

Excess winter mortality in England and Wales QMI

Quality and Methodology Information for excess winter mortality in England and Wales detailing the strengths and limitations of these data, methods used and data uses and users.

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1 . Output information

National Statistic	
Data collection	Death occurrences
Frequency	Annual
How compiled	Administrative data processing
Geographic coverage	England and Wales
Last revised	27 November 2019

2 . About this Quality and Methodology Information report

This quality and methodology report describes the quality characteristics of the data underlying the excess winter mortality series (including the European Statistical System five dimensions of quality) as well as the methods used to create it.

The information in this report will help you to:

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

3 . Important points

- [Excess winter mortality \(EWM\)](#) measures the increase in deaths in the winter period compared with the summer.
- It is an important measure as it allows users to assess whether policies are having an impact on mortality risks during the winter period.
- The Office for National Statistics (ONS) standard method defines the winter period as December to March and compares the number of deaths that occurred in this winter period with the average number of deaths occurring in two non-winter periods; the preceding August to November and the following April to July.
- The EWM index expresses the percentage of additional deaths that occurred in the winter period compared with the rest of the year and allows demographic and spatial comparisons.
- The data used to calculate EWM figures are taken from routinely collected death registration data, which cover all deaths occurring in England and Wales.
- Until 2009, these figures were published as an annual report in the ONS journal [Health Statistics Quarterly](#), but since 2010 they have been published as a [statistical bulletin](#).

4 . Quality summary

Overview

In common with other countries, England and Wales experience higher levels of mortality in the winter than in the summer. To measure this increase, the Office for National Statistics (ONS) calculates the number of excess winter deaths (EWD) and the excess winter mortality (EWM) index.

Both metrics measure the increase in mortality during the winter compared with the rest of the year and should not be interpreted as the number of people who died directly as a result of colder weather occurring during December to March. These metrics provide an informative summary of the comparative levels of mortality during the winter and non-winter periods in England and Wales.

The [annual publication](#) provides main findings and commentary on the two previous winters, with [a time series of EWD figures](#) back to 1950 to 1951 for England and Wales and a time series from 1991 to 1992 by sex, age, cause of death and place of usual residence.

Uses and users

The main external users of our EWM statistics include:

- Department of Health and Social Care
- Public Health England
- Welsh Government
- clinical commissioning groups and Welsh health boards
- Public Health Wales
- local authorities
- charities such as Age UK and National Energy Action
- academics

Research suggests that mortality during the winter, increases more in England and Wales compared with other European countries with colder climates. The elderly are more vulnerable than others during the winter, hence policies aimed at tackling EWM have been implemented, such as winter fuel payments ([Directgov, 2010](#)) and influenza vaccinations ([NHS Choices, 2019](#)), which have a particular focus on older people. The annual EWM figures allow users to assess whether these policies are having an impact.

National Records of Scotland (NRS) produces an annual report on [Increased Winter Mortality](#).

The Northern Ireland Statistics and Research Agency (NISRA) produces annual data tables for [Excess Winter Mortality](#).

Recent improvements

We previously published data for England and Wales combined, however, in the future this bulletin will report estimates for both countries separately. Therefore, the back series for England and Wales has been revised back to 1991 to 1992. However, we will still produce an England and Wales combined back series to 1950 to 1951 to provide information on a longer time series. As the May 2019 boundaries have been used to revise the back series, the figures may not match previously published because of slightly different boundaries. We have also updated the age groups in the data we produce to be in line with the rest of our mortality data.

5 . Quality characteristics of the excess winter data

Relevance

The data used to calculate excess winter mortality (EWM) figures are drawn from routinely collected death registration data, which cover all deaths occurring in England and Wales. More general information on the collection, production and quality of mortality data is available in [mortality metadata \(PDF, 2.39MB\)](#).

Provisional EWM figures are produced for the most recent winter using [special estimation methods](#) and so are rounded to the nearest 100. Final EWM figures for the previous winter are rounded to the nearest 10.

Individual deaths are assigned to geographical areas by linking the postcode of usual residence of the deceased to the latest version of the [National Statistics Postcode Lookup \(NSPL\)](#). EWM final figures between 1991 to 1992 and 2017 to 2018 have been produced using May 2019 boundaries and will not be revised. This means that the figures previously published may not match the new time series because of slightly different boundaries. In the future, EWM figures will be produced using the boundaries in place at the time.

Local area EWM figures for the most recent winter are not produced, as the methods used to estimate these provisional figures are not reliable at a local level.

EWM figures by country are available from 1991 to 1992 onwards. Historical EWM data for England and Wales combined are available from 1950 to 1951 onwards. It is not possible to calculate EWM before this time, as electronic death records are not available.

Accuracy and reliability

The legal requirement to register all deaths occurring in England and Wales means that death registrations provide an almost complete data source for mortality statistics.

The mortality data from which these EWM figures are calculated are routinely collected under various Acts of Parliament. The data cover nearly all deaths occurring in England and Wales and are considered of high quality. A majority of deaths are certified by a doctor using the Medical Certificate of Cause of Death (MCCD), but some deaths, for example, those that were violent or unexpected, are certified by a coroner.

As with all administrative sources of data, there are several potential sources of error in death registrations data, including:

- the death certificate was completed incorrectly by the doctor or coroner
- incorrect information was supplied by the informant at death registration
- some information may be missing, for example, if the informant does not know the deceased's date of birth
- a death may have been registered twice, so the database contains duplicate records
- the exact date of death may not be known (for example, if the deceased is discovered some time after death)
- errors were made by the registrar when registering the death
- errors in the automatic coding system used to code the cause of death
- errors were made by Office for National Statistics (ONS) coders when coding cause of death, or other variables (for example, occupation)

Quality checks are in place to minimise these errors, which include checks that are carried out at the time of registration, data entry checks, coding validation checks and pre- and post-analysis frequency checks. Risk is minimised as the coding is carried out by highly trained, experienced ONS staff who apply standardised International Classification of Diseases (ICD) coding rules.

Data for the current year come in the form of a special extract taken from the live database and have not been through all these rigorous quality checks. Therefore, provisional EWM figures will be less accurate than final figures.

ONS mortality data are “complete” in the sense that eventually all deaths occurring in England and Wales will be entered onto the ONS death registration database. Almost 95% of deaths are registered within one month of the date of occurrence. However, deaths that need further investigation from a coroner can take much longer. Therefore, a small number of deaths that occurred during the reference period, but have not yet been registered, will be missing from the data extract used to calculate EWM. More details of the estimation methods used to minimise this issue can be found in the [Methods used to produce excess winter data](#) section.

Although a small number of deaths that occurred several months or years earlier will be registered after final EWM figures are published, these figures are not updated as the impact of these late registrations on EWM figures is likely to be minimal. More information on the [impact of registration delays](#) is available.

Figures based on a small number of events are subject to random fluctuations, therefore the EWM index is presented with 95% confidence intervals. A 95% confidence interval is a measured range within which there is a 95% probability that the true population value lies. It is a standard way of expressing the statistical accuracy of a calculated estimate. As the interval around an estimate widens, the level of uncertainty about where the true value lies increases. The size of the interval around the estimate is strongly related to both the number of deaths and the size of the underlying population. At a national level the overall level of error will be small compared with the error associated with a local authority or a specific age and sex breakdown. Therefore, the widths of the confidence intervals reported in this release will have sizable differences.

More information about the quality assurance and accuracy of the underlying mortality data can be found in the [Mortality metadata \(PDF, 2.39MB\)](#) and the [Mortality statistics Quality and Methodology Information Report](#).

Output quality

EWM statistics are based on both final and provisional deaths that occurred within a given 12-month period.

Using this provisional dataset allows the ONS to publish the data to a more timely schedule, rather than over a year after the end of the winter period in question, which would be needed if using the finalised data. The disadvantage of using this EWD data means that late registrations (for example, deaths that have been referred to a coroner) will not appear in the data, meaning that the EWM deaths and index produced in the bulletin are based on provisional data and therefore we cannot guarantee 100% accuracy.

Coherence and comparability

The method used by the ONS to calculate EWM is consistent with that of the World Health Organization Regional Office for Europe. This standard method is used by National Records of Scotland (NRS) to calculate [Increased Winter Mortality](#) and by the Northern Ireland Statistics and Research Agency (NISRA) to calculate their [Excess Winter Mortality](#) tables. This method has also been used in a number of academic papers researching factors related to EWM, for example, [Healy, \(2003\)](#).

This method has been applied consistently for all time periods, so England and Wales data by sex, age and cause are available from the winter 1991 to 1992 onwards.

Within England and Wales, the number of EWD is likely to vary based on the size, sex and age structure of the population. Large local authorities, such as Birmingham, Sheffield and Leeds, will have a greater number of EWD, simply because they have more people living there and so have more deaths overall throughout the year.

The EWM index expresses the number of EWD as a percentage and shows the percentage of additional deaths that occur in the winter compared with the number of deaths occurring throughout the rest of the year. This means that the variations in the absolute number of deaths will not bias this statistic and makes objective comparison between areas possible. It is for this reason that the EWM index, not the number of EWD, should be used when comparing areas or examining trends over time.

EWM figures are produced using a standard method, from death registration data supplied to the ONS by registrars and coroners. This is the definitive source of mortality data. Some local public health departments and clinical commissioning groups use ONS mortality data to calculate EWM for their local area. These figures are likely to differ from ONS figures because they are based on provisional death registration data that have not been through the same quality assurance as the final death occurrences data used by the ONS. In addition, the ONS adjusts provisional figures for the most recent winter using a special calculated factor; other organisations may not apply this factor.

UK figures are not available as the ONS only hold and own death registration data for England and Wales. NRS produces an [annual winter mortality report](#) and NISRA produces data tables on [excess winter mortality](#).

Winter mortality figures for Scotland and Northern Ireland are both based on death registrations, whereas England and Wales figures are based on occurrences. In Scotland, a death must be registered within eight days and fact of death can be registered (with a cause given as unascertained, pending investigations) before the Procurator Fiscal has completed their investigations. Therefore, Scottish mortality data are not subject to the same registration delays as mortality data for England and Wales. Hence, almost all deaths that occurred in the relevant period will be included in the Scottish figures, so that winter mortality figures from Scotland are broadly comparable with ONS figures for England and Wales.

However, this is not true for Northern Ireland mortality data; for some causes of death, there can be a significant delay between when the death occurred and when it was registered. NISRA has compared EWM figures based on occurrences and registrations and the difference is quite large in some years. Therefore, EWM figures from Northern Ireland, and England and Wales are not directly comparable.

Concepts and definitions

Excess winter deaths (EWD):

The ONS standard method defines the winter period as December to March and compares the number of deaths that occurred in this winter period with the average number of deaths occurring in two non-winter periods; the preceding August to November and the following April to July:

$$\text{EWD} = \text{winter deaths} - \text{average non winter deaths}$$

Excess winter mortality (EWM) index:

The EWD index is calculated so that comparisons can be made between sexes, age groups and regions, and is calculated as the number of EWD divided by the average non-winter deaths, expressed as a percentage:

$$\text{EWM Index} = \frac{\text{EWD}}{\text{Average non winter deaths}} \times 100$$

The EWM index is presented with 95% confidence intervals, which are calculated as:

$$95\% \text{ confidence intervals} = \text{EWM Index} \pm 1.96 \times \left[\frac{\text{EWM Index}}{\sqrt{\text{EWD}}} \right]$$

Geography

The EWM release covers:

- England and Wales combined and separately
- English regions
- England and Wales local authorities
- England's clinical commissioning groups and Wales' health boards
- England and Wales Parliamentary constituencies

Accessibility and clarity

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

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

- [terms and conditions \(for data on the website\)](#)
- [accessibility](#)

Timeliness and punctuality

Each October, the ONS produces an annual file showing the number of deaths occurring in the previous year. This extract is taken approximately five months after the annual “death registrations” extract is taken, in order to give more time for late registrations (for example, deaths that have been referred to a coroner) to appear in the data. At the same time, a special extract of all deaths occurring in January to July of the current year is taken from the live death registrations database.

Information from these two datasets is combined and provisional EWM figures are produced using the number of deaths occurring each month between August of the previous year and July of the current year. Final figures are produced using the same time period one year earlier.

Provisional EWM figures for the most recent winter and final figures for the previous winter are published annually in November. Compared with the annual death occurrences file, the provisional mortality data for the current year undergo fewer quality checks and do not include late registrations, meaning provisional EWM figures can be made available much earlier than final figures.

Hence, provisional EWM figures are published eight months after the end of the winter period and four months after the end of the non-winter period; and final EWM figures are released 20 months after the end of the winter period and 16 months after the end of the non-winter period.

The provisional release date of the statistical bulletin on EWM is announced in the [GOV.UK statistical release calendar](#).

The date is then finalised at least four weeks before publication. The bulletin is published annually each November, which is four months after the end of the reference period. This delay is because of the large amount of quality checking that must be performed on the underlying mortality data. In the unlikely event of a change to the pre-announced release schedule, public attention will be drawn to the change and the reasons for the change will be explained fully at the same time, as set out in the [Code of Practice for Statistics](#).

Why you can trust our data

The ONS is the UK's largest independent producer of statistics and is the country's national statistics institute. The [Data Policies and Information Charter](#), available on the ONS website, detail how data are collected, secured and used in the publication of statistics. We treat the data that we hold with respect, keeping it secure and confidential, and we use statistical methods that are professional, ethical and transparent. More information about our [data policies](#) is available.

6 . Methods used to produce the excess winter data

Main data sources

All Office for National Statistics (ONS) mortality data come from information collected when a death is certified and registered. We code all of the causes mentioned on a death certificate using the [International Statistical Classification of Diseases and Related Health Problems, Tenth Revision \(ICD-10\)](#). From all of the causes mentioned, an underlying cause of death is selected using ICD coding rules.

Most deaths (around 95%) are registered within one month of the date of occurrence, although violent or unexpected deaths, which need further investigation from a coroner, can take much longer.

The [Excess winter mortality bulletin](#) is created using death occurrence data. These are part of the national mortality database for England and Wales, which is held by the ONS. The death occurrences database is updated each year to include the previous year's final figures.

Further details about how ONS mortality data are collected and coded can be found in the [Mortality metadata \(PDF, 2.39MB\)](#) and the [Mortality Statistics Quality and Methodology Information](#).

How we process and analyse the data

Excess winter mortality (EWM) is calculated by comparing the number of deaths occurring in winter with the number occurring in a non-winter period. A special mortality dataset is generated in October for deaths that were registered by this month, but which occurred up to the end of July for the present year. This dataset contains provisional death occurrence data for January to July of the current year.

As this special mortality dataset is provisional, deaths that are registered because they were referred to a coroner or an inquest was held may not be included in the extract if they were registered after October, even if the death occurred between January and July. This means that the figures contained in the dataset would underestimate the true number.

In order to compensate for this, a factor is then calculated using the number of deaths from the previous year's provisional and final datasets. The factor represents the percentage of deaths per month that were registered by the time the final dataset was created but were not at the time the provisional dataset was created. These factors are created for the total number of deaths per month and then applied to each corresponding month in the current year's provisional dataset (Example 1).

$$\text{Factor} = 1 + \frac{(\text{Final deaths} - \text{Provisional deaths})}{\text{Provisional deaths}}$$

This results in an estimated number of final deaths for January to July in the current year.

Example 1: Calculation of excess winter mortality adjustment factors in England and Wales combined

Month	2017 to 2018				2018 to 2019	
	Provisional deaths	Final deaths	Percentage not registered	Rounded factor	Provisional deaths	Adjusted deaths
January	59,149	60,021	1.47	1.01	50,248	50,750
February	47,892	48,852	2.0	1.02	44,375	45,263
March	51,527	52,887	2.64	1.03	43,831	45,146
April	41,502	43,124	3.91	1.04	42,198	43,886
May	39,383	41,441	5.23	1.05	40,380	42,399
June	36,473	38,902	6.66	1.07	37,268	39,877
July	37,266	40,283	8.1	1.08	37,655	40,667

Excess winter deaths (EWD) and the EWM index can then be calculated for the most recent winter (Example 2). As these figures are provisional, they are rounded to the nearest 100 and are not produced for areas smaller than regions of England.

Final EWM figures are calculated using all final data for the previous winter. They are rounded to the nearest 10 and are broken down by underlying cause of death, age and sex. Final EWM figures are also available for local areas.

Example 2: Calculation of provisional EWM figures, using the adjusted deaths from Example 1 in England and Wales combined

Winter period: December 2018 to March 2019 deaths	188,073
Pre non-winter period: August to November 2018 deaths	162,844
Post non-winter period: April to July 2019 deaths	166,829
Average non-winter deaths	164,837
EWD = winter deaths – average non-winter deaths	188,073 – 164,837 = 23,236
Rounded provisional EWM figure	23,200
EWM Index = (EWM / average non-winter deaths) x 100	(23,236 / 164,837) x 100 = 14.1

How we quality assure and validate the data

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

- independent extraction of base mortality and population data by two research officers
- independent analyses by two research officers and use of check sheets to match analyses before writing up results
- reproducing estimates in the previous publication to ensure they match
- plausibility checking of new estimates through cross-referencing with past publications and more widely with what we know about the general trend in mortality
- identification of outliers in subnational estimates
- checks across cause of death components of the definition

How we disseminate the data

[EWM data](#) are available online for England and Wales separately back to 1991 to 1992, and from 1950 to 1951 for England and Wales combined.

Links from the [release calendar](#) make the release date and location of each new release easy to locate. The [bulletin](#) can be downloaded free of charge as a PDF and the [datasets](#) in Microsoft Excel format. The underlying data for the charts and tables in the bulletin can be downloaded, while the digital interactive maps can be embedded into other media.

Other data not published on the web are available on request by emailing mortality@ons.gov.uk. Metadata describing the limitations of the data for more detailed tables are provided with each individual request. Most queries can be answered from the website datasets or supporting methods documents. Any additional enquires regarding excess winter mortality can be made by emailing mortality@ons.gov.uk.

Other information

Here are some useful links to other sources of data:

[ONS deaths and mortality publications](#)

[User guide to mortality statistics](#)

[Disclosure Control Policy for birth and death statistics](#)

National Records of Scotland: [annual winter mortality](#)

Northern Ireland Statistics and Research Agency: [excess winter mortality](#)