

Statistical bulletin

# Geographical inequalities in premature mortality in England and Wales: March 2021 to December 2023

All-cause and cause-specific premature mortality rates for adults aged under 75 years in upper tier local authorities, accounting for differences in sociodemographic characteristics.

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# 1 . Main points

- Premature mortality rates vary across Upper Tier Local Authorities (UTLA) in England and Wales; when accounting for differences in age and sex, all-cause premature mortality rates amongst adults aged 18 to 74 years old ranged from 285 per 100,000 person-years at risk in Richmond upon Thames, to 696 per 100,000 person-years in Blackpool.
- After further adjustment for ethnicity and being born outside the UK, the relative range between the UTLAs with the highest and lowest rates fell from 144% to 129%; when additionally adjusting for ethnicity, being born outside the UK, and socioeconomic status, the relative range fell to 56%, suggesting that socioeconomic status accounts for a considerable proportion of geographical inequalities in premature mortality.
- We also examined rates of premature mortality caused by specific conditions; when accounting for differences in age and sex, rates for cancers ranged from 208 per 100,000 person-years at risk in Blackpool to 104 per 100,000 person-years in Harrow, rates for diabetes ranged from 115 per 100,000 person-years in Newham to 25 per 100,000 person-years in Cheshire East, rates for respiratory conditions ranged from 113 per 100,000 person-years in Blackpool to 27 per 100,000 person-years in Richmond upon Thames, and rates for cardiovascular disease ranged from 146 per 100,000 person-years in Blackpool to 50 per 100,000 person-years in Richmond upon Thames.
- After additionally adjusting for differences in ethnicity, being born outside the UK and socioeconomic status, the relative range in cause-specific premature mortality between the UTLAs with the highest and lowest rates reduced from 369% to 166% for diabetes, from 315% to 106% for respiratory conditions, from 190% to 129% for cardiovascular disease, and from 101% to 50% for cancer.
- Geographical inequalities still exist even after accounting for differences in age, sex, ethnicity, being born outside the UK, and socioeconomic factors; these remaining differences are likely to be linked to factors not accounted for in this analysis, such as access to and provision of healthcare, environmental factors, and health-related behaviours.

## 2 . Data on premature mortality

[Geographical inequalities in premature mortality in England and Wales](#)

Dataset | Released 8 July 2025

All-cause and cause-specific premature mortality rates for adults aged under 75 years in upper tier local authorities, accounting for differences in sociodemographic characteristics.

## 3 . Glossary

### Premature mortality

Premature mortality was defined as someone who died from any cause before their 75th birthday.

### Cause-specific premature mortality

We analysed cause-specific premature mortality using four groups of major health conditions, which include cancers, cardiovascular disease, diabetes, and respiratory conditions. For cancers, cardiovascular disease, and respiratory conditions, we used the underlying cause of death reported on death certificates. For diabetes, we used both the underlying cause and contributory mentions because there is often co-morbidity between diabetes and other conditions.

## 4 . Data sources and quality

### Data linkage and coverage

We linked all usual residents of England and Wales enumerated at Census 2021 to death registrations from 21 March 2021 to 7 December 2023. The NHS Personal Demographics Service (PDS) dataset was used to link Census 2021 and death registrations; following linkage of census to PDS, onward linkage to death registrations could occur via an NHS number.

The linkage rate between Census 2021 and PDS was 94.6% (54.6 million linked person records). We then removed anyone who had imputed or incomplete census records, people who were not usual residents of England and Wales, and anyone aged 75 years or over, or 17 years and under. We have removed anyone under the age of 18 years to account for low coverage on the self-reported occupation field captured in Census 2021. Our study population therefore comprised 38.1 million people.

To fit statistical models to our data, we sampled the study population stratifying across 172 upper tier local authorities (UTLAs) in England and unitary authorities in Wales. We also grouped Cornwall and the Isles of Scilly, and City of London and Hackney, because of low sample sizes.

For each UTLA, we randomly sampled 4,000 individuals, stratified by age bands, who did not die prematurely and retained all individuals who died prematurely. This resulted in over 1,093,000 people in our down-sampled study population. We applied weights to our statistical models to reweight to the original study population.

### Statistical analyses

We analysed premature mortality (all-cause and cause-specific) using statistical models. In each model, time at risk of death was defined in days from 21 March 2021 until the earliest date from the following options:

- date of death
- date of 75th birthday
- end of study date (7 December 2023)

Three separate models were used to estimate premature mortality rates across UTLAs while accounting for differences in demographic, ethnic, and socioeconomic characteristics:

- model 1: accounting for differences in age and sex (and their interaction)
- model 2: accounting for differences in age, sex, ethnicity and being born outside the UK
- model 3: accounting for differences in age, sex, ethnicity, being born outside the UK and socioeconomic status (including highest qualification, current occupation and area-level deprivation)

For more information on model specification and the variables included in this analysis, see our [Geographical inequalities in premature mortality in England and Wales: March 2021 to December 2023 dataset](#).

This analysis was carried out using Poisson regression to estimate premature mortality rates and premature mortality incidence rate ratios (IRRs). Premature mortality rates adjusted for age and sex are expressed per 100,000 person-years at risk. These rates can be interpreted as the number of people expected to die prematurely if 100,000 people were each followed up for one year, assuming each UTLA had the same age and sex profile (that of the study population overall).

IRRs estimated from each model indicate the extent to which the premature mortality rate in each UTLA is greater or less than that of a reference UTLA (Richmond upon Thames, the UTLA with the lowest rate for all-cause premature mortality after adjusting for age and sex).

The premature mortality rates produced in this analysis differ in several ways from those produced by the Office for Health Improvement and Disparities (OHID). These include differences in terms of age and population coverage, study design, and approach to estimating rates. For example, the current analysis covers those aged 18 to 74 years, whereas the premature mortality rates produced by OHID cover those aged 0 to 74 years. For more information on the differences between our analyses, please see our [Geographical inequalities in premature mortality in England and Wales: March 2021 to December 2023 dataset](#).

We use the relative range of the IRRs to assess how the model adjustments affect the dispersion of the rates between UTLAs. This is calculated by dividing the highest IRR by the lowest IRR and subtracting one, and then multiplying by 100.

## Strengths and limitations

### Strengths

We used a population-level dataset to derive our sample, covering all usual residents of England and Wales who were enumerated at Census 2021 and could be linked to an NHS number. The census provides information not available on death registrations, such as socioeconomic classification, occupation and self-reported ethnicity, which enabled us to account for these characteristics in our analysis.

Census 2021 was estimated to cover around 97% of the population, and is therefore the most representative data source available to produce statistics about the population living in England and Wales.

## Limitations

Not all people living in England and Wales in March 2021 were enumerated at Census 2021 (for example, because of non-response). Of those who were enumerated, not all could be linked to an NHS number via the PDS and onward to death registrations data.

The proportion of people in the Census 2021 population who are in our linked study cohort is lowest among males, people aged 20 to 29 years, and people from ethnic minority groups. For more details, see our [Census 2021 to Personal Demographics Service linkage report](#).

Users should note that, because of the linkage process, this analysis does not include all death records. As a result, the premature mortality rates presented here may not capture all deaths that occur across UTLAs. This analysis is primarily intended to illustrate the relative differences in rates after accounting for different sociodemographic characteristics, rather than highlight the absolute premature mortality rates themselves.

If users are primarily interested in absolute premature mortality rates across UTLAs, rather than the relative differences between rates when accounting for differences in sociodemographic characteristics, please refer to the [data produced by the Office for Health Improvement and Disparities \(OHID\)](#), available on Fingertips.

Our estimated adjusted rates account for a limited set of demographic characteristics (age, sex, ethnicity, being born outside the UK and socioeconomic status), enabling premature mortality rates to be compared across UTLAs on a more like-for-like basis. However, many other factors besides those included in our models are likely to be related to both geographic area of residence and the risk of premature mortality. Therefore, our analysis cannot be used to infer cause-and-effect relationships between area of residence and premature mortality.

This analysis covers the period 21 March 2021 to 7 December 2023, which falls within the coronavirus (COVID-19) pandemic period. This means that the mortality rates presented in this release will have been affected by both the direct and indirect effects of the pandemic. We urge users to consider the impact of the pandemic when interpreting the estimates produced in this analysis. For information on the impact of the coronavirus pandemic, see our [Coronavirus \(COVID-19\) topic page](#).

## Collaboration

This analysis was funded by and conducted in collaboration with The Health Foundation, who have produced a separate, more in depth publication [Geographic inequalities in premature mortality: exploring the role of socioeconomic factors and ethnicity](#).

## 5 . Related links

### [Mortality profile - Data](#)

Interactive dataset | Released 7 May 2025

Interactive dataset from the Department for Health and Social Care (DHSC), allowing users to create mortality profiles filtered by geography, topic and indicator.

### [Inequalities in mortality involving common physical health conditions, England: 21 March 2021 to 31 January 2023](#)

Statistical bulletin | Released 31 August 2023

Rates of mortality involving cancers, cardiovascular diseases, chronic kidney disease, dementia, diabetes, and respiratory diseases, by Census 2021 variables.

### [Major conditions strategy: case for change and our strategic framework](#)

Policy paper | Released 21 August 2024

Policy paper from the previous government, outlining their major conditions strategy from 2022 to 2024.

### [Mortality from leading causes of death by ethnic group, England and Wales: 2012 to 2019](#)

Article | Released 19 August 2021

Analysis of ethnic differences in mortality and cause-specific mortality in England and Wales based on 2011 Census and death registrations. These are official statistics in development.

### [Deaths registered monthly in England and Wales](#)

Dataset | Released 16 May 2025

Number of deaths registered each month by area of usual residence for England and Wales, by region, county, health authorities, local and unitary authority, and London borough.

## 6 . Cite this statistical bulletin

Office for National Statistics (ONS), released 8 July 2025, ONS website, statistical bulletin, [Geographical inequalities in premature mortality in England and Wales: March 2021 to December 2023](#)