User guide to mortality statistics

Supporting information for mortality statistics, which present figures on deaths registered in England and Wales in a specific week, month, quarter or year.

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Release date:
9 October 2025

Next release:
To be announced

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1 . Overview

Mortality statistics are gathered using information from death certificates registered in England and Wales. They include counts of death registrations (the date a death is registered with a local authority) and occurrences (the date a death happened).

These data contribute to Deaths registered weekly in England and Wales, and Deaths registered monthly in England and Wales, and Deaths registered in England and Wales (Annual).

We also publish more detailed annual statistics on specific mortality topics, including:

- deaths related to drug poisoning and alcohol
- deaths by suicide
- child and infant mortality
- avoidable mortality
- excess winter mortality
- deaths of homeless people

Some of our datasets also include data from Northern Ireland and Scotland, which are collected by the Northern Ireland Statistics and Research Agency and National Records Scotland.

Provisional and revised mortality estimates

In some of our mortality releases, we publish provisional counts of deaths. This is because they are early estimates, which will be revised in the future as more registrations are submitted. We do this for weekly death registrations, monthly death registrations and quarterly rates and numbers of suicides.

With each publication, we update the data for the previous period. This means the number of deaths in a given period can see minor changes over time.

Revisions to numbers of deaths by cause (including quarterly suicides) are often more significant, because the cause of death is not always available when a death is first registered.

Find out more

- Further information on death certification is available in Section 8: Death certification process.
- Further information on death registration is available in Section 9: Death registration process.

Death registrations and occurrences

We collect information from death registrations through an online submission system. A death is only counted in our figures once it is registered. This means that numbers of death occurrences are never final; it is impossible to know definitively whether all deaths for a given date have been registered.

Bank holidays, workloads of doctors certifying deaths and other closures of registration offices can all affect the timeliness of a death being registered. For this reason, we highlight where bank holidays fall in our weekly publications.

In some cases, there are longer delays, for example when a death is referred to a coroner.

Changes to the process by which causes of deaths are scrutinised and certified (Death certification reform) came into force in England and Wales on 9 September 2024.

Find out more

- Further information on death registrations and occurrences is available in Section 2: Occurrences, registrations and the standard dataset.
- Further information on death certification is available in Section 8: Death certification process.

We also publish our Impact of registration delays on mortality statistics dataset. An Overview of the death certification reforms is also available on the GOV.UK website.

Underlying and contributory causes of death

Most regular ONS mortality statistics include the underlying cause of death – in other words, deaths “due to” a particular condition.

In some publications, we also refer to deaths “involving” a certain condition. A condition involved in a person’s death is anything the person was recorded as having at their time of death, regardless of whether it was the underlying cause of death.

Find out more

- Further information on causes of death is available in Section 10: Cause of death coding.

Expected and excess deaths

Excess deaths are the difference between the observed number of deaths in a particular period and the number of deaths that would have been expected in that period, based on historical data. This helps us to monitor trends in mortality over time.

In the past, we compared current figures with the five-year average. However, we now use a statistical model to calculate the expected deaths for any given period, which uses age-specific mortality rates, accounting for how the population has grown and aged over time.

The model also accounts for recent trends in mortality and seasonal and calendar effects.

This approach also means that extraordinary events such as the coronavirus (COVID-19) pandemic do not skew our estimates.

Find out more

- Further information is available in our Estimating excess deaths in the UK: February 2024 method changes article.

2 . Occurrences, registrations and the standard dataset

The majority of mortality publications are now based on registrations. The Office for National Statistics (ONS) continues to take an annual extract of death occurrences in the autumn following the data year, which is used for seasonal analysis of mortality data and several infant mortality outputs.

Since 2006, our Deaths registered in England and Wales annual bulletin has been based on the number of deaths registered in the calendar year. Between 1993 and 2005, the figures in annual reference volumes relate to the number of deaths that occurred in the reference period. Prior to 1993, publications gave numbers of deaths registered in the period. More details on these changes can be found in Mortality statistics: deaths registered in 2006.

The numbers of registrations for a year that actually occurred in previous years are shown in Table 1.

Table 1: Number of deaths that were registered and occurred in each calendar year, England and Wales, 2001 to 2024

Annual dataset year for registrations	Number of registrations	Number registered which occurred in that year	Percentage of those registered that occurred in that year	Number registered which occurred in previous years	Percentage of those registered that occurred in previous years
2024	568,613	524,936	92.3%	43,677	7.7%
2023	581,362	530,800	91.3%	50,562	8.7%
2022	577,158	541,770	93.9%	35,388	6.1%
2021	586,332	553,740	94.4%	32,592	5.6%
2020	607,920	577,143	94.9%	30,777	5.1%
2019	530,837	502,028	94.6%	28,809	5.4%
2018	541,589	509,829	94.1%	31,760	5.9%
2017	533,253	505,452	94.8%	27,801	5.2%
2016	525,047	501,881	95.6%	23,166	4.4%
2015	529,654	504,482	95.2%	25,172	4.8%
2014	501,400	477,734	95.3%	23,666	4.7%
2013	506,789	482,657	95.2%	24,132	4.8%
2012	499,320	478,724	95.9%	20,596	4.1%
2011	484,363	463,449	95.7%	20,914	4.3%
2010	493,239	473,659	96.0%	19,580	4.0%
2009	491,346	471,113	95.9%	20,233	4.1%
2008	509,064	488,750	96.0%	20,314	4.0%
2007	504,036	485,055	96.2%	18,981	3.8%
2006	502,590	485,199	96.5%	17,391	3.5%
2005	512,985	497,598	97.0%	15,387	3.0%
2004	514,245	499,081	97.1%	15,164	2.9%
2003	539,137	524,821	97.3%	14,316	2.7%
2002	535,352	520,847	97.3%	14,505	2.7%
2001	532,435	516,950	97.1%	15,485	2.9%

Source: User guide to mortality statistics from the Office for National Statistics

Notes

1. Of the 568,316 deaths registered in 2024, 524,936 occurred in 2024, 39,008 occurred in 2023, 3,321 occurred in 2022 and 1,348 occurred before 2022.

2. Deaths that do not contain sufficient information to calculate the registration delay have been excluded from all analyses. This is usually when the date of death occurrence is missing from the death certificate. Therefore, figures may not match those published elsewhere or previous versions of this publication.

The numbers of late registrations not included in the death occurrence dataset are shown in Table 2.

Table 2: Number of late registrations not included in the annual death occurrence dataset, England and Wales, 2001 to 2023

Year of death occurrence	Late registrations not included in occurrence dataset
2023	2,214
2022	5,646
2021	5,840
2020	4,802
2019	5,662
2018	3,109
2017	2,553
2016	3,491
2015	2,686
2014	2,923
2013	3,007
2012	3,863
2011	3,146
2010	3,065
2009	3,314
2008	3,451
2007	3,475
2006	1,721
2005	2,425
2004	2,239
2003	2,028
2002	1,792
2001	1,372

Source: User guide to mortality statistics from the Office for National Statistics

The numbers of late registrations by year of occurrence are subject to future revisions because of the likely addition of late registrations; revisions could extend back a number of years. Our Impact of registration delays on the mortality statistics bulletin provides further information on the time taken to register deaths in England and Wales.

3 . Cause of death definitions and lists

Causes of death presented in the data tables include only those causes with at least one death recorded during the reference period. There are several definitions and lists that are used to report cause of death statistics.

ONS leading cause of death

The Office for National Statistics (ONS) leading cause of death list was produced in 2005 by the ONS, based on a list developed by the World Health Organization (WHO). Revisions were made in 2015 and 2016, and coronavirus (COVID-19) was added as a leading cause during the pandemic.

Find out more

Further information is available in:

- our Leading causes of death in England and Wales – how should we group causes? article (PDF, 146 KB)
- the Method for deriving leading causes of death from the Bulletin of the World Health Organisation

ONS short list of cause of death

The ONS short list of cause of death, which can be found in Annex A (XLS, 25 KB), was developed by the ONS in consultation with the Department of Health (now the Department of Health and Social Care, (DHSC). This list of over 100 conditions is based on:

- all conditions given in the World Health Organization (WHO) basic tabulation list, with the exception of a few conditions that are so rare as certified causes of death in England and Wales that they could be safely excluded from the list
- totals for each International Classification of Diseases, 10th edition (ICD-10) chapter
- conditions used in monitoring public health targets
- other conditions often cited by the ONS

UK harmonised definitions

Definitions of specific causes of death used in accredited official statistics have been harmonised across UK countries to enable the production of coherent mortality statistics on these topics. We use harmonised definitions for suicides, deaths related to drug poisoning and alcohol-specific deaths. Further information is available in:

- our Suicides in the UK quality and methodology information (QMI)
- our Deaths related to drug poisoning in England and Wales QMI
- our Alcohol-specific deaths in the UK QMI

4 . Childhood mortality

Stillbirths

The Still-Birth (Definition) Act 1992 defines a stillbirth as "a child which has issued forth from its mother after the 24th week of pregnancy, and which did not at anytime after becoming completely expelled from its mother breathe or show other signs of life".

This definition has been in use since 1 October 1992. Prior to this, the Births and Deaths Registration Act 1953 defined a stillbirth as at 28 or more weeks completed gestation, rather than 24. Figures for stillbirths from 1993 are, therefore, not comparable with those for previous years. From 28 May 2012, the restriction to register a stillbirth within three months from the date of occurrence has been removed and stillbirths can be registered at any time.

Infant deaths

Infant deaths (under 1 year) at various ages are defined as:

- early neonatal - deaths under seven days
- perinatal - stillbirths and early neonatal deaths
- neonatal - deaths under 28 days
- postneonatal - deaths between 28 days and one year

Linked data refer to infant death records that have been successfully matched to their corresponding birth record; see the annual publications Child and infant mortality statistics, Infant mortality (birth cohort) tables and Unexplained deaths in infancy for further details.

Neonatal deaths

The tabulations of deaths by cause exclude neonatal deaths (deaths of infants aged under 28 days). In January 1986, a neonatal death certificate was introduced, from which it is not possible to assign an underlying cause of death. This certificate follows recommendations of the World Health Organization (WHO) in the International Classification of Diseases (ICD) (WHO, 1992 to 1994), whereby causes of death are given separately in the following categories:

- main diseases or conditions in fetus or infant
- other diseases or conditions in fetus or infant
- main maternal diseases or conditions affecting fetus or infant
- other maternal diseases or conditions affecting fetus or infant
- other relevant causes

While conditions arising in the mother that affected the fetus or infant could be mentioned on certificates prior to 1986, no provision was made for those cases in which the certifier considered that both maternal and fetal conditions contributed to the death. The certificate introduced in 1986 overcame this problem. However, since equal weighting is now given to main conditions in the fetus and in the mother, it is no longer possible to identify a single underlying cause of death for neonatal deaths (and stillbirths).

For this reason, most Office for National Statistics (ONS) mortality publications that include cause breakdowns exclude deaths of neonates. Together with a team of experts in the field, the ONS developed a hierarchical classification for classifying causes of neonatal deaths and stillbirths in ICD-10, known as the "ONS cause groups". More details can be found in our latest Child and infant mortality statistics bulletin.

In-depth information on the quality and methodology of these statistics can be found in our Child and infant mortality statistics QMI.

5 . Area coverage

Non-residents

Published mortality statistics are based on deaths registered in England and Wales, so include some deaths of residents of other UK countries and of visitors, where the death occurred in England and Wales.

Deaths of those whose usual residence is outside England and Wales are included in total figures for "England and Wales" overall but are excluded from any smaller geographical breakdowns. Table 3 gives recent numbers of deaths of non-residents, that were registered in England and Wales.

Table 3: Number of deaths of non-residents registered in England and Wales, 2015 to 2024

Year of registration	Number of deaths from all causes	of which, deaths of residents outside England and Wales	Percentage of deaths of residents outside England and Wales
2024	568,613	1,255	0.2%
2023	581,363	1,255	0.2%
2022	577,160	1,133	0.2%
2021	586,334	850	0.1%
2020	607,922	823	0.1%
2019	530,841	1,288	0.2%
2018	541,589	1,324	0.2%
2017	533,253	1,123	0.2%
2016	525,048	1,191	0.2%
2015	529,655	1,148	0.2%

Source: User guide to mortality statistics from the Office for National Statistics

Area of usual residence

Prior to 2016, the Office for National Statistics (ONS) assigned "area of usual residence" using a look-up product (the National Statistics Postcode Directory). This product associated postcodes with several geographic levels (for example, local authority or region). The postcode was allocated to each level of geography using a point-in-polygon methodology. Although this method is spatially accurate, it does not provide the stable building blocks needed for comparing geographies at different levels.

From the 2011 data year, we have assigned "area of usual residence" by first linking each postcode to an output area using this same point-in-polygon methodology and then linking to all higher geographies by using a population-weighted, best-fit look-up to output area, (The National Statistics Postcode Lookup, NSPL). This means that postcodes are allocated to a higher geography based on where the output area population-weighted centroid lies. This is in line with the Geography Policy for National Statistics.

Switching to the new area allocation method had negligible impact on mortality statistics down to local authority level. However, the new method improved comparability of mortality statistics for subnational areas over time.

For more information about these methods, see National Statistics Postcode Products. A paper investigating the impact of the new method on life events data was published in March 2013.

Until the 2016 data year, annual mortality statistics by area of usual residence were produced using the boundaries that were in place during the year the death was registered. For 2017 data onwards, figures are produced based on the latest boundaries available at the time of publication.

Details of the usual residence of the deceased are supplied by the informant to the registrar. Prior to 1993, there were rules determining the validity of one competing address over another for the purpose of registering the usual place of residence of the deceased. Previous annual reference volumes contain details of these rules. Since 1993, the informant can decide what address to give if more than one might be applicable.

Each year, there are a small number of cases (around 0.1%) where no usual residence is provided by the informant. This may be because the deceased had no fixed abode or their address was unknown. In such cases, the usual residence is coded to where the death took place.

Deaths overseas (including war deaths)

The law requires all deaths that occurred in England and Wales to be registered, after certification of the cause of death by a doctor or in some cases, investigation by a coroner. ONS mortality statistics are based on these registrations, and therefore do not include deaths abroad, for example, members of the armed forces serving overseas, international transport accidents (unless within the relevant territory) or individuals taken ill on holiday or business in another country.

Deaths of usual residents of England and Wales that occur elsewhere are not required to be registered in England and Wales, and the information provided by the civil registration systems of foreign countries varies in its timeliness and quality. However, the General Register Office does receive notifications of many deaths abroad and provides access to individual records through their website.

Place of occurrence

As a result of improvements in the classification and coding of communal establishments, the place of death definition that we use was revised in 2011. These changes were implemented for 2010 mortality statistics.

In particular, the classification was changed to specifically identify local authority and non-local-authority care homes. The categories for NHS and non-NHS psychiatric hospitals, other hospitals and communal establishments for the care of the sick have also been replaced with a category for all hospitals. This reflects current user needs.

Further improvements to how deaths are allocated to individual establishments and to how these are assigned to place of death categories is an ongoing exercise, which will improve the quality of this new classification.

The groups used for the place where death occurred are:

- home (those at the usual residence of the deceased (according to the informant), where this is not a communal establishment)
- care home (whether local authority or non-local authority)
- hospitals and communal establishments for the care of the sick (excluding psychiatric hospitals and hospices) (whether NHS or other than NHS)
- hospices (whether NHS or other than NHS)
- other communal establishments: includes schools, convents and monasteries, nurses' homes, university and college halls of residence, young offender institutions, secure training centres, detention centres, prisons and remand homes elsewhere: includes all places not covered in this list such as deaths on a motorway; at the beach; climbing a mountain; walking down the street; at the cinema; at a football match; while out shopping; or in someone else's home

To calculate death figures by place of death, we use information collected on the death certificate to determine where the death occurred and where the deceased lived. When these two variables are the same location, and this location is not a communal establishment, we create the group for deaths at home (sometimes referred to as "private homes").

Where the individual died in a communal establishment, we link the mortality data to a communal establishment file via a unique identifier assigned by the registrar. This allows us to collect information on the type of establishment, by breaking the list into over 80 types of organisation. Using these, we group the organisations into the categories described previously.

Where the deceased did not die in their own home, or in a communal establishment, they are included in figures for "elsewhere", which covers all other locations.

Figures on deaths of care home residents are also published, which differ to deaths in care homes. The term "care home resident" refers to all deaths where either (a) the death occurred in a care home or (b) the death occurred elsewhere but the place of residence of the deceased was recorded as a care home.

6 . Base populations

Annual populations

The population estimates used to calculate mortality rates are mid-year estimates of the resident population of England and Wales, based on the census. Our mid-year population estimates are updated figures using the most recent census, allowing for births, deaths, net migration and ageing of the population. When population estimates are not available for a current year, population projections are used, as such, figures for 2024 are based on projected populations.

The population estimates used are the most up to date when rates are produced. The specific population estimates used to calculate rates are detailed alongside published tables. Sometimes it is necessary to revise mortality rates following population estimate revisions. Any revisions to mortality rates are footnoted on tables. Further information on population estimates and their methodology is available.

Rebased mid-year population estimates following Census 2021

Our mid-year population estimates for the years 2012 to 2020 previously used data from 2011 Census, and figures for 2021 were previously based on projected populations. As of November 2023, revised population estimates for the years 2012 to 2021 have been calculated using Census 2021. We have therefore revised age-standardised mortality rates for the affected years accordingly in our Deaths Registered in England and Wales: 2022 release.

Populations for other time periods

For other time periods, adjustments are made to interpolate between annual population estimates based on how far a target date is between the dates of the two closest annual population estimates. For example, for monthly populations, we calculate an interpolated population centred on the midpoint of the month using two years' worth of population estimates (or where these are not available, population projections). For the first half of the year (January to June), populations for the current year and the previous year are used; for the second half of the year (July to December), populations for the current year and the following year are used.

The output is used as the population denominator in calculations of age-standardised and age-specific mortality rates.

For example:

June 2021 population equals
$population2020(i) \ + \ \left((population2021(i) \ - \ population2020(i)) \ x \ \left(\frac{m}{M} \right) \right)$

Where:

- m is the number of days from 1 July 2020 (the start of the mid-year for the population estimate) to the midpoint of June 2021 inclusive
- M is the number of days in 2021
- (i) is the age group

July 2021 population equals
$population2021(i) \ + \ \left((population2022(i) \ - \ population2021(i)) \ x \ \left(\frac{m}{M} \right) \right)$

Where:

- m is the number of days from 1 July 2021 (the start of the mid-year for the population estimate) to the midpoint of July 2022 inclusive
- M is the number of days in 2021
- (i) is the age group

7 . Death rates, ratios and standardisation

Death rates are derived from total deaths registered in England and Wales in the specific calendar year and corresponding mid-year population estimates.

It is the Office for National Statistics (ONS) practice not to calculate rates where there are small numbers of deaths in a cell, as rates based on such low numbers are susceptible to inaccurate interpretation. Age-standardised rates are not calculated where there are fewer than 10 deaths in a cell and crude rates are not calculated when there are fewer than 3 deaths in a cell; both of these are noted by (x). Rates that are based on fewer than 20 deaths are displayed in tables but are denoted by (u) as a warning to the user that the measure may be unreliable because of the small number of events.

Prior to July 2014, age-standardised rates were not calculated where there were fewer than three deaths in a cell. Rates in tables calculated from between 3 and 19 deaths were distinguished by italic type.

Annualisation of rates

For all types of rates outlined in this section, the basic unit would be "deaths per N population per X days" where N might commonly be 1,000 or 100,000, and X is the number of days within the period being considered (for example, seven days if weekly). To allow for easier comparison of rate values between periods of different length, unless otherwise stated in individual publications, rates are adjusted to be a consistent unit of "deaths per N population per year", using the following equation:

$$\text{adjusted rate} = rate\ x\ \left(\frac{y}{d}\right)$$

Where:

- rate is the unadjusted rate, based on deaths and population figures for the specified time period (per week, month or quarter).
- Y is the number of days in the year that the period falls within (365 or 366 for non-leap years and leap years, respectively)
- d is the number of days covered by the unadjusted period (for example, 7 if one week, 31 if May)

Crude death rate

Crude death rate is defined as total deaths per 1,000 population, or:

$$(\text{Total deaths divided by Total population})\ \text{multiplied by 1,000}$$

Age-specific death rates

Age-specific death rates may be calculated for each age group. These are defined as the number of deaths in the age group per 1,000 population in the same age group or:

$$M_k = (d_k\ \text{divided by}\ p_k)\ \text{multipled by}\ 1,000$$

Where:

M = age-specific death rate for age group k

d = deaths in age group k

p = population in age group k (mid-year population estimates with the exception for the rate for those aged under 1 year where the number of live births are used instead)

 = age

Age-specific rates may be calculated separately for males and females or for both sexes combined.

Age-standardised mortality rates (ASMRs)

Age-standardised mortality rates (ASMRs) allow for differences in the age structure of populations and therefore allow valid comparisons to be made between geographic areas, over time and between sexes. Using the direct method, the age-standardised rate for a particular condition is that which would have occurred if the observed age-specific rates for the condition had applied in a given standard population.

Thus:

$$\text{age-standardised rate} = \left\{\sum P_k m_k\right\} \text{ divided by } \sum P_k$$

Where:

P = standard population in sex or age group k

m = observed mortality rate (deaths per million persons) in sex or age group k (mid-year population estimates are used to calculate all age-specific rates prior to standardisation)

 = age or sex group 0, 1 to 4, 5 to 9, ..., 85 to 89, 90 years and over

(From the 2015 data year, ASMRs are calculated using population estimates for all age groups. Prior to the 2015 data year, the number of live births were used for the population at age under 1 year old. This change has had no significant impact on the rates.)

The age-standardised rate for “all causes” includes deaths at all ages, while the same rates for specific causes exclude neonatal deaths (infants aged under 28 days). Classification by underlying cause is not possible for neonatal deaths (see Section 11: Childhood mortality; subsection: Neonatal deaths).

The standard population used is the European Standard Population (ESP); it is the same for both males and females. The ESP is a hypothetical population used to weight ASMRs.

The ESP was originally published in 1976 and was updated by Eurostat in 2013. The 2013 ESP structure allocates a greater weight to older ages to better reflect the ageing population. This change has had a significant impact; consequently, ASMRs based on the 1976 ESP are not comparable with those based on the 2013 ESP. Further information about the change in methods is available.

Table 4: Distribution of the European Standard Population for 1976 and 2013

Age	1976 ESP [note 1]	2013 ESP [note 2]
Under 1 years	1,600	1,000
1 to 4 years	6,400	4,000
5 to 9 years	7,000	5,500
10 to 14 years	7,000	5,500
15 to 19 years	7,000	5,500
20 to 24 years	7,000	6,000
25 to 29 years	7,000	6,000
30 to 34 years	7,000	6,500
35 to 39 years	7,000	7,000
40 to 44 years	7,000	7,000
45 to 49 years	7,000	7,000
50 to 54 years	7,000	7,000
55 to 59 years	6,000	6,500
60 to 64 years	5,000	6,000
65 to 69 years	4,000	5,500
70 to 74 years	3,000	5,000
75 to 79 years	2,000	4,000
80 to 84 years	1,000	2,500
85 years and over	1,000	[z]
85 to 89 years	[z]	1,500
90 to 94 years	[z]	800
95 years and over	[z]	200
Total	100,000	100,000

Source: Revision of the European Standard Population (ESP): Report of Eurostat's task force from Eurostat, and Revised European Standard Population: 2013 ESP from the European Union

Notes

1. Revision of the European Standard Population: Report of Eurostat's task force.
2. Revised European Standard Population: 2013 ESP.
3. [z] denotes that this figure is not applicable.

For Accredited Official statistics publication of mortality and cancer incidence, the ONS is currently using an abridged ESP with a 90 years and over upper age band. Accredited Official statistics population estimates are only currently available for upper age limit of 90 years and over.

Perinatal mortality rate

Perinatal mortality rate is the number of deaths at ages under seven days (early neonatal deaths) plus stillbirths per 1,000 live births and stillbirths in the same period.

Infant mortality rate

Infant mortality rate is the number of deaths at ages under 1 year per 1,000 live births.

Years of life lost

Analyses of the effects of premature death assume that everyone may live to a defined age and that death at a younger age means that some future years of life have been lost. Calculations of Years of Life Lost (YLL) are made for deaths from selected causes with the aim of illustrating the relative effects from different diseases. From the 2023 edition onwards, the age group used is 1 to 74 years of age. These exclude deaths under 1 year of age, and at high ages where the cause may be uncertain. Prior to the 2023 edition, the "cut-off" ages used were 65, 75 and 85 years of age.

This approach, but with a "cut-off" age of 65 years, is also used to calculate Years of Working Life Lost (YWLL) due to premature death. From the 2012 data year onwards, the period of working life covers ages 16 to 64 years. Prior to the 2012 data year, the period of working life covered ages 15 to 64 years. This change has a negligible impact on the comparability of statistics over time:

$$\mathrm{YLL} = \sum (A - a_i) d_i$$

$$YWLL = [\sum (65 - a_j) d_j] + 49 \sum d_k$$

Where:

d , d , d = number of deaths in age group i, j or k

a , a , a = age i, j or k + 0.5

A = 75 years

= 1 to 74 years

= 16 to 64 years

= 1 to 15 years

The mean age at death may be included as a further indicator of the relative effects of premature death. It is based on the sum of ages at death for each person. From the 2023 edition, this was calculated based on single years of age 1 to 119, 120 and over. Prior to the 2023 edition this included those under 1 year of age. This change has a negligible impact on the comparability of statistics over time:

$$\mathrm{Mean\ age\ at\ death} = \frac{\sum (a_i d_i)}{d}$$

Where:

a = age + 0.5

d = number of deaths at age i

= single years of age 1 to 119, 120 and over

d = total number of deaths

Crude rate of years of life lost

Crude rate of years of life lost is defined as the number of Years of Life Lost for the specified ages (those aged 1 to 74 years) for the population of England Wales for those specified ages. It is given per 100,000 population:

$$\text{Crude rate of YLL} = \frac{YLLi}{P} * 100,000$$

Where:

YLL = number of years for given ages

P = population of England and Wales for given ages

Potential years of life lost

Potential years of life lost (PYLL) is a measure of the potential number of years lost when a person dies prematurely from any cause. The basic concept of PYLL is that deaths at younger ages are weighted more heavily than those at older ages. The advantage in doing this is that deaths at younger ages may be seen as less important if cause-specific death rates were just used on their own in highlighting the burden of disease and injury, since conditions such as cancer and heart disease usually occur at older ages and have relatively high mortality rates.

To enable comparisons between areas and over time, age-standardised PYLL rates, also known as SYLL rates, are calculated. These rates represent the PYLL if the population of England and Wales had the same population structure as the 2013 European Standard Population (ESP). SYLL rates are presented as years of life lost per 100,000 population.

PYLL is calculated as the sum of the mortality rate in each age group weighted by the potential number of years of life lost as indicated by remaining life expectancy for each age group. To calculate SYLL, this is then standardised to the 2013 ESP as shown in the equation:

$$\text{S}YLL = \frac{\sum_i (w_i \frac{a_i d_i}{n_i})}{\sum_i w_i} X\ 100,000$$

Where:

 = age group (less than 1 year, 1 to 4 years, 5 to 9 years, 10 to 14 years, ..., 85 to 89 years, and 90 years and over)

d = number of deaths in age group

a = weight or average age-specific period life expectancy in age group for a given year

n = population in age group

w = number of individuals in the standard population in age group

8 . Death certification process

When a death occurs, the attending practitioner (AP) completes a medical certificate of cause of death (MCCD).

Death Certification Reform

Changes to the process by which causes of deaths are scrutinised and certified (death certification reform) came into force in England and Wales on 9 September 2024. These reforms were led by the Department of Health and Social Care (DHSC) and are underpinned by various pieces of legislation and regulations. The reforms follow well-publicised reports and inquiries since the Shipman case in 1998 (PDF, 1.45MB), and cover a number of changes.

Changes to eligibility of APs

Since death certification reform, a medical practitioner who cared for the deceased continues to be identified as an AP and to be responsible for certifying the cause of death.

A medical practitioner is eligible to be an AP and complete a MCCD, if they have attended the deceased in their lifetime. This is a change from the previous requirement, where the AP must have attended the deceased within 28 days. In March 2020, the Coronavirus Act 2020 set the temporary provision for any doctor to complete the MCCD. This provision ended in March 2022.

Since death certification reform, the AP must share the completed MCCD and proposed cause of death with a medical examiner (ME).

Introduction of a statutory ME system

MEs were introduced on a non-statutory basis in 2019, and the proportion of deaths scrutinised by an ME has increased gradually since then. From 9 September 2024, a statutory ME system was introduced, and since then all deaths that are not certified by a coroner must be scrutinised by an ME.

The role of an ME is to:

- provide independent scrutiny of causes of death given by the medical practitioner, to improve the quality and accuracy of the MCCD
- facilitate discussions between the bereaved and someone not involved in providing care about any questions or concerns they may have
- review medical records and work with APs to complete the MCCD, help ensure its accuracy and highlight any concerns about the care of the deceased

The AP will complete the MCCD and will forward the completed MCCD to the ME. The ME will scrutinise the MCCD.

Once the AP and ME have completed their certification and scrutiny, the MCCD is sent to the Register Office. The ME then notifies the informant that they can register the death.

This notification starts the five-day statutory time frame to register a death. Before 9 September 2024, the five-day statutory time frame started from the date of death, or the date on which the body was found, (including weekends and bank holidays), unless the coroner is involved. Most deaths are certified by an AP and registered in this way. Please refer to Section 9: Death registration process for more information.

We continue to monitor the time taken to register a death as part of our ongoing assessments of the quality and timeliness of mortality data. Our preliminary assessments are available in our Death certification reform, England and Wales: 9 September 2024 to 30 June 2025 (provisional data) article.

Monitoring the time taken to register a death is important because any change in time taken to register a death following 9 September 2024 could affect the interpretation of our statistics. For example, in our excess deaths measure, the observed number of registrations is compared with a statistically calculated expected number of deaths each week.

Introduction of an ME MCCD

The medical examiner medical certificate of cause of death (ME MCCD) also allows MEs to certify natural deaths in rare cases where:

- there is no AP
- an AP is not available within a reasonable time

The ME MCCD is used when the cause of death is known, where a senior coroner determines they do not need to investigate, and helps avoid unnecessary post-mortems or uncertified deaths.

Changes to the existing MCCD

Death certification reform has also introduced new data fields to the MCCD, including:

- line 1d in Part 1 of the Cause of death section, which brings the MCCD in line with international standards
- ethnicity of deceased, as self-declared by the patient on the medical record
- questions about whether the deceased was pregnant, and whether the pregnancy contributed to the death, which brings the MCCD in line with international standards

The changes to the MCCD apply to those who have died on or after 9 September 2024 and mean a new MCCD (Annex B (PDF, 272 KB)) will be used for these deaths, rather than the previous MCCD (Annex C (PDF, 386 KB)). Transitional arrangements were prepared to manage the small number of deaths where the MCCD was issued before 9 September 2024 but was not processed and registered until after this date.

We are monitoring the use of these new data fields to assess their quality and inform their use in future mortality statistics. Our preliminary assessments are available in our Death certification reform, England and Wales: 9 September 2024 to 30 June 2025 (provisional data) article.

Changes to coroner forms

Coroner forms have changed to reflect:

- the statutory ME system
- the introduction of the ME MCCD
- new fields on the existing MCCD

Changes affecting informants and registrars

New categories of informants have been introduced for:

- the partner of the deceased
- the personal representative of the deceased

Death certification reform changes the responsibilities of the registrar. There is no longer a requirement for a registrar to:

- scrutinise a cause of death
- refer to the coroner

The registrar can refer the MCCD back to the ME if any questions or concerns are raised by the informant.

There are circumstances when a MCCD cannot be issued immediately, such as when a death is reported to a coroner, and registration is consequently delayed.

Referral to the coroner

Deaths that should be referred to a coroner by an AP include those where:

- the cause is unknown
- the deceased was not seen by the certifying doctor either after death or within the 14 days before death
- the death was violent, unnatural or suspicious
- the death may have been due to an accident (whenever it occurred)
- the death may have been due to self-neglect or neglect by others
- the death may have been due to an industrial disease or related to the deceased's employment
- the death occurred during an operation or before recovery from the effects of an anaesthetic
- the death may have been a suicide
- the death occurred during or shortly after detention in police or prison custody
- there was no doctor available who was legally qualified to certify the death

Coroners have several possible courses of action once a death has been referred.

From 9 September 2024, if the coroner decides they are not under a duty to investigate the death (because the death was due to natural causes) the coroner will complete either:

- Form CN1A, Annex D (PDF, 75 KB), which is sent to the AP (with an ME copied)
- Form CN1B, Annex E (PDF, 111 KB), which is sent to an ME

Form CN1B is completed to inform the ME that the case is being referred in the absence (or timely availability) of an AP. This form notifies the ME that they should complete an ME MCCD.

Before 9 September 2024, the coroner would complete Form 100A (Annex F: (PDF, 142 KB)), which would notify the registrar to register the death using the cause given on the MCCD.

In rare cases where no medical certificate is available, the death will be registered as uncertified and the cause taken from Form 100A.

Alternatively, the coroner may order a post-mortem examination. This may happen if:

- the death was sudden and the cause unknown
- there was no doctor in attendance
- the death has been referred directly to the coroner by the police

If the post-mortem shows unequivocally that the death was due to natural causes, the coroner notifies the registrar that they do not intend to hold an inquest and the investigation is discontinued.

From 9 September 2024, the coroner will complete Form CN2 (Annex G (PDF, 114 KB)) if they decide to discontinue an investigation where the cause of death becomes clear before an inquest. This form is sent from the coroner to the registrar.

Before 9 September 2024, the equivalent Form 100B (Annex H (PDF, 113 KB)) was completed.

Coroners' inquests

If an inquest is necessary, the death can usually be registered only after the inquest has taken place. In a small number of cases, the coroner holds an inquest without a post-mortem. In most cases, the inquest concludes the investigation and the death is then certified by the coroner using Form 99 (Rev) A (Annex I (PDF, 112 KB)). This provides the registrar with details of the deceased and the inquest findings as to cause of death.

If someone is to be charged with an offence in relation to the death, the coroner must adjourn the inquest until those legal proceedings are completed. Since 1978 (see the “Accelerated registrations” subsection in Section 10: Cause of death coding), it has been possible to register these deaths at the time of adjournment, when the coroner issues Form 120A (Annex J (PDF, 110 KB)). This form includes details of injuries that led to the death but no conclusion.

In the case of motor vehicle incidents, there is enough information to code the cause of death. Other deaths, such as possible homicides, are given a temporary code for underlying cause of death (U50.9) until final information becomes available. This is supplied by the coroner to the registrar on Form 121 (Annex K (PDF, 143 KB)).

Training for completion of MCCDs

Thousands of general practitioners (GPs), hospital consultants, junior doctors in training and doctors in other clinical posts complete MCCDs.

In the late 1990s, the Office for National Statistics (ONS) developed training materials on death certification, with the oversight of a range of stakeholders, through the ONS Death Certification Advisory Group (DCAG).

Previously, guidance for doctors completing MCCDs in England and Wales was updated by the ONS DCAG. The Chief Medical Officer notified all registered doctors of new guidance. Under the Coroners and Justice Act 2009, guidance is now given to doctors completing MCCDs in England and Wales by DHSC, and agreed by the ONS, General Register Office (GRO) and the National Medical Examiner (currently Dr Alan Fletcher, who was appointed in March 2019).

This Guidance for medical practitioners completing MCCDs in England and Wales was updated ahead of death certification reform on 9 September 2024. In addition, the Royal College of Pathologists have led the recruitment and training of MEs, in preparation for the transition to a statutory ME system.

Coroners typically certify between 15% and 20% of all deaths. Training for coroners is organised through the Ministry of Justice. The process of referral to a coroner and how referred deaths are dealt with varies between coroners' areas.

Legally uncertified deaths

A very small percentage of deaths remain legally uncertified, as discussed in our Analysis of legally uncertified deaths in England and Wales, 1979 to 2002 article. We receive copies of at least one certificate of cause of death for these cases, which are registered and coded as normal.

Uncertified deaths include deaths for which the AP, who completed the MCCD, did not fulfil all the legal requirements for doing so. Before death certification reform, this included scenarios where the doctor:

- was not in attendance with the deceased during the last illness; please note that this was not a requirement during the coronavirus pandemic, as outlined in the MCCD guidance for medical practitioners from the DHSC
- did not see the body, and the coroner did not order a post-mortem but issued Form 100A (Annex F (PDF, 142 KB))

Uncertified deaths also include deaths of foreign military personnel in England and Wales where the certifying doctor was not a registered medical practitioner for the purpose of issuing medical certificates.

Since 9 September 2024, the number of uncertified deaths have decreased. This could be explained by death certification reforms expanding the eligibility of APs and introducing ME certification.

Table 5: Numbers of registered deaths by certification type, England and Wales, 2022 to 2024

Certification type	Number of deaths 2024	Percentage of deaths 2024	Number of deaths 2023	Percentage of deaths 2023	Number of deaths 2022	Percentage of deaths 2022
All certification types	568,613	100.0%	581,362	100.0%	577,158	100.0%
Certified by doctor	455,009	80.0%	459,827	79.1%	466,434	80.8%
Certified by doctor with no post-mortem	428,363	75.3%	427,084	73.5%	428,923	74.3%
Certified by doctor with post-mortem	1,682	0.3%	1,688	0.3%	1,814	0.3%
Post-mortem information not known on doctor's medical certificate	24,964	4.4%	31,055	5.3%	35,697	6.2%
Certified by coroner	102,040	17.9%	107,859	18.6%	102,670	17.8%
Certified by coroner with inquest and post-mortem	21,722	3.8%	21,693	3.7%	19,972	3.5%
Certified by coroner with inquest and no post-mortem	18,372	3.2%	18,172	3.1%	15,925	2.8%
Certified by coroner with no inquest, post-mortem	60,663	10.7%	67,907	11.7%	66,662	11.6%
Certified by coroner with no inquest nor post-mortem	1,175	0.2%	[z]	[z]	[z]	[z]
Post-mortem information not known on coroner's inquest	108	[low]	87	[low]	111	[low]
Certified by medical examiner	1,402	0.2%	[z]	[z]	[z]	[z]
Certified by medical examiner with no post-mortem	1,378	0.2%	[z]	[z]	[z]	[z]

Certified by medical examiner with post-mortem	8	[low]	[z]	[z]	[z]	[z]
Post-mortem information not known on medical examiner's inquest	16	[low]	[z]	[z]	[z]	[z]
Uncertified	10,162	1.8%	13,676	2.4%	8,054	1.4%

Source: User guide to mortality statistics from the Office for National Statistics

Notes

1. [low] denotes a non-true zero because of rounding; [z] denotes that this figure is not applicable.

2. Death certification reform came into force in England and Wales on 9 September 2024. Any deaths certified by a medical examiner in 2024 were therefore only registered after this date.

Presumption of death

On 1 October 2014, the Presumption of Death Act 2013 (PDF, 258KB) came into force in England and Wales. This means that an application can be made to the High Court for a declaration (Annex L (PDF, 92 KB)) that a missing person is presumed to be dead where the person who is missing is thought to have died or has not been known to be alive for a period of at least seven years.

9 . Death registration process

The registration of life events (births, deaths, marriages and civil partnerships) is a service carried out by the Local Registration Service in partnership with the General Register Office (GRO).

Most deaths are certified by an attending practitioner (AP), using the Medical Certificate of Cause of Death (MCCD). Since 9 September 2024, all deaths that do not get referred to a coroner are independently scrutinised by a Medical Examiner (ME). Deaths will not be registered until the registrar receives notification of the cause of death from the ME or the coroner. Informants, usually a close relative of the deceased, will be aware of the cause of death before they register the death.

In England and Wales, there is a five-day statutory time frame to register a death. This starts when the ME notifies the informant that they can register the death.

In Northern Ireland, deaths must be registered within five days, with the exception of those referred to a coroner.

In Scotland, deaths must be registered within eight days, in which time, the cause of death for accidental, sudden or suspicious deaths may not yet be established. These deaths are still registered within this period, where cause of death would later be updated in the Register of Corrected Entries (now the Register of Corrections Etc (RCE)), following an investigation.

The time taken to register deaths means that data for death occurrences in recent periods are less complete. Most mortality publications use registration data, rather than occurrence data.

In certain cases, deaths are referred to, and sometimes then investigated by, a coroner. The coroner sends information to the registrar, and this is used instead of that on the MCCD to register the death. In some cases, additional information provided on Form 99 (Rev) A (Annex I, (PDF, 112 KB)) is forwarded to the Office for National Statistics (ONS) by the registrar. Accordingly, the information used in ONS mortality statistics normally comes from one of three sources:

- details supplied by the AP and ME when certifying a death, for example, whether the body was seen after death, cause of death, when the deceased was last seen alive and whether a post-mortem was carried out

- details supplied by the informant to the registrar, for example, occupation of deceased, sex, usual address, date and place of birth, marital status, date of death and place of death

- details supplied by a coroner to the registrar following investigation, for example, cause of death (following post-mortem), place of accident (following inquest); in the case of deaths certified after inquest, the coroner supplies the registrar with all the particulars that would have been supplied by the informant

Details are also supplied by the informant on the spouse of the deceased (only if the deceased is either married or civil partnered), for example, name, date of birth, occupation and employment status. If the deceased was a child, the full names and occupation of the parents will be required. If these details are supplied by the coroner, rather than by the informant, occupation and employment status will not be supplied. Occupation is classified using the Standard Occupation Classification (SOC).

Registration of deaths by declaration

Most deaths are registered in the same district in which the death occurred. Since April 1997, relatives can provide information about the deceased to a registrar in a different district from that in which the death occurred. This is known as registration of deaths by declaration. The registrar completes a Form 400 (Annex M, (PDF, 199 KB)), as well as the usual Form 310 (Annex N (PDF, 111 KB) or Annex O (PDF, 139 KB)) and sends them to a registrar in the district where the death took place; the second registrar then carries out the actual registration.

The use of registration by declaration has changed over time and was affected by change in legislation during the coronavirus (COVID-19) pandemic. In March 2020, the Coronavirus Act 2020 enabled deaths to be registered by telephone to the relevant district where the death occurred.

Registration by declaration is more likely to be used for infant deaths. This is because of the practice of referring infants or pregnant women with serious or unusual health problems to regional care units where appropriate, which may often be some distance from the parents' home address.

Table 6: Number of deaths registered by declaration, England and Wales, 2024

Group	Number of death registrations	Number of registrations by declaration	Percentage of registrations by declaration
All deaths	568,613	15,685	2.8%
Infant deaths	2,557	270	10.6%

Source: User guide to mortality statistics from the Office for National Statistics

Notes

1. Infant deaths are deaths of those under 1 year of age.

Additional registration data

Data items other than the cause of death depend largely on information supplied by the informant. For deaths certified after inquest, police officers or other witnesses may supply this information, which cannot later be checked by the registrar. For some data, for example, occupation, accuracy cannot be checked. For others, validity (age and date of birth) or "reasonableness" (age and cause of death) may be checked. Some details may also be verified later, for example, date of birth, with records held at h alth service data sources.

GRO checks and verifications

Checks are also made on death registration details at various times by registrars, superintendent registrars and account managers from GRO.

Checks at the time of registration

When someone attends to register a death, the registrar is instructed to make the following checks:

- a medical certificate (or coroner's document) is presented
- the death is in their area
- the death occurred within the last 12 months
- the informant is qualified to give information
- the correct medical certificate has been used
- the certificate relates to the correct person
- the certificate has been filled in properly – meaning that it is signed, not amended in any way, the doctor's qualifications are filled in, the last date seen alive is shown, and whether or not the certifier saw the deceased after death is recorded
- the death does not need to be referred to the coroner

The registrar then carries out the registration and reviews the recorded detail with the informant before the register page is signed by the informant and registrar. The signed register page is normally a computer-generated print, replicating the detail held on computer, but when the computerised system is unavailable, it is a handwritten page.

Checks by superintendent registrars and account managers

Superintendent registrars carry out the following quarterly checks:

- the Quarterly Certified Copy (QCC) entries agree with each register entry
- the entries appear to be in sequence
- there is a medical certificate or coroner's form to accompany each death entry, as appropriate
- each entry has been signed by an informant (if required) and by the registrar
- for any manual entries, a general check on any apparent erasure or illegibility

Account managers visit registration districts on a periodic basis and, as part of the process, will typically include the following inspection activity:

- sitting in on actual registrations to check questioning technique
- examining a sample of register entries, and supporting documentation and draft entries
- examining computerised records held

10 . Cause of death coding

Coding the underlying cause of death

Automated cause coding

Since 1993, the majority (approximately 80%) of Office for National Statistics (ONS) mortality data have been coded by automatic cause coding software. Specific text terms from the death certificate are converted to International Classification of Diseases (ICD) codes, and then selection and modification rules (see later in this section) are used to assign the underlying cause of death. Using computer algorithms to apply rules increases the consistency and improves the international and temporal comparability of mortality statistics. The cause coding of deaths certified after inquest is done manually by experienced coders, as the software could not code the free text format used by coroners.

International Classification of Diseases, 10th edition (ICD-10) was introduced in England and Wales in January 2001. Since then, various amendments have been authorised by the World Health Organization (WHO). Amendments may, for example, correct errors in the software supporting automatic coding, accommodate new codes in response to new conditions, such as coronavirus (COVID-19) or incorporate advances in medical knowledge of the relationship between conditions.

Between 2001 and 2010, the ONS used the Mortality Medical Data System (MMDS) ICD-10 version 2001.2 software provided by the United States National Centre for Health Statistics (NCHS) to code cause of death. In January 2011, this was updated to version 2010, which incorporated most of the WHO amendments authorised up to 2009.

The main changes in ICD-10 version 2010 were amendments to the modification tables and selection rules. Overall, the impact of these changes is small, although some cause groups are affected more than others. For further information, see the results of the bridge coding study. There is also another study looking at the impact on stillbirths and neonatal deaths.

On 1 January 2014, we changed the software used to code cause of death to a package called IRIS (version 2013). The development of IRIS was supported by Eurostat, the statistical office of the EU and is now managed by the IRIS Institute hosted by the German Institute of Medical Documentation and Information in Cologne.

IRIS software version 2013 incorporated all official updates to ICD-10 approved by WHO, which were timetabled for implementation before 2014. These updates included changes to the use of codes within the neoplasms (cancer) chapter (ICD-10 codes C00 to D48). In addition, a small number of changes were made to the coding of specific conditions, to bring previous coding practice in line with international coding rules and changes were made to the coding of neonatal deaths and stillbirths.

On 1 January 2022, we again updated the IRIS software to the Multicausal and Unicausal Selection Engine (MUSE) (IRIS version 5.8). The MUSE operates based on internationally agreed decision tables that reflect the most recent version of ICD-10. This system also increases the automation of coding compared with the previous software.

Further information on the impacts of changes to cause of death coding software is available:

- Impact of the Implementation of IRIS Software for ICD-10 Cause of Death Coding on Mortality Statistics
- Impact of the implementation of IRIS software for ICD-10 cause of death coding on stillbirth and neonatal death statistics
- Cause of death coding in mortality statistics, software changes: January 2020
- Cause of death coding in mortality statistics, software changes: January 2022

The death certificate (Annex B, (PDF, 272 KB)) used in England and Wales is compatible with that recommended by the WHO. It is set out in two parts. Part I gives the condition or sequence of conditions leading directly to death, while Part II gives details of any associated conditions that contributed to the death but are not part of the causal sequence. Since 9 September 2024, Line 1d has been included in Part 1 of the death certificate.

The selection of the underlying cause of death is based on ICD rules and is made from the condition or conditions reported by the certifier, as recorded on the certificate. The underlying cause of death is defined by WHO as the disease or injury that initiated the train of events directly leading to death or the circumstances of the accident or violence that produced the fatal injury.

Deaths attributed to accidents, poisonings and violence are examined, firstly according to the underlying cause of death (external cause) and secondly by the nature of injury or main injury. External cause of injury codes are taken from Chapter XX of the ICD (prefixes U50.9 and V01 to Y89, where U50.9 is a temporary code and not included in Chapter XX) and nature of injury codes are from Chapter XIX (prefixes S00 to T98) or from a smaller number of other post-procedural codes not within Chapter XIX.

Selection and modification rules

The selection of the underlying cause of death is generally made from the condition or conditions entered in the lowest completed line of Part I of the Medical Certificate of Cause of Death (MCCD). If the death certificate has not been completed correctly - for example, if there is more than one cause on a single line with no indication of sequence or the conditions entered are not an acceptable causal sequence - it becomes necessary to apply one or more of the selection rules in the ICD-10.

Even where the certificate has been completed properly, there are particular conditions, combinations or circumstances when modification rules have to be applied to select the correct underlying cause of death. On some death certificates, for example, when two or more causes are listed and then linked together, these may point to another cause (not mentioned directly on the certificate) as underlying (an inferred underlying cause). This happens in a minority of cases and these are most commonly related to diseases of the circulatory system and late effects of cerebrovascular disease. In other cases, the underlying cause of death can be selected from Part II of the MCCD.

In summary, the purpose behind the selection and modification rules is to derive the most useful information from the death certificate and to do it uniformly so that data will be comparable between places and times and each death certificate produces one, and only one, underlying cause of death.

Underlying cause of death versus contributory causes

Coding rules ensure that each recorded item on the certificate is coded independently of all others on the same certificate. All mentioned causes (the underlying cause of death and any other causes that were mentioned on the death certificate as contributing to the death) have been coded routinely since 1993.

Most of the regular ONS mortality tables analyse the underlying cause of death, often referred to as deaths "due to" a particular cause. In some publications we also refer to deaths "involving" a particular cause. This is a broader category that includes all deaths that had the cause mentioned on the death certificate, whether as the underlying cause or a contributory cause.

ICD-10 implementation

ICD-10 was implemented in England and Wales in 2001. The main differences between ICD-9 and ICD-10 are outlined in Results of the ICD-10 bridge coding study, England and Wales, 1999.

The vast majority of deaths in ICD-9 remained in comparable chapters in ICD-10. However, there were some discontinuities in the data because of the application of new rules for assigning underlying cause in ICD-10, most notably for deaths due to pneumonia. Section 16: Background and history of mortality data (subsection: Historical changes in mortality data) provides further details about sources of information on the changes to ICD-10.

Historically, the rule that changed cause of death statistics most was the introduction of Rule 3 (see Section 16: Background and history of mortality data (subsection: Legislation) for further details). In ICD-10, the list of conditions affected by Rule 3 is more clearly defined than in ICD-9 and is also broader in scope.

Deaths from 1979 to 2000, which appear in tables containing historical data, are coded to ICD-9 and have been grouped to reflect ICD-10 categories. To achieve this broad comparability, the ranges of ICD-9 codes used for some of the groupings differ from those published in annual volumes prior to 2001. Particular causes affected include leukaemia, diseases of the liver and land transport accidents.

Note on coding of acute rheumatic fever (ICD-9 390 to 392, ICD-10 I00 to I02)

In 1999, we found that, in some circumstances, deaths from rheumatic and valvular heart diseases were wrongly coded to acute rheumatic fever by the automated cause coding system introduced in 1993. All deaths in 1998 and 1999 with any mention of acute rheumatic fever were checked and recoded manually, if necessary. From 2000, routine checks were set in place to correct any deaths miscoded to acute rheumatic fever. Therefore, published data on deaths between 1993 and 1997 assigned to acute rheumatic fever should be regarded as highly unreliable.

Note on coding influenza due to identified avian or swine influenza virus (ICD-10 J09)

Following guidance from WHO, the ICD-10 code J09 "Influenza due to identified avian influenza virus" has been used to record H1N1 swine influenza. For ease of use, J09 has been renamed to "Influenza due to identified avian or swine influenza virus" in the mortality tables since 2009.

The number of deaths with an underlying cause of "Influenza due to identified avian or swine influenza virus" (J09) differ from figures reported by Public Health England (PHE).

Note on coding of the coronavirus (COVID-19)

Following guidance from WHO, the ICD-10 codes U07.1 (COVID-19, virus identified) and U07.2 (COVID-19, virus not identified) have been used to record deaths from COVID-19 since 2020. In February 2021, two further codes were implemented following additional guidance from WHO: U09.9 (Post-COVID condition, unspecified) and U10.9 (Multisystem inflammatory syndrome associated with COVID-19, unspecified).

Two codes for certain conditions

The "dagger and asterisk" system

ICD-10 has continued the system introduced in ICD-9 whereby there are two codes for diagnostic descriptions that contain information about both an underlying generalised disease (given a dagger (†) code) and a local manifestation in a particular organ or site that is a clinical problem in its own right (given an asterisk (*) code). This system was introduced because previously the underlying disease alone did not allow for analysis of the manifestation of a disease that was the reason for receiving medical care.

Conditions with dagger codes are used in assigning underlying causes, whereas asterisk codes are not used in this way so will not appear in tables including underlying cause of death only. Asterisk codes appear as categories for the same conditions occurring when a particular disease is not specified as the underlying cause. For example, codes G20 and G21 (not asterisk codes) are for forms of Parkinsonism that are not manifestations of other diseases assigned elsewhere, while category G22* is for "Parkinsonism in diseases classified elsewhere". Corresponding dagger codes are given for conditions mentioned in asterisk categories; for example, for syphilitic Parkinsonism in G22*, the dagger code is A52.1† (symptomatic neurosyphilis).

For further information on the dagger and asterisk system, see Section 3.1.3 of the ICD-10 instruction manual (PDF, 2.1MB).

Secondary causes

Deaths where the underlying cause is assigned to an external cause (ICD-10 Chapter XX, U50.9 to Y89) are also assigned at least one nature of injury code (Chapter XIX, S00 to T98) or a post-procedural code not within Chapter XIX. This means it is possible to have more than one nature of injury code for a single death.

For example, a car occupant injured in a transport accident (V40 to V49) may have suffered a fracture to the skull (S02) and femur (S72) as well as injuries of the spleen (S36). However, it is necessary to select which one of the nature of injury codes is to be identified as the one causing death. This one cause code is referred to by the ONS as the secondary cause. To do this, WHO provides guidelines or "rules" to ensure that the most useful information is derived from the death certificate and that it is done uniformly.

The move from ICD-9 to ICD-10 had an impact on the allocation of secondary causes. The ONS published an assessment of this impact. In ICD-10, when more than one body region is involved, coding is made to the relevant category of injuries involving multiple body regions (T00 to T07). Therefore, in the previous example of an occupant injured in a transport accident, under ICD-10 the secondary cause would be classified as "other specified injuries involving multiple body regions" (T06.8), whereas under ICD-9 the secondary cause would be more specifically classified as a fracture of the skull (ICD-9 800).

An update by WHO was implemented for 2014 data whereby if more than one serious injury is reported on the relevant part of the certificate, the main injury must be selected from the Priority Ranking of ICD-10 Nature-of-Injury Codes (PDF, 1.0MB) list. The update indicates that when more than one of the serious injuries reported in the relevant part of the certificate have the same and highest rank, select the first mentioned of these injuries; however, we prefer a specific injury over an injury from the block T00 to T07 (injuries involving multiple body regions) with the same priority rank.

Information on injuries is derived from the coroners' forms that are supplied to the ONS, in particular the coroner's certificate of cause of death after inquest (Form 99 (Rev) A – Annex I (PDF, 112 KB)). This form was revised in May 1993 to bring it into line with the MCCD and with WHO recommendations. Because the revised form no longer includes specific questions about type of injury and parts of body injured, some coroners now often provide less detail than before. The result is that some deaths are assigned to residual codes for nature of injury. For example, in ICD-10 the statement "head injury" is coded to "unspecified injury of head" (S09.9), whereas with more detail it might be assigned to "fracture of skull and facial bones" (S02.n).

Final cause of death

The conditions mentioned on the death certificate are used to derive an underlying cause of death. In some cases, more information on cause of death may become available at a later stage after the death has been registered such that the underlying cause may be subsequently amended. Around 0.05% of deaths have their underlying cause amended (Table 6). This amended or final cause is used in mortality statistics. Sometimes, the later information becomes available only after publication. Users with access to individual records of deaths as shown in the public record (which is never amended) may consequently find some differences with published statistics.

Table 7: Number of deaths where original cause was amended for final cause, England and Wales, 2024

Deaths	Percentage	Analysis
0	[z]	Original 'Diseases of the respiratory system' cause amended for final cause
0	[z]	Original 'Neoplasm' cause amended for final cause
0	[z]	Original 'Diseases of the circulatory system' cause amended for final cause
4	[low]	Other original cause amended for final cause
3	[low]	3-digit ICD-10 codes for original and final cause match
56	[low]	4-digit ICD-10 codes for original and final cause match
286	0.1%	Pending conclusion deaths resolved and final cause submitted
568,260	99.9%	No final cause information submitted (includes neonatal deaths)

Source: User guide to mortality statistics from the Office for National Statistics

Notes

1. [low] denotes a non-true zero because of rounding; [z] denotes that this figure is not applicable.

In summary, further details on the causes of death can be obtained in one or other of the following ways.

Deaths certified by doctors may have their cause amended as a result of a post-mortem or of tests initiated before death. The certifier sends this additional information directly to the cause coding team at the ONS, where it is only used for statistical purposes and does not appear in the public record. Less than 1% of deaths certified by a doctor have a post-mortem and in the majority of cases, the certified cause remains unchanged. In addition, the ONS cause coders may contact the certifier for more information if the certificate is unclear or they cannot code the underlying cause; this is very rare.

When a death has been certified by a coroner after post-mortem (with no inquest), further information may be available once they have results of bacteriology or histopathology. This is also very rare. Following an inquest, coroners may submit to the ONS details of how a fatal accident occurred. This is rare, as coroners normally only certify the cause of death after their investigations are complete, so the first and only information the ONS receives about these deaths is the final underlying cause. Coroners may also provide a final underlying cause of death and conclusion much later for an accelerated registration following an adjourned inquest (see next subsection).

Accelerated registrations

On 1 January 1978, certain provisions of the Criminal Law Act 1977, the Coroners (Amendment) Rules 1977 and the Registration of Births, Deaths and Marriages (Amendment) Regulations 1977 came into force. These meant that in cases where an inquest was adjourned, the death could be registered as an accelerated registration, without the need to await the outcome of criminal proceedings.

Accelerated registrations that are not transport incidents are assigned to code U50.9 (event awaiting determination of event); prior to 2007, they were assigned to code Y33.9 (other specified events, undetermined intent). Most of these are eventually reassigned to assault (X85 to Y09), but the delays before this happens can affect the published figures in the under-estimation of deaths from assault (Death certification and the epidemiologist). For this reason, ONS statistics on deaths from assault usually include ICD-10 code U50.9 (see next section).

Accelerated registrations related to deaths involving motor vehicle incidents are assigned to a code in the range V01 to V89 (land transport accidents) if sufficient information is available on the coroner's certificate of adjournment.

Assault and intentional self-harm

Numbers of deaths from assault (homicide in ICD-9)

It is possible to make alternative assessments about the number of deaths that may be attributed to assault. There are two estimates presented in standard tables. The first is the number coded to X85 to Y09; this is the basic ICD classification to which all assaults should eventually be assigned. The second is the number coded to X85 to Y09 plus those coded to U50.9 (event awaiting determination of intent); this takes account of accelerated registrations, most of which are eventually coded to an assault code.

Numbers of deaths from intentional self-harm (suicide in ICD-9)

As with assault, it is possible to make two separate estimates of the number of deaths annually from intentional self-harm. The first is the number coded to X60 to X84; this is the basic ICD classification to which all definite intentional self-harm conclusions are assigned. The second is the National Statistics definition of suicide, which includes the number coded to X60 to X84 plus those coded to Y10 to Y34 (event of undetermined intent); this takes account of most deaths, excluding 10- to 14-year-olds, where an open inquest conclusion was returned, but it excludes all deaths that are pending investigation.

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 because of 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. For more information on the suicides definition, please see our Suicides in the UK statistical bulletin.

11 . Quality of mortality data

Mortality statistics in England and Wales are derived from the registration of deaths. The data pass through a number of processes before becoming usable for analysis. These processes are complex and involve a wide range of people, organisations and computer systems.

Receipt of death registration data at Office for National Statistics (ONS) Titchfield office

Details of deaths are received from register offices electronically. Routine and automated checks are carried out on each file and the combined data are then loaded onto the deaths database. Regular receipt and diagnostic reports are produced, resulting in weekly contacts with the identified registrars to resolve any problems.

Examples of checks include:

- identification of missing entries, so that death registration details are received in sequence
- checks for duplicate records
- checking for misplaced records, for example, verifying that each registrar is using the register allocated
- for paper records - that date of death and date of registration are in the correct range
- for paper records - records are checked for completeness prior to keying
- checks on registrars whose returns have not been received by the fourth working day after the end of each week

Validation processes

Once on the database, the data are passed through a series of validation processes that are carried out automatically with any inconsistencies highlighted. Simple validations include examination of dates or employment status to ensure that they are likely. More complicated validations include checks for consistency between dates of birth, death and registration or between age and marital status.

Routine checks in Titchfield

All deaths accepted onto the database that need routine coding are identified and coded as required by the Life Events Processing Branch (LEP). The detailed routine coding falls into five main areas:

- coding of postcodes to give usual residence of deceased
- occupation of the deceased (or spouse, civil partner, or mother and/or father; see Section 2: Information collected at death registration for further details)
- communal establishment coding for place of death of deceased
- place of birth of deceased
- cause of death (see following checks)

Routine automated and manual checks of cause of death data are carried out on all records on a monthly basis. These include:

- checking cause fields against inquest conclusion fields for compatibility
- the presence or absence of original and final cause of death fields
- codes for Office for National Statistics (ONS) cause groups are present for neonatal deaths and absent for non-neonatals (see Section 11: Childhood mortality; subsection: Neonatal deaths)
- validity of suicides at very young ages
- mentioned conditions on death certificate are compatible with sex
- the derived underlying cause of death is mentioned in Part I or Part II of the death certificate

Once coding of the cause of death is complete, checks are carried out on variables such as date of death, sex, year of birth, marital status and communal establishments. These checks evolve continuously during exploratory surveillance of data quality and some of these are later incorporated as routine checks.

Automated cause coding

Automated cause coding (discussed in the Coding the underlying cause of death subsection in Section 10: Cause of death coding) is used to derive codes for each medical condition on the certificate and to identify the underlying cause. The accuracy of automated coding is checked regularly within data quality check requirements. Periodical reports on persistent coding problems are referred to a medical epidemiologist and authors of the software to highlight areas of concern for the new releases.

Checks before and after extraction of data for analysis

To produce mortality outputs based on final data, annual extracts are taken from the deaths database. These extracts are then used to produce annual tables and files of individual death records for other government departments and health authorities, as provided for by relevant legislation. Before these annual extracts, provisional extracts are taken to allow for timelier analysis, such that presented in our Weekly deaths dashboard and our Quarterly suicide death registrations bulletin series.

The first of these are carried out as a final check of what is held on the deaths database before an annual extract of data is taken. These comprise frequency checks for a range of fields, covering age, sex, underlying cause and area of residence. Also checked are possibly incorrect combinations of fields. Any apparent errors or inconsistencies result in checks of individual cases by coders who make amendments, as required. Some of these checks are also carried out routinely every month.

Further examinations are carried out once the data extract has been taken. They include checks similar to those done before extraction, to ensure that corrections made at that stage were properly carried out. After the annual extract used for mortality analyses has been produced, a further set of frequency counts and two-way tables are prepared to ensure that no new errors have been introduced. These checks are to ensure that the frequency distributions are both valid and plausible and broadly similar to those for the previous year's data.

Checks on routine outputs

Mortality outputs are now produced using Reproducible Analytical Pipelines (RAPs). These include automated quality checks on the output, such as:

- systematic checks of totals (row, column, and other) against known correct figures
- checks of individual cells against correct figures
- checks that the number of rows are correct in tables
- checks that numbers are consistent between tables

In addition, further checks to ensure figures are consistent and plausible (or what would be expected compared with the previous year's tables) are also undertaken.

More quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in our Mortality statistics in England and Wales QMI. Our Policy on protecting confidentiality in tables of birth and death statistics is also available.

12 . Background and history of mortality data

Redevelopment of mortality statistics

In the early 1990s, there was an extensive redevelopment of collection and processing systems for population, health and registration data - in particular, for births and deaths. For deaths, this included: the progressive computerisation of registration in local offices, the move to a large deaths database to hold all deaths data from 1993 and the introduction of automated coding of cause of death.

Further information about these changes follows, with more details in the annual volume in the DH2 series for 1993 and 1994. Changes to the rules for selecting and coding cause of death brought England and Wales into line with international practice in 1993.

The deaths databases

In the deaths processing system that has been used within the Office for National Statistics (ONS) since the early 1990s, there are two deaths databases, one for register information and the other for statistical data.

The registration database contains mainly textual information that appears on the death certificate. This corresponds to most of the details supplied by informants to a registrar, available to applicants requesting a copy of the death certificate.

The deaths statistical database contains only coded details of each death. When outputs are required, the statistical database can supply information on individual deaths or provide datasets for tabulation. The statistical database is continually updated and amended as further information becomes available.

In 1999, we developed a database to facilitate research into deaths related to drug poisoning and to aid the identification of specific substances involved in these deaths. The database currently contains data on all deaths on the annual data files for England and Wales between 1993 and the latest available year, where the underlying cause of death is regarded as resulting from drug-related poisoning, according to the current Accredited Official statistics. The database covers accidents and suicides involving drug poisoning as well as poisonings due to drug abuse and drug dependence but not other adverse effects of drugs.

Legislation

The existing provisions for the registration of deaths and the processing, reporting and analysis of mortality data appear in different legislation that reflects the distinct and separate roles of the Registrar General for England and Wales and the UK Statistics Authority.

The Registrar General is guided by the following:

- Population (Statistics) Act 1938: deals with the statistical information collected at registration
- Births and Deaths Registration Act 1953: covers all aspects of the registration of births, stillbirths and deaths
- Population (Statistics) Act 1960: makes further provision for collecting statistical detail at registration
- Registration of Births and Deaths Regulations 1987: cover further aspects of the registration of births and deaths
- Coroners Act 1988: sets out the procedures to be followed by coroners in handling deaths
- Still-Birth (Definition) Act 1992: altered the definition of a stillbirth to 24 or more weeks completed gestation, instead of the previous definition of 28 or more weeks
- The Deregulation (Still-Birth and Death Registration) Order 1996: allows for the registration of deaths by declaration
- National Health Service Act 2006 (amended 2013) and National Health Service (Wales) Act 2006: consolidated legislation relating to the health service and separate provision of the health service in Wales from that in England; the Acts require notification of a birth or death to the local authority and the clinical commissioning group (local health board in Wales) where the birth or death occurred - both Acts include provision for the supply of information on individual deaths to the NHS by the Registrar General
- Presumption of Death Act 2013: application can be made to the High Court for a declaration that a missing person is presumed to be dead where the person who is missing is thought to have died or has not been known to be alive for a period of at least seven years
- Coronavirus Act 2020: temporary modifications related to registration of deaths and stillbirths, and so on, and reviews to legislation relating to death certification and cremations in the UK during the coronavirus (COVID-19) pandemic.

Details of legislation and regulations underpinning death certification reforms are provided by the Department of Health and Social Care (DHSC).

The UK Statistics Authority is guided by the following:

- Registration Service Act 1953: in Section 19, this required the Registrar General to produce annual abstracts of the number of live births, stillbirths and deaths
- Statistics and Registration Service Act 2007: transferred some of the statistical functions of the Registrar General, including the production of an annual abstract, to the Statistics Board, also known as the UK Statistics Authority, and the ONS, which became the executive office of the UK Statistics Authority; the 2007 Act also provides the Registrar General with a power to disclose any information about a birth, death or a stillbirth to the UK Statistics Authority for statistical purposes; it also enables the UK Statistics Authority to produce and publish statistics relating to any matter; the Act also includes a provision for the UK Statistics Authority to supply individual birth and death records to the Secretary of State for Health and certain NHS bodies

When the Statistics and Registration Service Act 2007 came into force on 1 April 2008, the arrangement where the National Statistician was also the Registrar General for England and Wales ended. At the same time, the General Register Office (GRO) also stopped being part of the ONS and was moved to the Identity and Passport Service. The NHS Central Register (NHSCR), formerly part of the ONS, also transferred to the Health and Social Care Information Centre (HSCIC), which is now known as NHS Digital.

The responsibility for the production of mortality statistics is now a function of the UK Statistics Authority, which is required to produce an annual abstract of mortality statistics in order that the Minister for the Cabinet Office can lay it before Parliament.

Historical changes in mortality data

Users should note certain changes to the collection and coding of deaths data over the years may affect their interpretation of trends in mortality. These changes include the following.

1979

Introduction of the International Classification of Diseases (ICD), ninth edition. This replaced the eighth edition, used from 1968 to 1978. A 25% sample of death certificates for 1978 was selected and coded to both the eighth and ninth editions to give a guide to the effect of these changes on specific categories.

1981 to 1982

Industrial action taken by registration officers affected the quality of information about deaths from injury and poisoning. Details normally supplied by coroners were not available; the statistics were significantly affected. Figures on injury and poisoning for 1981, with the exception of suicides, should be treated with caution. Categories such as "transport accidents" and "homicide" were significantly understated, whereas "non-specific accidents" and "undetermined injuries" were overstated. Statistics relating to nature of injury were less affected by the absence of the coroners' information. Although industrial action extended into 1982, the coroners' information was collected retrospectively for that year, enabling more accurate figures to be produced. However, complete details to help code the cause of death were still unavailable in 1982. This resulted in more deaths than usual being assigned to "unspecified" categories.

1984

Our interpretation of World Health Organization (WHO) Rule 3 was amended in the assignment of underlying cause of death. Series DR for 2006 has more detail. It resulted in a decrease in the numbers of deaths coded to pneumonia and a few other causes and an increase in deaths from many other conditions - most of the latter being small increases. The background to this change is given in the annual volume DH2 number 11 for 1984, which includes a table assessing the numerical effects of changes, by underlying cause. Deaths from injury and poisoning were excluded from this exercise.

1986

Since January 1986, registrars have recorded the following information on the draft entry form:

- the date when the certifying doctor last saw the deceased alive
- whether the deceased was seen after death by a medical practitioner
- whether the death was reported to a coroner and by whom
- whether the certifying practitioner indicated that death might have been linked to the deceased's employment

The first three items had been recorded on the medical certificate for many years for legal and administrative purposes. The fourth resulted from legislation passed in 1985.

1986

New stillbirth and neonatal death certificates were introduced in January 1986. The new neonatal certificate included both maternal and fetal conditions. This means that it is not possible to assign an underlying cause for deaths under 28 days. From 1986, therefore, tables of deaths by cause and age do not include neonates, although the all-cause total for neonates is often given. Details of neonatal deaths by cause can be found in our Child and infant mortality statistics bulletin.

1993

We reverted to the internationally accepted interpretation of Rule 3 operating in England and Wales before 1984 (see Section 16: Background and history of mortality data; subsection: The deaths databases).

1993

Redevelopment of our collection and processing systems, which took effect on published mortality data from January 1993. Changes included:

- the computerisation of registration, with registrars in most local offices entering details on computers and supplying data to the ONS on floppy disk
- the automation of cause of death coding, so that procedures for assigning codes to underlying cause are now automatic for about 80% of all deaths but not used for deaths certified after inquest
- the use of a dynamic database to hold all deaths data, for easy retrieval of up-to-date information; these and other changes are described in Death certification and the epidemiologist

1993

A revised coroner's certificate of cause of death after inquest was introduced in May 1993, which resulted in less detail for many deaths from injury and poisoning (ICD-9 E800 to E999) - both for the description of injury sustained and for the classification of some suicides.

Following the introduction of the revised certificate, problems were identified relating to the processing of deaths certified after inquest because of the non-receipt of some data that contained additional detail about some accidental deaths. This resulted in more deaths being assigned to residual categories such as "other and unspecified causes" (ICD-9 E928.9). For this reason, the number of deaths coded to suicide and self-inflicted poisoning by motor vehicle gas exhaust (ICD-9 E952.0) declined substantially, while those from suicide and self-inflicted poisoning by other carbon monoxide (ICD-9 E952.1) rose.

To resolve this problem, we amended our systems and manually coded all deaths that resulted in a coroner's inquest or adjourned inquest. Data were re-coded where necessary for 1993 and 1994. Changes were concentrated in the external causes of the ICD, while the effect on other causes was limited.

1993

Ending of medical enquiries to obtain more precise information on the underlying cause of death.

1997

Provision for registration of a death by declaration was introduced in April 1997, whereby details of a death could be supplied to a registrar in a district other than that where the death took place. Analysis shows that this provision is most likely to be used for deaths of infants and for neonatal deaths in particular.

2001

Introduction of the ICD-10 for coding cause of death on 1 January 2001. This replaced the ICD-9 used from 1979 to 2000. There are some significant differences between the ICD versions. The main differences are:

- a change in format of the code and an expansion in the number of codes used
- a movement of some diseases and conditions between broad groups called ICD chapters
- changes to the rules governing the selection and coding of the underlying cause of death, especially Rule 3, which has had a large effect

We coded the 1999 registration dataset to both the ICD-9 and ICD-10 to give a guide to the effect of changes on specific categories of cause of death. Results of the ICD-10 bridge coding study, England and Wales, 1999 were published in 2002. Research specifically examining the effect on injury and poisoning was published in The effect of the introduction of ICD-10 on trends in mortality from injury and poisoning in England and Wales.

Further information about Understanding the changes to mortality statistics following the move to coding cause of death to ICD-10 is also available.

2002

Introduction of the GRO Network (GRONET) to register offices began, allowing for births and deaths registration details to be sent directly to the ONS via email.

2006

Introduction of Registration Online (RON) pilot areas enabling registrars to record births, stillbirths, deaths and civil partnerships online instead of using Registration Service Software (RSS).

2007

RON was implemented and, because of significant performance problems, suspended. This resulted in around half the registrars reverting back to using the previous electronic system, RSS.

2009

RON was fully implemented on 1 July 2009. Of all registrations in 2009, there were 83% recorded on RON.

2010

All deaths recorded using RON.

2011

In January 2011, the software used for cause of death coding was updated from the ICD-10 version 2001.2 to version 2010. The main changes in ICD-10 version 2010 are amendments to the modification tables and selection rules. Modification tables and selection rules are used to ascertain a causal sequence and consistently assign underlying cause of death from the conditions recorded on the death certificate. Overall, the impact of these changes is small although some cause groups are affected more than others. For further information, see the results of the bridge coding study. There is also another study looking at the impact on stillbirths and neonatal deaths.

2014

On 1 January 2014, the software used to code cause of death was changed. The new IRIS software version 2013 incorporates official updates to ICD-10 that are approved by WHO. Further information on IRIS can be found in Section 9: Cause of death coding; subsection: Coding the underlying cause of death. A dual coding study looked at the impact on mortality statistics; a further study looked into the impact of the coding changes on stillbirths and neonatal deaths.

2014

On 1 October 2014, the Presumption of Death Act 2013 came into force in England and Wales. This means that an application can be made to the High Court for a declaration that a missing person is presumed to be dead where the person who is missing is thought to have died or has not been known to be alive for a period of at least seven years.

2017

Changes to the Policing and Crime Act 2017 removed the requirement for a coroner's inquest for every death where Deprivation of Liberty Safeguards (DoLS) were in place. Deaths under DoLS that occurred on or before 3 April 2017 should be treated outside the context of state detention and should only be reported to the coroner where one or more other conditions are met. This should result in a decrease in the number of inquests for natural deaths.

2020

The Coronavirus Act 2020 included temporary changes to death registration legislation during the COVID-19 pandemic.

2022

On 1 January 2022, the software used to code cause of death was changed to the successor of IRIS, which is known as the Multicausal and Unicausal Selection Engine (MUSE) (IRIS version 5.8). The MUSE operates based on internationally agreed decision tables that reflect the most recent version of ICD-10. Further information can be found in our Cause of death coding in mortality statistics, software changes: January 2022 article.

The Coronavirus Act 2020 ended in March 2022.

2024

On 9 September 2024, death certification reforms came into force in England and Wales. See Section 8: Death certification process for more information.

13 . Glossary

Accelerated registrations

Accelerated registrations is the process by which a death can be registered at the time of adjournment of an inquest instead of having to await the outcome of criminal proceedings.

Age-standardised rates

Age-standardised rates is a statistical measure to allow more precise comparisons between two or more populations by eliminating the effects in age structure by using a "standard population".

Annual extract

The annual extract is the dataset taken from the main deaths database from which tabulations are derived. Sometimes it is referred to as the "standard" extract.

Assault

In the International Classification of Diseases (ICD), 10th edition, assault refers to homicide and injuries inflicted by another person with intent to injure or kill, by any means (excluding deaths from legal intervention and operations of war).

Bridge coding

Bridge coding is an exercise in which the same group of deaths are independently classified according to two different classifications or coding methods.

Contributory cause of death

A contributory cause of death is a cause mentioned on the death certificate but not as the underlying cause of death (see Underlying cause of death definition). This could be a pre-existing condition that contributed to the death or part of the sequence of events that lead to the death.

Comparability ratios

Comparability ratios are measures, expressed as ratios, indicating the net effect of the change in classification (from ICD-9 to ICD-10) on a particular cause of death.

Coronaviruses

The World Health Organization (WHO) defines coronaviruses as "a large family of viruses that are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS)". Between 2001 and 2018, there were 12 deaths in England and Wales due to a coronavirus infection, with a further 13 deaths mentioning the virus as a contributory factor on the death certificate.

Coronavirus (COVID-19)

COVID-19 refers to the "coronavirus disease 2019" and is a disease that can affect the lungs and airways. It is caused by a type of coronavirus. Further information on COVID-19 is available from the World Health Organization (WHO).

Coroner

A coroner is a public official responsible for the investigation of violent, sudden or suspicious deaths.

Declaration

The declaration is the method by which an informant can register a death in a different district from that in which the death occurred.

Dual coding

Dual coding is the coding of the same data twice, using different methods of coding to assess inconsistencies.

Early neonatal

Early neonatal relates to infants aged under seven days.

Epidemiologist

An epidemiologist is a person concerned with the incidence and distribution of diseases and other factors, including the environment, relating to health.

External cause

An external cause of death refers either to an accident or violence. It is an alternative term for the underlying cause of death. ICD codes from Chapter XX; see Secondary causes.

Hierarchical classification

The hierarchical classification is the Office for National Statistics's (ONS's) method for classifying the causes of neonatal deaths and stillbirths using groups of ICD codes referred to as "ONS cause groups".

Informant

An informant is the person who provides the registrar with the information required to register a death.

Inquest

An inquest is an inquiry into the cause of an unexplained, sudden or violent death held by a coroner.

Modification rules

Modification rules are rules used in ICD-10 to select the correct underlying cause of death.

Neonatal

Neonatal relates to infants aged under 28 days.

Perinatal

Perinatal includes stillbirths and early neonatal deaths.

Pre-existing condition

A pre-existing condition is defined as any condition that either preceded the disease of interest (for example, coronavirus (COVID-19)) in the sequence of events leading to death or was a contributory factor in the death but was not part of the causal sequence.

Quarterly Certified Copy (QCC)

A Quarterly Certified Copy (QCC) is a copy made of each Register, sent to the General Register Office (GRO) at Southport.

Registrar

A registrar is a statutory officer responsible for the registration of births, deaths, and marriages.

Registrar General

The Registrar General is a statutory appointment with responsibility for the administration of the Registration Acts in England and Wales and other related functions as specified by the relevant legislation.

Registration Online (RON)

Registration Online (RON) is a web-based system that enables registrars to record births, stillbirths, deaths, marriages and civil partnerships online.

Registration Service Software (RSS)

Registration Service Software (RSS) is a system of collecting data electronically at the registration of a birth or death. Used prior to RON.

Rule 3

Rule 3 is one of the rules used to select the correct underlying cause of death; its different use in ICD-10 results in significant differences from ICD-9 for some causes; see Selection rules.

Secondary cause

The secondary cause is the nature of injury, or main injury, that caused death (where the underlying cause is assigned to an external cause from Chapter XX in ICD-10, V01 to Y89). Nature of injury codes are taken mostly from Chapter XIX (prefixes S and T).

Selection rules

Selection rules are rules used in the ICD to determine the correct selection of the underlying cause of death; see Rule 3.

Sequela (sequelae)

A sequela is a condition reported as the result of a previous injury – a "late effect" (under ICD-9) or that occurs as a late effect one year or more after the originating event. Sequelae is the plural version of sequela.

Standard population

The standard population is used in the calculation of the age-standardised death rates; this is an element of the population (such as age and sex) that is "held constant" to control its effect, for example, the European Standard.

Stillbirth

Refer to the Still-Birth (Definition) Act 1992; a stillbirth is a child born after 24 or more weeks completed gestation who did not show any signs of life at any time after being born.

Superintendent registrar

A superintendent registrar is a statutory officer with responsibilities relating to births, deaths, marriage and other registration functions, as specified in the relevant legislation.

UK Statistics Authority

The UK Statistics Authority is an independent body operating at arms' length from government as a non-ministerial department, directly accountable to Parliament. It was established on 1 April 2008 by the Statistics and Registration Service Act 2007.

Underlying cause of death

The underlying cause of death is "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 ICD.