

ABOUT MORTALITY DATA FOR ENGLAND AND WALES

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GENERAL

The Office for National Statistics (ONS) is the governmental department that provides statistical and registration services. It was established in 1996 as a result of the merger of the Office of Population Censuses and Surveys (OPCS) with the Central Statistical Office.

The Office also incorporates the General Register Office for England and Wales (GRO). The GRO is responsible for ensuring the registration of all births, marriages, and deaths in England and Wales, and for maintaining a central archive dating back to 1837.

Statistical publications are issued by the "Stationery office". Its earlier name was "Her Majesty's Stationery Office".

Vital statistics in England and Wales date back to 1837. The reliability of these statistics increased significantly in 1841 following the population census. Since then, vital statistics have been published annually including a number of demographic data that are considered worldwide to be of a good quality, relative to the historical time period. Vital statistics are available at the national and regional levels.

The first population census was conducted in 1801 but the first modern, good quality census was that of 1841. Population censuses have been conducted every ten years since 1801. The only exception was 1941 when the census was not taken. The most recent population census was conducted in 2011.

Source of Data

The mortality data used for the Human Mortality Database (HMD) come primarily from published sources, originating mostly from the General Register Office/Office for National Statistics (ONS). Census counts prior to 1911 come from Mitchell (1994a). Population estimates and deaths counts for the period during the two World Wars were provided by the General Register Office and include only information about the civilian population. For the total population (including military), estimates of population (1912-1920 and 1932-1950) and death counts (1914-1920 and 1939-1950) come from Jdanov et al. (2005). Mid-year population estimates for 1982-1990 are available (from ONS) in two formats: rounded (by thousands or hundreds) and unrounded. For our calculations, we used the unrounded estimates, but we are not allowed to release these unpublished raw data. Instead, the *raw data* (Input Database) files show the rounded population estimates.

Specific Episodes in the Demographic History of England and Wales

Mortality in England and Wales has been significantly influenced by the two World Wars as well as by the 1918 influenza epidemic. Large birth cohorts are evident for a couple of years following the wars. Because this data series includes both civilian and military deaths, the impact of the wars is obvious, particularly during World War I.

TERRITORIAL COVERAGE

There were no territorial changes in England and Wales during the period of reference (1841-2022). Note: Wales was a region of England during the 19th Century.

DEATH COUNT DATA

Coverage and completeness

National death statistics encompass all deaths that occurred in the country, irrespective of whether the deceased was a resident or a visitor. Deaths of non-residents are not included in sub-national counts. Overseas deaths of nationals are included in the national counts. Death counts during the two World Wars include both civilian and military deaths (even if the death occurred abroad).

In England and Wales, deaths are counted in the calendar year during which they occurred. Date of occurrence should be distinguished from date of registration of deaths. In some cases where a coroner has to investigate the cause of death, registration can be delayed up to several months. Until registration is completed, the death is not counted as having occurred. Hence, the exact number of deaths for a given calendar year may not become available until several months after the end of the year. Recently, the period between occurrence and registration for investigated deaths has decreased significantly. In any event, late registration involves a very small number of deaths.

Specific Details

Age-Heaping. Single-year death counts show some signs of age heaping effects during World War I and between the two World Wars. The evidence about age heaping can be observed at old ages ending with “0” such as age 60 or 70 (Appendix 2). Over several years, the number of deaths at these ages was lower than that observed in the adjacent ages.

POPULATION COUNT DATA

The ONS reports annual population numbers for the resident population (i.e., the population residing permanently in England and Wales). Temporary visitors are excluded. These official figures refer to the mid-year population.

The population census counts all people who are in the country at the time of the census (i.e., the *de facto* population).

Specific Details

The quality of international migration data has always been a very important issue for population statistics in the UK. Mitchell (1994b) summarized deficiencies of the historical statistics on migration. First, official statistics did not account for all movements between Britain and continental Europe until 1912 at the earliest. Second, until the 1900s, the distinction between citizens and foreign nationals was imperfect. Third, migration via airports was not recorded until the 1950s. Such deficiencies in recording international migration obviously affected the quality of official population estimates. In order to avoid potential biases in the official data, we calculated inter-censal population estimates for the period 1841-1960 according to the HMD methodology (see the Methods Protocol for details).

The previously published post-censal population estimates for England and Wales for the period from mid-2002 to mid-2010 have been revised by the National Statistics Office to take into account the results of the 2011 Census. The size of these revisions is relatively small (464,000 or 0.83 per cent for the total population) (ONS, 2012). The newly revised inter-censal population estimates superseded previously published post-censal population estimates adjusted for unregistered net-migration. The difference between the previously published post-censal estimates and the new intercensal estimates mainly resulted from the fact that the 2011 census accounted for a higher number of unregistered immigrants than the previously published post-censal estimates.

The mid-year population estimates for 2011-2020 are newly revised (in the light of the 2021 census) inter-censal estimates. The mid-year population estimates for 2021-2023 refer to the post-censal estimates calculated on the basis of the 2021 census.

BIRTH COUNT DATA

Coverage and Completeness

The definition of a live birth is the internationally accepted one.

The statistical collection of birth counts is similar to that of deaths. National birth statistics encompass all births that occurred in the country, irrespective of whether the mother was a resident or a visitor. Births to mothers who are non-residents are not included in sub-national counts. Overseas births to mothers who are nationals are included in the national counts.

In England and Wales, births are counted in the calendar year during which they occurred. Date of occurrence should be distinguished from date of registration. By law, a birth must be registered within 42 days. This lag may create some difference between the number of births that occurred and the number registered by the end of a given calendar year. The HMD includes the former even if the birth was not registered until the following calendar year.

DATA QUALITY ISSUES

In England and Wales, official population estimates since 1961 are available by single year of age at the mid-point of each year. Following the HMD methods protocol, we derive the population size on January 1st by averaging the two adjacent mid-year estimates for each age. Then, in order to calculate period death rates, we estimate exposure, which approximates the mid-year population.

The user is warned that our exposure estimates may differ from the original mid-year population estimates, and thus, HMD death rates may differ slightly from those published by the ONS.

Revision NOTES

Changes with the December 2017 revision:

Life tables: All life tables have been recalculated using a modified methods protocol. The revised protocol (Version 6) includes two changes: 1) a more precise way to calculate a_0 , the mean age at death for children dying during the first year of life and 2) the use of birth-by-month data (where and when available) to more accurately estimate population exposures. These changes have been implemented simultaneously for ALL HMD series/countries. For more details about these changes, see the revised Methods Protocol (at <http://www.mortality.org/Public/Docs/MethodsProtocol.pdf>), particularly section 7.1 on Period life tables and section 6 and Appendix E, on death rates. The life tables calculated under the prior methods (Version 5) remain available at v5.mortality.org but they have not been, and will not be, updated.

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REFERENCES

Jdanov, D., E. Andreev, D.Jasilionis D, and V. Shkolnikov. (2005). Estimates of Mortality and Population Changes in England and Wales over the two World Wars. *Demographic Research*, Special Collection 4, Vol 13(16), pp. 389-414. Available at (<http://www.demographic-research.org/>).

Mitchell, B.R. (1994a). "Table 3: Population and vital statistics." Pp. 13-14 in: *British Historical Statistics*. Cambridge: Cambridge University Press.

Mitchell, B.R. (1994b). "Population and vital statistics." Pp. 1-6 in: *British Historical Statistics*. Cambridge: Cambridge University Press.

Office for National Statistics (ONS). (2007). *Population Estimates for England and Wales, Mid-2002 to Mid-2010 Revised (National)*. Retrieved 25 April 2013 (<http://www.ons.gov.uk>).

Office for National Statistics (ONS) (2022). Population estimates for the UK, England, Wales, Scotland and Northern Ireland: mid-2021. Retrieved 19 September 2023 (<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2021>)

APPENDIX 1:

Description of the original data used for HMD calculations

DEATHS

Period	Type of Data	Age grouping	RefCode
1841-1909	Annual number of deaths to the <i>de facto</i> population, by sex and age groups (nx1 rectangles)	0, 1, 2, 3, 4, 5-9, 10-14, 15-19, 20-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+	02
Males and females: 1910-1913; 1921-1938; 1951-2001 Females only: 1914-1920	Annual number of deaths to the <i>de facto</i> population, by sex and age groups (1x1 rectangles)	0, 1, 2, ...maximum age attained	03, 04, 05, 20
Males: 1914-1920; 1939-1950 Females: 1939-1950	Annual number of deaths (including military deaths abroad), by sex, age, and year of birth	0, 1, 2, ...maximum age attained	98
2002-2014	Annual number of deaths to the <i>de facto</i> population, by sex and age groups (1x1 rectangles)	0, 1, 2, ...110+	13, 14, 18, 19, 21, 26, 31, 35, 40
2015-2022	Annual number of deaths to the <i>de facto</i> population, by sex and age groups (1x1 rectangles)	0, 1, 2, ...105+	45, 49, 53, 58, 61, 67

POPULATION

Period	Type of Data	Age grouping	Comments	RefCode
1841, 1851, 1861, 1871, 1881, 1901, 1951, 1961	Census counts	0,5,10,...,85+	<i>de facto</i> population	07, 08
1911, 1921, 1931	Census counts	0, 1, 2, 3, ..., 100+	<i>de facto</i> population	07
1912-1920, 1932-1950	Annual mid-year population estimates (of permanent residents)	0, 1, 2, 3, ..., 90	Estimates during the war time include military persons stationed abroad.	99

**APPENDIX 1 (CONTINUED):
DESCRIPTION OF DATA USED FOR LEXIS DATABASE**

POPULATION

Period	Type of Data	Age grouping	Comments	RefCode
1962-2010	Annual mid-year inter-censal population estimates (of permanent residents)	0,1,2,3,.....,90+	The raw data for 1981-1990 shown in the HMD are rounded to hundreds (RefCode= 11). The original population estimates (RefCode= 10) were used for calculations but cannot be released publicly.	09, 10, 41
2011-2020	Annual mid-year population estimates (of permanent residents)	0,1,2,3,.....,90+	Inter-censal estimates based on the 2021 census	63
2021-2023	Annual mid-year population estimates (of permanent residents)	0,1,2,3,.....,90+	Post-censal estimates based on the 2021 census	64

BIRTHS

Period	Type of Data	RefCode
1841-2022	Annual live birth counts, by sex	12, 17, 24, 25, 27, 28, 34, 39, 43, 47, 51, 55, 59, 66

BIRTHS BY MONTH

Type of data: Annual live birth counts by month

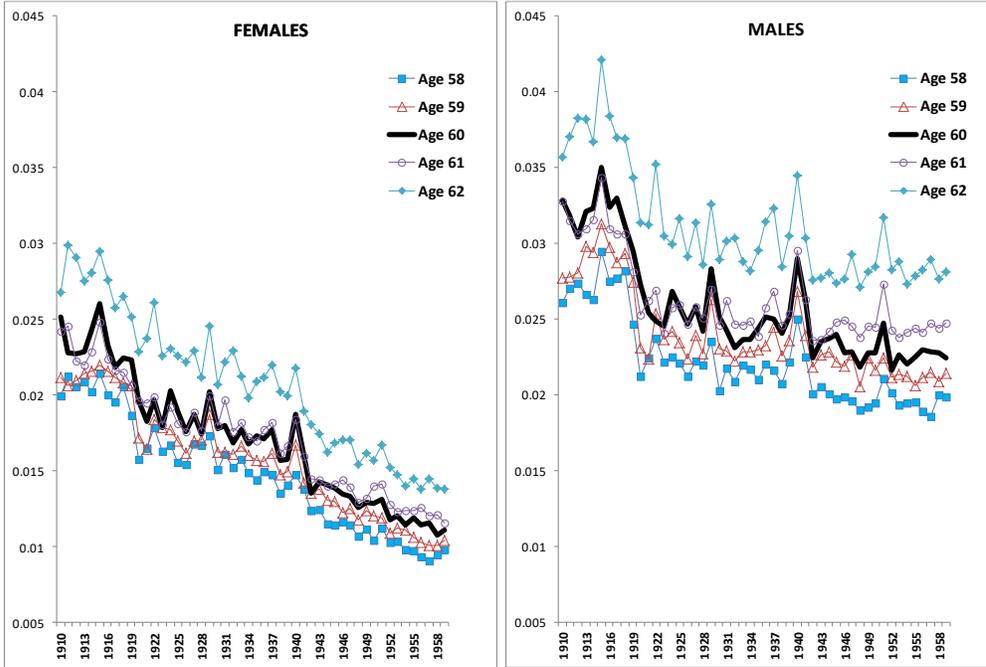
Period covered: 1938-2022.

RefCode(s): 32, 33, 44, 48, 52, 56, 60, 65.

APPENDIX 2:

Mortality rates for selected ages, England & Wales Civilian population, males, 1910-1959.

A) Ages 58-62:



B) Ages 68-72:

