Climate-related mortality, England and Wales quality and methods guide

What the climate-related mortality, England and Wales statistics cover, how we produce them, and their quality and comparability. Includes definitions and latest changes.

Contact:
Climate and Health team
climate.health@ons.gov.uk

Release date:
26 August 2026

Next release:
To be announced

Table of contents

1. Overview

2. Latest changes to quality and methods

3. What the statistics cover

4. Where the data come from

5. How we produce the statistics

6. Quality of the statistics

7. Changes and their effects on comparability over time

8. Comparability and coherence with other statistics producers

9. Users and uses of these statistics

10. Definitions

11. Related links

12. Cite this page

1 . Overview

In the current statistical bulletin, we present an application of the Standards for Official Statistics on Climate-Health Interactions (SOSCHI) project methodology. Visit our Climate-Health platform for more information on the SOSCHI project and the indicators developed.

This guide provides quality and methods information for our Climate-related mortality statistical bulletin series. We model daily death occurrences with climatic data across England and Wales to understand the relative risks and mortality impacts associated with the coldest and hottest 2.5% of observed temperatures.

The underlying data, statistics and methodology presented in the current bulletin were quality assured by both internal and external experts in the climate and health field. The results were compared with similar statistics from the academic field and those produced by other government departments.

The estimates have been presented with 95% confidence intervals to help provide the user an understanding of the uncertainty associated with each statistic. Smaller mortality counts, often occurring when disaggregating by demographic group or underlying cause of death, can lead to more uncertainty in the resulting estimates.

These are official statistics in development. For more information, see Section 6: Quality of the statistics.

For monitoring reports on temperature-related mortality across the UK nations, see:

- the UK Health Security Agency's (UKHSA's) heat mortality for England and cold mortality for England monitoring reports
- Public Health Wales's heat mortality for Wales and cold mortality for Wales monitoring reports
- Public Health Scotland's Heat impacts on health in Scotland and Winter mortality in Scotland publications
- Northern Ireland Statistics and Research Agency's (NISRA's) Winter mortality in Northern Ireland publication

Our modelled estimates use historical data to monitor long-term trends of the health impacts of changing temperature patterns. They are complementary to the active monitoring and reporting systems used by other government bodies. However, because the underlying data and methods are different, our estimates should not be expected to be equivalent to estimates from other sources.

2 . Latest changes to quality and methods

This quality and methods guide was first published on 26 August 2026.

For more information on latest and upcoming changes, see Section 7: Changes and their effects on comparability over time.

3 . What the statistics cover

We present statistics on temperature-related mortality for England, Wales, and the nine regions of England. Using historical data, these statistics estimate the long-term risk of mortality across the full temperature distribution for each region over the study period. Risks are expressed relative to the region's optimal temperature, where mortality risk is lowest, also known as the minimum mortality temperature.

Using a statistical model, we provide estimates for the number and percentage of deaths attributable to the coldest and hottest temperatures across the temperature distribution. These are modelled estimates and not observed counts of individual deaths attributable to outdoor temperatures.

The coldest and hottest temperatures are defined as mean temperatures less than or equal to the 2.5th percentile of the temperature distribution, or greater than or equal to the 97.5th percentile, respectively. The percentiles for each region of England, and Wales are determined by the distribution of mean temperatures across the whole data time series.

For both the coldest and hottest temperatures, the attributable numbers and proportion of total deaths are calculated for each day in the time series, then output in the following aggregations for each region or country:

- total across the whole time series
- annual, that is, for each year in the time series

These aggregations provide estimates of the impact across the whole study period, enabling the monitoring of long-term trends.

Our statistics also explore temperature-related mortality risk and impact by demographic group and underlying cause of death. The following have been published:

- sex: male and female
- age: aged under 65 years and aged 65 years and over
- deprivation quintiles using the respective English and Welsh indices of multiple deprivation
- underlying cause of death by diseases of the circulatory system, diseases of the respiratory system, cerebrovascular diseases (stroke) and dementia and Alzheimer's disease
- all-cause deaths excluding coronavirus (COVID-19) deaths

The following codes in the International Classification of Diseases, 9th Revision (ICD-9) and 10th Revision (ICD-10) were used to identify underlying causes of death.

Table 1: Underlying cause of death coding

Underlying cause of death	ICD-9	ICD-10
Diseases of the circulatory system	390 to 459 excluding 430 to 438	I00 to I99 excluding I60 to I69
Diseases of the respiratory system	460 to 519	J00 to J99
Cerebrovascular diseases (stroke)	430 to 438	I60 to I69
Vascular dementia and other dementia or Alzheimer's disease	290 (290.4 [note1]), 331.0 [note 2]	F00 to F03, G30
Coronavirus (COVID-19)	N/A	U07.1, U07.2, U10.9

Source: Climate-related mortality from the Office for National Statistics

Notes

1. Vascular dementia is described in ICD-9 as "arteriosclerotic dementia".
2. Dementia is described in ICD-9 as "senile dementia" or "presenile dementia".

What the statistics exclude

- Deaths that may have occurred during the study period but were not registered by the end of 2025.
- As we link deaths registered in England and Wales to postcode of usual residence, any non-UK residents are not included in this analysis.
- Our statistics do not include active mortality monitoring of heatwaves or cold spells.

4 . Where the data come from

Mortality data

The Births and Deaths Registration Act (1836) made it a legal requirement for all deaths to be registered from 1 July 1837.

The Local Registration Service, in partnership with the General Register Office (GRO), register deaths occurring in England and Wales.

When a death is registered, a copy of the death certificate is sent from the GRO to us, where the information is processed, quality assured and analysed.

Our analysis uses death occurrences (the date of death) as opposed to death registrations (the date the death was registered) to better understand the association between death and weather patterns at, or around, the time of death.

We include all death occurrences that have been registered up to the end of the study period. The timeliness of registrations can be affected for reasons such as the need for a coroner's investigation. Because of this, there may be some underestimation in the mortality data, particularly in more recent study periods.

Find out more in our User guide to mortality statistics.

Climate data

We used UK Met Office data derived from the European Centre for Medium-Range Weather Forecasts Reanalysis Generation 5 (ERA5) dataset. ERA5 is a comprehensive climate reanalysis that combines observations from weather stations, satellites, and other sources to provide global, hourly estimates of atmospheric, ocean-wave, and land-surface conditions.

Our main climatic variable of interest was mean temperature. We used the ERA5 two-metre air temperature measure, which records air temperature at a height of two metres above the surface of land, sea, or inland waters. Temperatures were converted from Kelvin to degrees Celsius for analysis.

To reduce potential confounding in the temperature-mortality relationship, we also included the following variables in our models:

- surface (air) pressure converted to hectopascal (hPa)
- 10-metre wind speed in metres per second (m/s)
- relative humidity as a percentage (%)

For further information on these variables, see ERA5 hourly data on single levels from 1940 to present.

Climate data were mapped to the regional boundary shapefiles from our Open Geography Portal.

Air pollution data

We used the Daily Air Quality Index (DAQI) produced by the Department for Environment, Food and Rural Affairs to adjust for pollution effects on mortality risk. DAQI is a summary measure, graded from 1 to 10, of the highest level of pollution across five pollutants:

- nitrogen dioxide (NO2)
- sulphur dioxide (SO2)
- ozone (O3)
- particles less than 2.5 micrometres (PM2.5)
- particles less than 10 micrometres (PM10)

5 . How we produce the statistics

Creating the dataset

1. At the record level, each death was assigned a Welsh Index of Multiple Deprivation (WIMD) or Index of Multiple Deprivation (IMD) quintile using the postcode of usual residence of the deceased.

2. All-cause mortality records were then aggregated from individual records to daily death counts for each of the nine English regions, and Wales.

3. Additional daily variables were created to identify death counts for demographic groups and underlying causes of death of interest, using the 9th Revision and 10th Revision of the International Classification of Diseases.

4. Daily climatic variables were linked to each region, with units converted where necessary to ensure consistency.

5. Daily air quality scores were also linked at the regional level: for Wales, separate air quality scores were available for North and South Wales, but South Wales data were only available from 12 May 1992 onwards; to create a single Wales-level measure, a new daily variable was derived using the maximum value from either the North or South Wales score on each day.

Modelling stage 1: Quasi-Poisson regression with distributed lag non-linear model

This first stage of the analysis fits a Quasi-Poisson time series regression with a distributed lag non-linear model (DLNM), as specified in the Standards for Official Statistics on Climate-Health Interactions indicator methodology, to the data for each region to determine the temperature-mortality association, reported as relative risk (RR).

The DLNM accounts for both the non-linear temperature-mortality association and the delayed effects of temperatures on, or following, exposure to a given temperature. A lag period of 21 days after exposure was chosen to account for the delayed health outcome effects of colder temperatures, as well as the effects of hotter temperatures, which often have a shorter lag period of around three days.

The RR for each region uses the full length of the time series input into the method. The DLNM model controls for the day of the week, long-term trends with a seasonal component, and other climatic variables of wind speed, air pressure, relative humidity and air pollution.

The temperature-mortality association is subsequently estimated for each region by calculating a predicted RR with the fitted DLNM, where the RR reference value is taken to be the mean of the time series' daily temperatures in that geography.

Modelling stage 2: Calculate optimal temperatures and final relative risks

The optimal temperature (OT) for each region is determined by identifying where RR is lowest on the exposure-response curve, that is, the temperature with the smallest risk of mortality. The RRs are then recentred around the OT in the model, fixing the OT as the reference point for the RRs.

Modelling stage 3: Calculating attributable numbers and fractions

The third stage of the analysis calculates the attributable numbers (ANs) and attributable fractions (AFs) of mortality from the hottest and coldest temperatures, and their respective confidence intervals (CIs).

Daily ANs for each region were estimated for the hottest and coldest days, defined as days with a mean temperature at or above the 97.5th percentile and at or below the 2.5th percentile of the regional temperature distribution, respectively. Estimates were derived using the temperature-mortality associations from Modelling stage 2 and the mean number of deaths occurring on and during the subsequent 21-day lag period for days that met these thresholds.

The daily ANs were then aggregated to produce annual estimates and overall totals across the study period.

This method is adapted from the Attributable risk from distributed lag models article by Gasparrini and Leone.

The AF for the hottest and coldest temperatures was calculated as the percentage of all deaths in a given area or demographic group that were attributable to the hottest and coldest temperatures, respectively.

CIs for the ANs and AFs were estimated using Monte Carlo simulation with 1,000 simulations. This approach quantifies uncertainty by repeatedly sampling from the probability distributions of the model parameters and recalculating the estimates. The resulting distribution of estimates was then used to derive CIs.

6 . Quality of the statistics

Statistical designation

These statistics are labelled as official statistics in development. They are based on information from death registration records and the European Centre for Medium-Range Weather Forecasts Reanalysis Generation 5 (ERA5) reanalysis climate dataset provided by the Met Office. We are developing how we process the data and produce the statistics to improve their quality.

Once we have completed the developments, we will review the statistics with the Statistics Head of Profession.

If the statistics meet trustworthiness, quality and value standards based on user feedback, we will remove the "official statistics in development" label to publish under the official statistics label.

If they do not meet trustworthiness, quality and value standards, we will further develop them and might stop producing them.

We will inform users of the outcome of our, and any Office for Statistics Regulation (OSR), review and any changes.

How we quality assure the data and statistics

1. We conducted an iterative external peer review of the methods during the development by international experts and methodological expert review of the code.

2. We used internal data science support to functionalise the analysis code, which was subject to rigorous unit and function testing.

3. We used Microsoft Copilot's artificial intelligence (AI) technology to assist with quality assurance of our analytical code.

4. We implemented feedback from sharing the analysis code with external users for user testing.

5. We used GitHub for clear version control with internal governance process for making amendments and updates.

6. We underwent the approval and quality assurance process required to turn the analysis functions into the climatehealth CRAN package.

7. We compared the results of the current statistical article with similar statistics from both the academic field and those produced by other government departments.

8. We shared the underlying data and statistics produced for the current statistical article with both external and internal experts for quality assurance purposes.

9. We used R scripts and Copilot to assist with cross-referencing the accompanying dataset and data downloads with expected results, in addition to manual spot-checks.

10. We followed best practice quality assurance guidance for producing quality statistics in government as outlined by the Analysis Function.

Strengths

- Death registration is mandatory, so these data have high completeness.

- The climate dataset based on ERA5 reanalysis data (modelled ground weather station data together with satellite data) was provided by the UK Met Office to give a more robust temperature dataset, which can account for spatial and temporal limitations associated with using ground weather station climate data.

- We used a widely published and implemented scientific methodological approach to assess temperature-related risks and associated estimated mortality.

- We underwent an iterative methodology development process with feedback from international experts throughout the development.

- The methodology is appropriate for both shorter and longer time series datasets to calculate the overall cumulative effect of an exposure.

- The model accounts for the non-linear temperature-mortality relationship and the delayed effects of temperature on mortality.

- The methodology allows controlling for seasonality and longer-term trends in mortality.

- Additional time-varying risk factors such as coronavirus (COVID-19) and additional climatic variables have been controlled for in the analysis.

Limitations

- Deaths that occurred in the study period but were not registered within the period are not included in the analysis, possibly underestimating the more recent periods.
- The RR and optimal temperature estimates from the model are based on the whole time series and therefore assume a static temperature-mortality relationship; this should be interpreted with caution as, for example, results may not provide evidence for changes in risk over time resulting from adaptation or changing climate impacts.
- Implementing one single model for both the hottest and coldest temperatures is unable to account for season-specific temperature-mortality relationships and their respective differences in delayed effects; because we used a combined model, we did not control for the incidence of seasonal diseases, such as influenza, which can affect mortality observed in winter months.
- Where possible, this indicator should also be interpreted with an understanding of implemented adaptation strategies and hazard exposure during the time series.
- Outdoor temperature does not capture a population's true exposure to certain temperatures as many people may be indoors during such temperatures; therefore, for the current analysis, it is assumed that the population is exposed to outdoor temperatures.
- Estimating risk and attributable deaths at the regional level generalises the temperature-mortality relationship across the region, rather than more accurately capturing exposure at smaller scales such as local authority level.
- Climatic variables have been controlled for in the model, however, other modifying variables such as social factors can be challenging to control for because of lack of available data.
- The estimates presented are not age-standardised and therefore do not account for regional differences in population age structure, including the higher mortality typically observed in older populations.
- Smaller mortality counts, often occurring when disaggregating, can lead to more uncertainty in the estimates.

European Statistical System Quality Dimensions

The Office for National Statistics (ONS) has developed Guidelines for measuring statistical quality, based on the five European Statistical System (ESS) Quality Dimensions. These are:

- relevance
- accuracy and reliability
- timeliness and punctuality
- comparability and coherence
- accessibility and clarity

We have integrated these considerations into the guide.

7 . Changes and their effects on comparability over time

Latest changes

The current bulletin incorporates methodological, analysis code and data source improvements, which means the estimates supersede those published in our previous Climate-related mortality, England and Wales: 1988 to 2022 article.

These changes were simultaneously implemented for the 2026 release.

Derivation of the England-level estimates

As there was substantial heterogeneity between regions, it was not appropriate to combine the regional estimates using a meta-analytical approach to produce an England-level estimate. Instead, England-level estimates were calculated as the sum of the regional estimates. This approach was implemented following expert advice.

This differs from the approach used in the previous article, where a meta-analysis was used to derive England-level estimates. In addition, an error was identified in the analysis code used to produce the previous estimates, which resulted in a substantial overestimation of heat-attributable deaths and a slight underestimation of cold-attributable deaths at the England level.

Thresholds applied to attributable deaths

For analysing attributable deaths for the 2026 bulletin, expert advice was provided on the hottest and coldest temperature thresholds. A decision was made based on this advice to restrict the thresholds to the coldest and hottest 2.5% of days, for the Standards for Official Statistics on Climate-Health Interactions (SOSCHI) project's mortality attributable to high and low temperatures indicator, rather than the previously used 5%. This was done to ensure the methodology had a higher level of generalisability for global application. As such, these thresholds are applied here, as a demonstration of the SOSCHI indicator in the context of England and Wales.

This did not have a large impact on the deaths associated with the hottest days, as the relative risk at the 97.5% threshold for the hottest temperatures falls near the optimal temperature, where there is close to no increased risk. This is shown in Figure 1 where the relative risk (RR) curve within the shaded area is close to 1. In the current analysis, we found that the 95% threshold would often fall on the optimal temperature itself.

This threshold change did, however, have a large impact on the deaths associated with the coldest temperatures. This is because there is generally an increased relative mortality risk at both the 5th and 2.5th percentiles of temperature. This is shown in Figure 1 where the shaded region highlights the deaths that would have been attributable to the coldest temperatures if the 5% threshold were used, but are not included in the current analysis.

Figure 1: Reducing the attributable thresholds affected the estimates of cold-related deaths more than heat-related

Data source for climatic variables

For the 2026 publication, following expert advice, a decision was made to use European Centre for Medium-Range Weather Forecasts Reanalysis Generation 5 (ERA5) reanalysis climate data as the source data, provided by the UK Met Office, as opposed to Centre for Environmental Data Analysis (CEDA) data.

In addition to a daily mean temperature found using satellite data, ERA5 provided a higher level of spatial and temporal resolution for all climate variables, with modelled geophysical properties, which mitigate against limitations associated with using ground weather station data from CEDA. Relative humidity and wind speed were also available on a daily temporal scale, where they were previously only available on a monthly scale through CEDA. ERA5 also provided a daily air pressure available, which was not available through CEDA.

Past changes

Until 26 August 2026, we have not made any changes to quality and methods in the past three years, since the release of the previous article published in September 2023.

Upcoming changes

Implementation of the Standards for Official Statistics on Climate-Health Interactions methodology into the UK statistical system

We are working to embed this analysis into regular statistical outputs in the future. See Section 7 of the Standards for Official Statistics on Climate-Health Interactions (SOSCHI) methodology working paper for full details of future methodological research and developments.

8 . Comparability and coherence with other statistics producers

Public Health Wales – Heat mortality monitoring reports

Public Health Wales's (PHW) Heat mortality monitoring is not comparable with Office for National Statistics (ONS) estimates, because of the following differences.

Methodological approach:

- ONS: uses a distributed lag non-linear model (DLNM) framework to model deaths attributable to the hottest temperatures
- PHW: descriptive epidemiological methods applied to assess excess mortality

Time period:

- ONS: longer-term 1988 to 2025 period used
- PHW: shorter-term 2016 to 2024 period used

Exposure period:

- ONS: the exposure period covers the entire calendar year
- PHW: the exposure period focuses on June to September

Exposure definition:

- ONS: deaths are attributed to the hottest temperatures defined by temperatures greater than or equal to the 97.5th percentile of temperatures based on the distribution of temperature across the whole time series for the region
- PHW: heatwaves were defined as at least three consecutive days with the maximum temperature of at least 25 degrees Celsius; a heat period was defined by days where the central mean temperature in Wales was at least 20 degrees Celsius

Public Health Wales – Cold weather mortality monitoring reports

PHW's Cold weather mortality monitoring (PDF, 1.2KB) is not comparable with ONS estimates, because of the following differences.

Methodological approach:

- ONS: uses a distributed lag non-linear model (DLNM) framework to model deaths attributable to the coldest temperatures
- PHW: descriptive methods applied to assess excess mortality

Time period:

- ONS: longer-term 1988 to 2025 period used with exposure period covering the entire calendar year
- PHW: assessed 31 October 2024 to 31 March 2025 only

Exposure definition:

- ONS: deaths are attributed to the coldest temperatures defined by temperatures less than or equal to the 2.5th percentile of temperatures based on the distribution of temperature across the whole time series for the region
- PHW: cold periods were defined when at least two consecutive days with the national mean temperature of less than or equal to two degrees Celsius

UK Health Security Agency – Heat mortality monitoring reports

The UK Health Security Agency (UKHSA's) Heat mortality monitoring reports have some similarities with the Office for National Statistics (ONS's), however, are not comparable in some aspects of the methodology, because of the following differences.

It is important to note that, although the methodology for modelled mortality is similar, the UKHSA provide estimates of the short-term impact on mortality during heatwave periods. Whereas our estimates use longer-term historical data to identify the impact over a long period of time.

Coverage:

- ONS: England and Wales
- UKHSA: England only

Estimates:

- ONS: modelled estimates only
- UKHSA: observed excess mortality and modelled mortality; the following bullets compare ONS and UKHSA modelled mortality

Methodological approach:

- ONS: modelled using distributed lag non-linear model (DLNM) framework
- UKHSA: modelled using DLNM framework

Exposure period:

- ONS: the exposure period covers the entire calendar year; modelling heat and cold temperatures together
- UKHSA: the exposure period focuses on May to September

Exposure definition:

- ONS: deaths were attributed to the hottest temperatures defined by temperatures greater than or equal to the 97.5th percentile of temperatures based on the distribution of temperature across the whole time series for the region
- UKHSA: deaths were attributed to heat spells defined by days where the average central England temperature is at least 20 degrees Celsius

Climatic variables:

- ONS: other climatic variables are controlled for within the model
- UKHSA: no other climatic variables are controlled for within the model

Time period:

- ONS: used a long time series to estimate the temperature-mortality relationship assessing long-term trends
- UKHSA: used a five-year period to estimate the temperature-mortality relationship for shorter-term monitoring

Deaths due to coronavirus (COVID-19):

- ONS: COVID-19 deaths were only controlled for in a subanalysis presented in the accompanying dataset
- UKHSA: deaths mentioning COVID-19 were excluded from the analysis

UK Health Security Agency – Cold mortality monitoring reports

UKHSA's Cold mortality monitoring reports are broadly comparable with ONS's, because of the following similarities and differences.

It is important to note that, although the methodology for modelled mortality is similar, the UKHSA provide estimates of the short-term impact on mortality during cold episodes. Whereas our estimates use longer-term historical data to identify the impact over a long period of time.

Coverage:

- ONS: England and Wales
- UKHSA: England only

Exposure period:

- ONS: the exposure period covers the entire calendar year; modelling heat and cold temperatures together
- UKHSA: the exposure period focuses on November to March

Exposure definition:

- ONS: deaths were attributed to the coldest temperatures defined by temperatures less than or equal to the 2.5th percentile of temperatures based on the distribution of temperature across the whole time series for the region
- UKHSA: deaths were attributed to cold episodes defined by two or more consecutive days where the average daily mean England temperature is below two degrees Celsius

Climatic variables:

- ONS: other climatic variables are controlled for within the model
- UKHSA: no other climatic variables are controlled for within the model

Time period:

- ONS: used a long time series to estimate the temperature-mortality relationship assessing long-term trends
- UKHSA: used a five-year period to estimate the temperature-mortality relationship for shorter-term monitoring

Deaths due to coronavirus (COVID-19):

- ONS: COVID-19 deaths were only controlled for in a subanalysis presented in the accompanying dataset
- UKHSA: the winter of 2020 was excluded in the main analysis because of the impact of COVID-19

Deaths due to influenza:

- ONS: influenza not controlled for
- UKHSA: estimates provided for influenza adjustment

Methodological approach:

- ONS: modelled using distributed lag non-linear model (DLNM) framework
- UKHSA: modelled using DLNM framework

9 . Users and uses of these statistics

The Standards for Official Statistics on Climate-Health Interactions (SOSCHI) methodology and accompanying analytical climatehealth code package were developed to allow production of climate-related mortality statistics by a range of global users. Main users include:

- global national statistical offices, Ministries of Health, and other government departments can adapt and apply the methodology using the associated analytical code to routinely monitor the health impacts of the hottest and coldest temperatures over time; improving global comparability of the evidence
- policymakers and adaptation practitioners can use the statistics as part of a regular official evidence base to inform, design, monitor and evaluate climate adaptation and public health strategies
- we provide a publicly accessible dataset and methods to enable researchers, and the wider public to undertake further analyses, raise awareness of climate-related health risks, and support evidence-informed decision making
- health and climate stakeholders can use the statistics to identify vulnerable populations, assess trends over time and prioritise interventions where the health burden is greatest

10 . Definitions

Attributable fraction

The estimated percentage of all deaths that can be attributable to the hottest and coldest temperatures that would not have occurred if there had been no exposure to the hottest and coldest temperatures.

Attributable number

The estimated number of deaths that are attributable to the hottest and coldest temperatures that would not have occurred if there had been no exposure to the hottest and coldest temperatures.

Coldest temperatures

Mean temperatures below or equal to the 2.5th percentile of the country or region's temperature distribution across the full time series.

Confidence intervals

A confidence interval gives an indication of the degree of uncertainty of an estimate, showing the precision of an estimate. The 95% confidence intervals are calculated so that if we repeated the study many times, 95% of the time the true unknown value would lie between the lower and upper confidence limits. A wider interval indicates more uncertainty in the estimate. Overlapping confidence intervals indicate that there is little or no evidence of a true difference between two estimates, at that level of confidence.

Hottest temperatures

Mean temperatures above or equal to the 97.5th percentile of the country or region's temperature distribution across the full time series.

Optimal temperature

The temperature at which the relative mortality risk in a particular country or region is lowest. Also known as the minimum mortality temperature.

Relative risk

The likelihood of an individual dying during, or shortly after, exposure to a certain daily temperature. When a temperature has a relative risk (RR) of 1, this means there is neither an increase nor a decrease in the likelihood of the individual dying during, or shortly after exposure to that temperature, compared with the optimal temperature.

11 . Related links

Standards for official statistics on climate-health interactions
Corporate information | Last updated 29 June 2026
An overview of the Standards for Official Statistics on Climate-Health Interactions (SOSCHI) project, which aims to develop a transparent and globally usable framework and technical platform for official statistics on climate change, environment, and health. The methodology developed for the mortality attributable to high and low temperatures was applied for this analysis.

SOSCHI Methodology: Mortality attributable to high and low temperatures
Methodology | Released 14 May 2026
This document provides full details and guidance of applying the methodology used for the current analysis. This methodology was developed with advice from experts in the climate and health field. In March 2026, the methodology was endorsed by the United Nations Statistical Commission who agreed to incorporate this indicator into the Global Set of Climate Change Statistics.

Suicides in England and Wales: 1981 to 2024
Statistical bulletin | Released 3 October 2025
This statistical bulletin includes an application of another SOSCHI indicator: suicides attributable to extreme heat. The analysis presents relative risk of suicide for extreme temperatures. The estimated deaths presented are associated with the hottest 2.5% of daily mean ambient outdoor temperatures.

Climate-related mortality, England and Wales: 1988 to 2022
Statistical article | 22 September 2023
This statistical article contains relative risk of death associated with temperature for England and Wales: 1988 to 2022. This has been superseded by the current analysis article following methodological and data source improvements.

12 . Cite this page

Office for National Statistics (ONS), released 26 August 2026, ONS website, quality and methods guide, Climate-related mortality, England and Wales quality and methods guide