the UK, detailing the strengths and limitations of the data, methods used, and data uses and users.

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Release date:
3 October 2025

Next release:
To be announced

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1 . Output information

National Statistic	
Data collection	Death Registrations (Administrative data)
Frequency	Annual
How compiled	Administrative data processing
Geographic coverage	UK
Related publications	Suicide by occupation, England: 2011 to 2015 Estimating suicide among higher education students, England and Wales: Experimental statistics

2 . About this Quality and Methodology Information report

This quality and methodology report contains information on the quality characteristics of the data (including the European Statistical System five dimensions of quality) as well as the methods used to create it.

The information in this report will help you to:

- understand the strengths and limitations of the data
- learn about existing uses and users of the data
- understand the methods used to create the data
- help you to decide suitable uses for the data
- reduce the risk of misusing data

3 . Where to go for help

If you are struggling to cope, please call Samaritans free on 116 123 (UK and Ireland), email jo@samaritans.org, or visit the Samaritans website to find details of the nearest branch.

4 . Information for the media

If you are a journalist covering a suicide-related issue, please consider following the Samaritans' media guidelines on the reporting of suicide, due to the potentially damaging consequences of irresponsible reporting.

5 . Important points

- Suicides in the UK presents statistics on the number of suicides, age-standardised and age-specific mortality rates by sex for the UK and its constituent countries.
- Additional statistics are also presented for England and Wales including suicide method and the number of deaths and mortality rates by subnational areas.
- The release uses the National Statistics definition of suicide, which is consistently used by government departments, agencies and the devolved administrations across the UK.
- The deaths included in the National Statistics definition are defined using the International Classification of Diseases, 10th Revision (ICD-10) for years 2001 onwards and International Classification of Diseases, Ninth Revision (ICD-9) for years prior to 2001.
- The statistics are compiled using information supplied by the coroner (England, Northern Ireland, Wales) or a Procurator Fiscal (Scotland) when a death is registered.
- Suicide statistics are presented based on the year these deaths were registered rather than the year of occurrence and due to registration delays some deaths will not have occurred in the same year in which they were registered.
- Suicide data for Scotland and Northern Ireland are provided by the National Records of Scotland (NRS) and the Northern Ireland Statistics and Research Agency (NISRA) respectively, using the same definition.

6 . Quality summary

Overview

Suicides in the UK presents statistics on the number of deaths, age-standardised and age-specific mortality rates for deaths from suicide. The output is based on the National Statistics definition of suicide, which includes deaths with an underlying cause of intentional self-harm (ages 10 years and over) and deaths with an underlying cause of event of undetermined intent (ages 15 years and over).

The deaths included in the suicide definition are defined using the International Classification of Diseases, Ninth Revision (ICD-9) for years 1981 to 2000 and International Classification of Diseases, 10th Revision (ICD-10) for years 2001 onwards. See Table 1 in the Concepts and definitions section for the exact cause of deaths codes included in the National Statistics definition of suicide.

Suicide statistics provide an indicator of mental health and are important for monitoring trends in deaths resulting from intentional (and probable) self-harm. The statistics are widely used to inform policy, planning and research in both public and private sectors and they enable policymakers and support services to target their resources most effectively.

Uses and users

There is widespread policy, professional and public interest in the prevalence of suicide in the UK. The main users of these statistics include the Department of Health and Social Care, devolved government administrations, public health organisations and local government. Figures on suicide are used to monitor and develop policies to prevent suicide.

In England, The Department of Health and Social Care use suicide statistics to determine the progress being made in reducing the prevalence of suicide in England in response to the aim to reduce the level of suicide by 10% by 2020 to 2021. In Wales, the Welsh Government and Public Health Wales use these statistics to assess progress being made towards the Talk to me 2: Suicide and self harm prevention strategy for Wales 2015 to 2020 .

In their suicide prevention action plan every life matters, the Scottish Government have an action to set up and fund a National Suicide Prevention Leadership Group (NSPLG), which will report to Scottish ministers and make recommendations on supporting the development and delivery of local prevention action plans. Northern Ireland's Ministerial Co-ordination Group on suicide prevention are also continuing to provide oversight in line with their Protect Life 2 suicide prevention plan.

The statistics also support the work of the England and Wales National Suicide Prevention Advisory Groups, the National Suicide Prevention Strategy Advisory Group (NSPSAG) for England and the National Advisory Group to the Welsh Government on Suicide and Self Harm Prevention. These groups include representatives from different government departments, academics and charities who provide advice on suicide prevention, including funding.

Other users of these statistics include academics and charitable organisations such as Samaritans, Mind and PAPYRUS. The figures are often used for research purposes and they are used to target services for vulnerable groups.

Figures for England are also used in Public Health England's Suicide Prevention Profiles, which have been produced to help develop understanding at a local level and support an intelligence-driven approach to suicide prevention. Our suicide data are also used to support the Sustainable Development Goals, which are a universal call for action to address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, prosperity, and peace and justice.

Strengths and limitations

Strengths

- Suicide deaths are compiled using information supplied when a death is registered, which gives complete population coverage.
- Coding for cause of death is carried out according to the World Health Organisation (WHO) ICD-9 and ICD-10, based on internationally agreed rules.
- Statistics on suicide 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.
- We report two statistical measures, age-standardised rates and age-specific rates: age-standardisation is undertaken using the European Standard Population 2013; age-standardisation weights data according to its age structure, thereby enabling populations with different age structures to be compared validly.
- The combining of constituent country data means we can produce a UK-level release, which has greater usability among international bodies such as the Organisation for Economic Co-operation and Development (OECD) and Eurostat, as well as having the flexibility for constituent country benchmarking in a devolved health policy landscape.

Limitations

- For some breakdowns, such as certain geographical areas or age-groups, the number of deaths is either too small to report an age-standardised or age-specific rate or too small to report a rate with reliability; for example, due to small numbers of deaths, local authority estimates are based on three years of registrations data as opposed to single registration years.

- It is our best practice not to calculate rates based on such small numbers, as they are imprecise and susceptible to inaccurate interpretation; rates based on fewer than 20 deaths are marked with a “u” to warn users that their reliability is low; for reliability, age-standardised rates are not calculated for when there are fewer than 10 deaths, while age-specific rates are not calculated when there are fewer than three deaths.

- These statistics are compiled using information supplied when a death is registered and information such as ethnicity, sexual orientation and reasoning behind the suicide is not routinely recorded and so the data cannot be broken down by these factors.

- Due to disclosure control, our Policy on protecting confidentiality in tables of birth and death certificates limits the breakdowns that we can apply to the data.

Recent changes and improvements

Change to the National Statistics definition of suicide

The National Statistics definition of suicide was revised in January 2016 to include deaths from intentional self-harm in children aged 10 to 14 years. Previously, we did not include suicides in young children due to the very small numbers involved. However, after discussions with Public Health England and the constituent countries of the UK, it was decided that it was appropriate to include them.

Deaths from an event of undetermined intent in 10- to- 14-year-olds are not included in these suicide statistics, because although for older teenagers and adults we assume that in these deaths the harm was self-inflicted, for younger children it is not clear whether this assumption is appropriate. This new definition has been applied to the full back series from 1981 to the latest year of death registrations. Further information on the impact can be found in the 2014 suicide registrations bulletin.

Change to the Standard of Proof for suicide in England and Wales

In July 2018, the Standard of Proof used by Coroners in England and Wales to determine whether a death was caused by suicide changed. Previously, a “criminal standard” was applied, meaning that the coroner required evidence “beyond all reasonable doubt” that a death was caused by suicide. Since July 2018, a “civil standard” has been applied by coroners meaning that it must be shown on the balance of probability that:

- the death occurred because of a deliberate act by the deceased

- that in doing so and at all relevant times, the deceased intended the consequence would be death

For all deaths given a conclusion of suicide, a coroner makes this decision having ruled out all other possible explanations. The Office for National Statistics (ONS) will monitor and report the impact of this change on our data; as the change in the Standard of Proof occurred partway through a calendar year, we will not know the impact of the change until we have more data.

Cause of death coding changes

In 2011, the ONS, the National Records of Scotland (NRS) and the Northern Ireland Statistics and Research Agency (NISRA) adopted a change in the classification of deaths in line with the new coding rules of the World Health Organisation. The change resulted in some deaths previously coded under “mental and behavioural disorders” now being classified as “self-poisoning of undetermined intent” and therefore included in the suicide figures. Theoretically, this could mean that more deaths could be coded with an underlying cause of “event of undetermined intent”, which is included in the National Statistics definition of suicide.

Change to the coding of narrative conclusions

Narrative conclusions are a factual record of how, and in what circumstances, the death occurred. They are sometimes returned by coroners where the cause of death does not easily fit any of the standard “short-form” conclusions (see Table 1 for information on each type of coroners’ conclusion included in our suicide statistics).

In 2011, additional guidance was provided to the ONS coding team to improve the coding of narrative conclusions in England and Wales. Prior to 2011, some deaths with a narrative conclusion were coded as accidents. This is because the ONS applies the International Classification of Diseases (ICD) rules for coding cause of death such that where no indication of intent has been given by the certifier, deaths from injury or poisoning must be coded as accidents. At the same time, improvements were also made to allow better identification of narrative verdicts.

In October 2011, an advice note was also issued to coroners in England and Wales that provided guidance on the information that should be included in a narrative conclusion to help the ONS code cause of death using the ICD. In potential self-harm cases, coroners were advised that the description of the circumstances should make clear the intention of the action that led to death.

Together, these two changes (improvements in the coding of narrative conclusions; improved information included in coroner’s conclusions) could have resulted in an increased number of narrative conclusions coded as intentional self-harm since 2011, when previously they may have been coded as accidents because of a lack of information about intent.

Table 1: Coroner’s conclusions included in ONS suicide statistics (England and Wales)

Coroner’s conclusion	Detail
Suicide (sometimes referred to as a short-form conclusion)	A coroner will conclude that the cause of death was suicide having ruled out all other possible explanations. Based on the information provided by the Coroner, ONS then assigns these deaths with an underlying cause of death code from the ICD-10 range X60-X84 (intentional self-harm).
Open (sometimes referred to as a short-form conclusion)	These conclusions are given when it is not possible to determine whether the death was a result of an accident or whether the death was a result of intentional self-harm. Based on the information provided by the Coroner, ONS then assigns these deaths with an underlying cause of death code from the ICD-10 range Y10-Y34 (injury or poisoning of undetermined intent).
Narrative	Narrative conclusions are a factual record of how, and in what circumstances the death occurred. These are sometimes returned where the cause of death does not easily fit any of the above short-form conclusions. Narrative conclusions are only included in our suicide statistics if it has been possible to assign the death with an underlying cause of intentional self-harm or injury or poisoning of undetermined intent, based on the information provided by the Coroner.

Source: Office for National Statistics

Updated user guidance

Due to inaccurate use and reporting of data on suicide, which can have damaging consequences such as causing unnecessary or inappropriate concerns, we have since improved our guidance on how to use our suicide data. We have compiled information, which we include on all data published on our website, to provide users with a better understanding of our suicide registrations data, including where the data come from and some advice on use to aid interpretation.

7 . Quality characteristics of the suicides in the UK data

Relevance

Suicide statistics provide an indicator of mental health and are important for monitoring trends in deaths resulting from intentional (and probable) self-harm. The statistics are widely used to inform policy, planning and research in both public and private sectors and they enable policymakers and support services to target their resources most effectively. Main users of the data include:

- the Department of Health and Social Care
- other devolved health administrations
- public health observatories
- local and health authorities
- academics
- charity organisations

Each constituent country of the UK has a suicide prevention strategy (see the Uses and users subsection) in place to identify risk factors, take action through cross-sector organisations, and reduce suicide rates. These statistics are used to continuously assess trends in suicides and progress on suicide prevention.

Accuracy and reliability

For clarity, this section is divided into two sections. The first covers important points relating to the accuracy and reliability of suicide registrations data; the second concerns death registrations data more generally.

Suicide death registration statistics

Registration delays

In England, Wales and Northern Ireland, when someone dies unexpectedly, a Coroner investigates the circumstances to establish the cause of death. The investigation, referred to as an “inquest”, is a process that can take months, and in some cases, years. The length of time it takes to have an inquest creates a gap between the date of death and the date of death registration, referred to as a registration delay. The latest data shows that the median delay between the date of death and the date of registration was 152 days in England, 132 days in Wales, and 147 days in Northern Ireland (see Table 2).

Unlike the other countries of the UK, there is no system of coroners’ inquests in Scotland; instead, unexpected deaths are investigated by an official known as the Procurator Fiscal. In Scotland, the different system means that deaths caused by suicide are registered far earlier than those in any other country of the UK, with the median registration delay in 2017 being eight days.

Table 2: Median registration delay for deaths caused by suicide, UK, 2001 to 2017 registrations[1]

Registration Year	England	Wales	Scotland	Northern Ireland
2001	102	115	4	229
2002	102	125	5	278
2003	115	139	5	287
2004	126	155	5	257
2005	130	141	5	339
2006	137	166	5	328
2007	145	151	6	286
2008	153	146	6	243
2009	155	173	6	231
2010	156	149	7	171
2011	159	148	7	157
2012	156	148	7	144
2013	168	143	7	141
2014	150	133	7	146
2015	144	127	8	165
2016	149	126	7	147
2017	152	132	8	:

Source: Office for National Statistics, National Records of Scotland and Northern Ireland Statistics and Research Agency

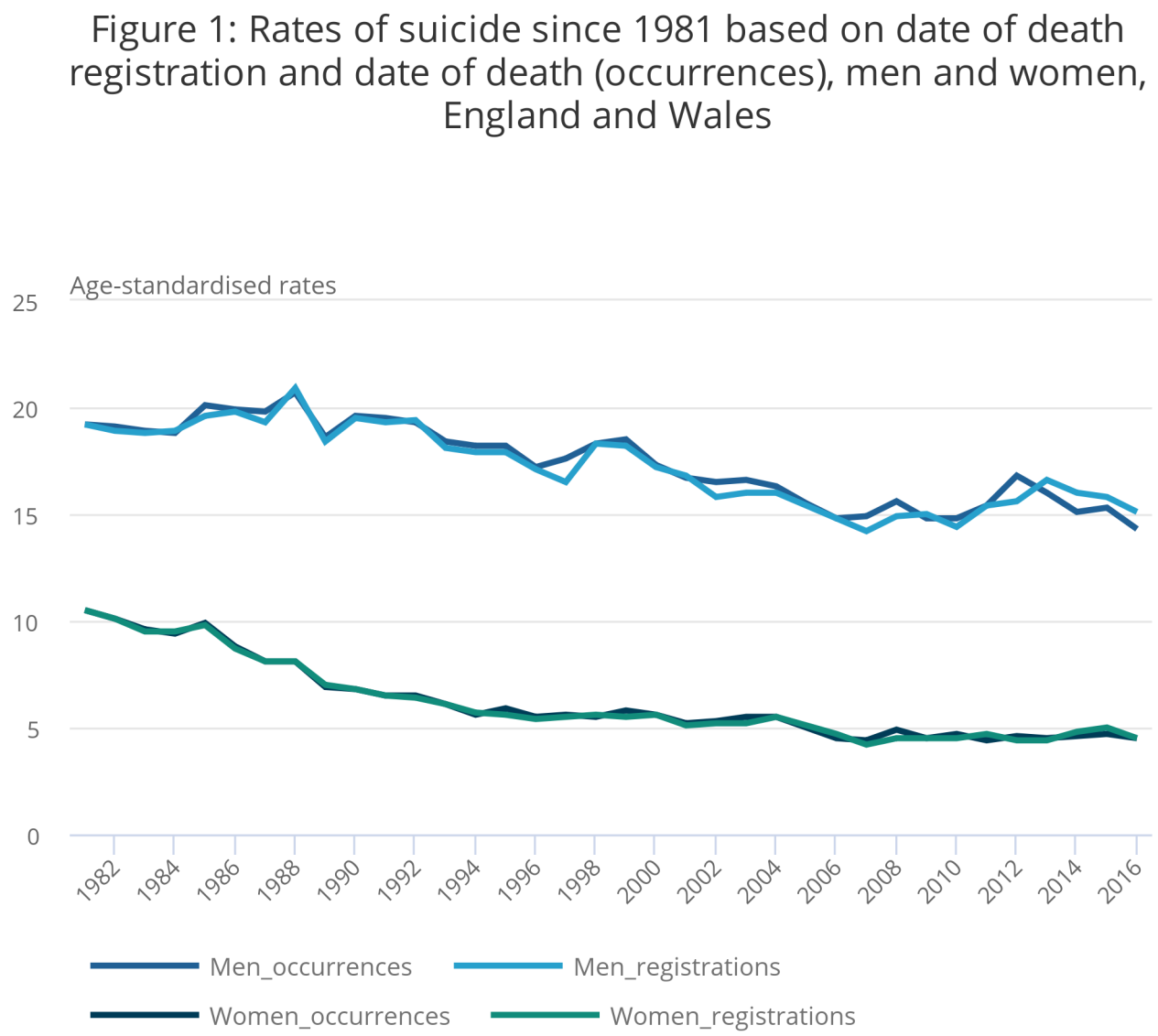
Notes

1. The value for Northern Ireland was unavailable at the time of our last publication and has therefore been noted “:”.

Publishing suicide figures based on year of registration means that many deaths appear in the statistics of a year that is later than the year in which the death occurred. Differences in the death registration systems in England, Wales, Scotland and Northern Ireland mean that the length of registration delays varies between these countries and has implications for the comparability of mortality statistics across the UK. That is, the UK suicide figures for deaths registered in a given year will comprise deaths occurring in different time periods for different countries of the UK. However, as suicide trends tend to change relatively slowly over time, this is unlikely to have a great impact on the usability of UK suicide statistics.

Despite registration delays, publication of suicide statistics by registration year enables figures to be published in a timely manner. The alternative would be to publish statistics based on the year in which the death occurred, however, this would delay publication, cause repeated revisions to historical data, and be inconsistent with other published mortality figures. When comparing rates of suicide based on year of registration and year of death, these generally follow the same pattern (Figure 1).

Figure 1: Rates of suicide since 1981 based on date of death registration and date of death (occurrences), men and women, England and Wales



Source: Office for National Statistics

Under-reporting of suicide

The actual number of suicide deaths in each year is likely to be greater than those reported in our annual release. The accuracy of suicide statistics is dependent on the quality of the information supplied when a death is registered. Deaths caused by suicide, including deaths of undetermined intent, are registered by a coroner. The Office for National Statistics (ONS) uses the information provided by coroners to code the underlying cause of death. In some instances, it can be difficult to establish whether the cause of death was suicide, for example, when a narrative conclusion is given. Narrative conclusions can be coded as suicide if the description clearly states that the individual intended to take their own life. If this is not clear they are referred to as “hard to code” narrative conclusions, which are coded as accidental deaths.

There are also factors that may influence whether a coroner reaches a conclusion of suicide or not including whether a note was left, marital status, advancing age and if the deceased had been in contact with psychiatric services more than a year before their death. Method of suicide has also been found to influence the conclusion given, with poisoning, jumping and drowning all less likely to receive a verdict of suicide than other conclusions such as hanging (see the Factors influencing coroners' verdicts report for more information).

Death registrations data

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 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, such as with suicides. 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 practicing 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.

Suicide statistics are National Statistics, which have been assessed by the Office for Statistics Regulation as fully compliant with the Code of Practice for Statistics. For a complete list of all National Statistics, see the list maintained by the Office for Statistics Regulation.

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 the Mortality statistics QMI and the User guide to mortality statistics.

Coherence and comparability

Suicide 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. We apply the National Statistics definition of suicide to data we receive from the NRS, as they produce annual updates on number of suicides deaths using a slightly different definition as the ONS. NISRA use the same definition of suicide as the ONS in their annual suicide updates.

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 included for Northern Ireland and Scotland. As such, for reasons of comparability, our UK estimate of suicide includes non-residents of England, Wales and Scotland. In the UK, causes of death are coded according to the International Classification of Diseases (ICD) produced by the World Health Organisation (WHO).

Statistics comparing suicide rates worldwide can be found on the WHO website. However, variant definitions are used internationally, which the Organisation for Economic Co-operation and Development (OECD) is addressing through efforts to agree an internationally recognised definition.

Accessibility and clarity

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 relevant statistical bulletin.

Timeliness and punctuality

The provisional date for the annual release of Suicides in the UK is pre-announced on the GOV.UK release calendar and on the ONS release calendar 12 months in advance. The date is then finalised at least one month before publication. Statistics are published around September (nine months after the end of the reference period).

We also publish the provisional number and rate of suicide deaths registered in England per quarter to provide timely surveillance of suicide deaths in England, based on the best available provisional data. Quarterly data for the latest year are provisional and may be subject to small changes once annual death registrations are complete.

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 Statistics.

Concepts and definitions

International Classification of Diseases (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. This means that the causes of deaths are consistently defined using the latest version: ICD-10 (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.

Suicide is defined as deaths where the underlying cause was intentional self-harm, for those aged 10 years and over, and deaths where the underlying cause was event of undetermined intent for those aged 15 years and over (see Table 3).

Table 3: The National Statistics definition of suicide based on codes from the International Classification of Diseases (ICD), England and Wales

ICD codes	Description	Notes
ICD 9 (deaths registered 1979-2000)		
E950-E959	Intentional self-harm	Persons aged 10 years and above
E980-E989	Injury/poisoning of undetermined intent	Persons aged 15 years and above; excludes E988.8
ICD 10 (deaths registered 2001 onwards)		
X60-X84	Intentional self-harm	Persons aged 10 years and above
Y10-Y34	Injury/poisoning of undetermined intent	Persons aged 15 years and above; excludes Y33.9 where the coroner's verdict was pending for the years 2001-2006

Source: Office for National Statistics

In January 2016, the suicide definition was revised to include deaths from intentional self-harm in children aged 10 to 14 years. Previously, we did not include suicides in young children due to the very small numbers involved but it has since been agreed that it is appropriate to include these deaths.

Deaths from an event of undetermined intent in 10- to 14-year-olds are not included in these suicide statistics, because although for older teenagers and adults we assume that in these deaths the harm was self-inflicted, for younger children it is not clear whether this assumption is appropriate. This new definition has been applied to the full back series from 1981 to the latest year of death registrations.

Geography

The suicides in the UK release covers:

- the UK and its constituent countries of England, Wales, Scotland and Northern Ireland
- lower tier local authorities in England
- regions in England
- unitary authorities in Wales

Output quality

Suicides in the UK is published nine months after the reference period. The production of these statistics relies upon the availability of the annual death 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 subsequently revised. Further information on key quality aspects related to suicides can be found in the 'Suicide death registration statistics' section.

Why you can trust our data

The User guide to mortality statistics provides detailed information on the processing and quality of mortality data for England and Wales. Internal consistency checks are conducted to eliminate any errors made during the recording of deaths, and to ensure the annual dataset is complete. Any concerns relating to cause of death are referred to a medical advisor or medical epidemiologist. For further information on mortality statistics in Scotland, please visit the National Records Scotland website, and for Northern Ireland, the Northern Ireland Statistics and Research Agency website.

In the compilation of these statistics, the ONS itself independently determines the focus, content, commentary, illustration and interpretation of these measures presented in bulletins. We provide early access for quality assurance to a small number of people working in other government bodies. This is to acknowledge use of mortality data we do not own, in the case of Scotland and Northern Ireland, and for general comment on the plausibility of our findings.

8 . Methods used to produce the suicides in the UK data

How we collect the data, main data sources and accuracy

Suicides in the UK is compiled using information supplied when a death is registered. A record for each death registered in England and Wales is held on the Office for National Statistics (ONS) Death Registrations Database, while those registered in Scotland and Northern Ireland are held by National Records of Scotland and the Northern Ireland Statistics and Research Agency 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 the User guide to mortality statistics.

For more information on administrative sources of data that the ONS uses to produce statistics (including a list of administrative sources), or that are available for use in the production of statistics in the future, and information on statistical techniques for using administrative data, please see the Statement of Administrative Sources.

How we process the data

All deaths in England and Wales are coded by the ONS according to the International Classification of Diseases, 10th Revision (ICD-10) produced by the World Health Organisation. Deaths caused by suicide are manually coded by a team of expert mortality coders based on information provided by the coroner.

The number of suicide deaths split by sex and age group (ages 10 to 14 years, 15 to 19 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.

How we analyse and interpret the data

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, England and Wales combined and England and Wales separately, while the latter are for the UK, its four constituent countries and English regions.

Age-standardised rates

The number of deaths does not consider the size of the underlying population and differences in numbers of deaths (for example, over time; between geographical areas) could be explained by differences in the underlying population structure such as different proportions of people of different ages. When available, rates, such as age-standardised mortality rates, should be quoted, as these are adjusted to consider population size and structure.

Age-standardised mortality rates are calculated using the number of deaths and mid-year population estimates provided by our Population Estimates Unit. Information about the methods used to calculate mid-year population estimates can be found in the Methodology guide for mid-year population estimates.

Age-standardised mortality 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 specific 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. 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:

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

where:

- *i* is the age group (under 1 year, 1 to 4 years, 5 to 9 years, 10 to 14 years and so on to 85 to 89 years, and 90 years and over)
- *wi* is the number, or proportion, of individuals in the standard population in age group i
- *ri* is the observed age-specific rate in the subject population in age group i, given by:

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

- *di* is the observed number of deaths in the subject population in age group i
- *ni* 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 years and over. This is because official population denominators for the oldest age group in the ESP (95 years and over) are not available for all geographical area levels.

Table 4: The 2013 European Standard Population, by age group

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

Age-standardised rates were not calculated where there were fewer than 10 deaths in a year and these are marked with ":" to inform the users that the rate has been suppressed. It is our best 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.

Due to small numbers of deaths, local authority estimates are based on three years of registrations data as opposed to single registration years. However, the data are published by single year for a higher subnational geography level, for example, English regions, where the number of deaths is large enough to produce reliable rates.

Age-standardised rates are published with 95% confidence intervals to allow users to identify significant differences between geographical areas, the sexes and over time. Significance is assigned on the basis of non-overlapping confidence intervals. As a general rule, if the confidence interval around an estimate overlaps with the interval around another, there is no significant difference between the two estimates. While more formalised and accurate methods of significance testing are available, the non-overlapping confidence interval 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. The standard error is denoted as SE(ASR) and calculated as:

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

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. This is calculated as follows:

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

where:

- *wi* is the number of individuals in the standard population in age group i
- *ri* is the crude age-specific rate in the local population in age group i
- *di* 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 suicide deaths are normally distributed. However, if the number of suicide 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). 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 are calculated as follows:

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

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

where:

- Dl and Du 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. This is calculated as follows:

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

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. This is calculated as follows:

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

Conversely, the normal approximation method is used where there are 100 or more deaths. This is calculated as follows:

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

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

How we quality assure and validate the data

Quality assurance is carried out at all stages of production. Specific procedures include:

- independent extraction and analysis of data by two members of staff to ensure that the same results and conclusions have been reached
- checking of new estimates through cross-referencing with past publications and more widely what we know about the general trend in mortality
- identification of outliers in subnational estimates

How we disseminate the data

The suicides in the UK release is annually published on the ONS website. This provides the latest number and rate of suicide deaths for the UK and its constituent countries, together with local administrations in England and Wales. Figures are available from 1981 as this is when the National Statistics Postcode Lookup file was first made available.

We also publish the provisional number and rate of suicide deaths registered in England per quarter to provide timely surveillance of suicide deaths in England, based on the best available provisional data. Quarterly data for the latest year are provisional and may be subject to small changes once annual death registrations are complete.

The Office for National Statistics is a member of both the English National Suicide Prevention Strategy Advisory Group and the Welsh National Advisory Group, where the latest published data are presented to the group to monitor suicide trends and inform policy.

The release calendar makes the release date and location of each new suicides in the UK release easy to locate. The bulletin can be downloaded free of charge as a PDF and the datasets in Microsoft Excel format. The underlying data for the charts and tables in the bulletin can be downloaded, while the digital interactive maps can be embedded into other media. For information regarding conditions of access to outputs, please refer to:

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

Special extracts and tabulations of mortality data for England and Wales are available to order (subject to legal frameworks, disclosure control, resources and agreements of costs, where appropriate). Metadata describing the limitations of the data for more detailed tables are provided with each individual request. Such enquiries should be made by email to mortality@ons.gov.uk.

How we review and maintain the data processes

The definition of suicide has been recently reviewed. In 2016, the suicide definition was revised to include deaths from intentional self-harm in children aged 10 to 14 years. Previously, we did not include suicides in young children due to the very small numbers involved. However, after discussions with Public Health England and the constituent countries of the UK, it was decided that it was appropriate to include them.

Deaths from an event of undetermined intent in 10- to- 14-year-olds are not included in these suicide statistics, because although for older teenagers and adults we assume that in these deaths the harm was self-inflicted, for younger children it is not clear whether this assumption is appropriate.

We are also involved with the national suicide prevention strategy advisory groups for England and Wales, where we consult experts from across government, academia, charities and families bereaved by suicide to identify evidence gaps, gather feedback, and scope out and test new ideas for inclusion in our bulletins. We will also work with this expert stakeholder group as an overseeing body in future reviews of the suicide definition.

9 . Methods used to produce estimates on suicides attributable to extreme heat

This section outlines the methodology for measuring suicides attributable to extreme heat in England and Wales. These are official statistics in development based on an indicator developed by the international Standards for Official Statistics on Climate-Health Interactions (SOSCHI) project led by the ONS.

Increased temperatures and extreme weather events have been found to impact on mental health as seen by increased risk of suicides. To measure this impact, a new methodology has been developed based on scientific literature and in consultation with leading experts. A detailed overview of the methods used are included in the SOSCHI methods document: suicides attributable to extreme heat. At the time of publication, this is an initial "alpha version", which will be updated as part of the final SOSCHI framework that is being developed.

Here, the approach has been applied to England and Wales data from 2001 to 2023, with details on the methods and data sources provided in this section to aid with interpretation of the estimates.

As these are official statistics in development we welcome further feedback from users, which can be sent to climate.health@ons.gov.uk.

Summary of the methodology

The indicator provides estimates of short-term excess risk of suicide attributable to extreme outdoor temperature. This can give insight into how more frequent and intense hot days may impact mental health, informing health protection measures.

For this indicator, extreme heat is defined as days when the daily mean temperature exceeds the 97.5th percentile for the associated geography and reference period, 2001 to 2023.

The indicator has four component parts:

- relative risk: association between mean temperature and suicide
- attributable fraction: percentage of suicides attributable to extreme heat
- attributable number: number of suicides attributable to extreme heat
- attributable rate: suicides per 100,000 population attributable to extreme heat

The statistical approach uses a two-stage design, adapted from Kim et al. Stage one applies a conditional quasi-Poisson case-crossover design with a distributed lag non-linear model (DLNM) to estimate the association between temperature and suicide in each geography. The DLNM, approach adapted from Gasparrini et al. captures non-linear and delayed effects. Stage two uses meta-analysis to pool results across geographies, improving statistical power in areas with low suicide counts and enabling additional estimates for England alone, and England and Wales combined.

Where there are cases of negative attributable numbers this may suggest that, in the context of the model, extreme heat is associated with a reduction in suicide rates (an inverse relationship). Monte Carlo simulations are used to derive 95% confidence intervals (adapted from Gasparrini and Leone).

Data sources

Statistics on daily mortality are derived from the information provided when deaths are certified and registered. This analysis uses the UK official statistics definition of suicide. For the purposes of this analysis, total estimates for England and Wales exclude non-residents as these are calculated from regional estimates through the meta-analysis.

More quality and methodology information on strengths, limitations, appropriate uses, and how the mortality data were created is available in:

- our Mortality statistics in England and Wales quality and methodology information (QMI)
- our User guide to mortality statistics

Daily regional mean temperature from the Centre for Environmental Data Analysis (CEDA) archive have been used for this analysis. CEDA works in collaboration with the Met Office to produce estimates of climate data from meteorological measuring stations across the UK.

Attributable rates per 100,000 population were calculated using population totals for each associated geography and time period taken from mid-year population estimates between 2001 and 2023.

Strengths and limitations

Strengths

While suicide is not a direct measure of the incidence or prevalence of mental health conditions, it is a useful proxy for some types of mental health challenges that may be exacerbated by extreme heat.

These statistics can therefore:

- monitor, to some extent, the mental health impacts of extreme heat
- inform national adaptation plans (NAPs) and resilience strategies
- guide environmental and public health policy to reduce heat-related risks

Data limitations

This analysis used daily suicide counts to assess temperature-related impacts. As suicide is relatively infrequent as a cause of death in the population as a whole, numbers can be low, especially at regional levels, contributing to uncertainty around the estimates. Confidence intervals should be considered when interpreting results.

For more information on the accuracy and reliability of suicide death registrations, please refer to the Quality characteristics of the suicides in the UK data.

Regional temperature values are derived from averaged grid-point values based on nearby weather stations. These represent outdoor temperatures and therefore do not capture exposure to indoor heat, which varies, for example, because of cooling systems. For more information on the temperature data see the HadUK-Grid information.

Method limitations

While short-term factors of relative humidity and rainfall were tested in the model, other factors such as sunshine duration, which are known to have independent effects on suicide rates, were not tested. Socioeconomic factors that may affect the rate of suicide, for example loss of livelihoods, were not considered. Although the analysis design helps control for such factors, unmeasured confounding may still bias results.

Relative risk estimates are based on the full, 2001 to 2023, timeseries. This may mask changes over time, for example, because of climate adaptation, potentially overestimating risk in later years and underestimating in earlier years. Therefore, any year-on-year changes in attributable estimates are likely to depend on temperature exposure rather than improved adaptation.

While this indicator focuses on short-term influences on suicides, climate impacts on mental health are broader and longer-term. Climate can impact conditions such as anxiety, depression and PTSD that are challenging to measure at this scale without regular population level surveys and post-event follow ups.

Acknowledgements

We would like to acknowledge members of the Mental Health Topic Expert Group for their contributions, especially Professor Masahiro Hashizume and Dr Yoonhee Kim at the University of Tokyo who helped to apply the methodology from an existing multi-location study to this indicator. The SOSCHI project is funded by Wellcome (grant number 224682/Z/21/Z).

10 . Other information

Here are some useful links to other sources of data on suicide:

- Suicide by Occupation, England: 2011 to 2015
- Estimating suicide among higher education students, England and Wales: Experimental Statistics
- Who is most at risk of suicide?
- Suicides – National Records of Scotland
- Suicides – Northern Ireland Statistics and Research Agency
- Suicide death statistics – Eurostat
- Deaths registered in England and Wales