

ABOUT MORTALITY DATA FOR SCOTLAND

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We are still working on the *Background and Documentation* file for Scotland. For a description of the original data used to estimate the mortality surface for Scotland, see Appendix 1.

DATA QUALITY ISSUES

For the period around the two world wars, population estimates and death counts provided by the National Records of Scotland (NRS) (the former General Register Office) cover the civilian population only. During World War I and World War II, the male population exhibits a sudden decline because the military is not included. There is a corresponding increase in the male population during the first post-war years due to demobilization.

Population estimates for the period around World War I are available by five-year age groups only. Unfortunately, the standard HMD method for splitting such data into single years of age does not work well due to the irregular implicit migration pattern. The following special procedure has been applied. First, the standard HMD method was applied to split the 1911 and 1921 census data into single years of age data. Next, a modified spline method was used to split population estimates data for the periods 1911-1921, 1921-1931, and 1931-1938. The same method has been used for England & Wales. For a detailed description of the method, see the *Background & Documentation* file for the Civilian Population of England & Wales (Appendix 2).

Population estimates for the period 1855-1860 are pre-censal population estimates calculated according to the HMD methodology (assuming zero net-migration). In addition, life expectancies at ages 65 and 80 seem to be unreasonably high (if compared to Sweden) at least until the mid-1870s (Appendix 2, Figure 1).

Unlike England & Wales and Northern Ireland which took their most recent censuses in 2021, Scotland held this census in 2022. The ONS/ National Records of Scotland also published a revised (in the light of the 2022 census) series of population estimates for the period 2012 to 2021. This procedure produced some notable differences with the previous series of estimates for the same years, especially at ages 25-35 years (Appendix 2, Figure 2). In addition, the ONS/NRS also revised the previously published inter-censal mid-year population estimates for 2002-2010 (based on the 2011 census). According to the ONS/NRS, this revision had only minor effect (Appendix 2, Figure 2).

The compulsory registration of births began on July 1st, 1837. However, according to the U.K. Office for National Statistics (ONS) birth registration was incomplete until 1874. Therefore, the quality of the data for 1855-1875 is assumed to be lower than in later years and should be used with caution.

For Scotland, official birth and death figures for a given year are those registered during that year, a small number of which will have occurred in previous years due to

late registration. The monthly number of registrations for 2020 does not reflect the actual number of births in many months. During the second half of March 2020 most registration offices closed due to the Covid-19 pandemic and most birth registrations were postponed. Therefore, monthly births for 2020 were excluded from the calculations. Given the weak seasonality of births in Scotland, we do not expect this to have any major impact on our final mortality estimates.

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.

ACKNOWLEDGEMENTS

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APPENDIX 1:

Description of the original data used for HMD calculations

DEATHS

| Period | Type of Data | Age grouping | RefCode |
|-----------|---|---|--|
| 1855-1962 | Annual number of deaths to the <i>de facto</i> population, by sex and age groups (<i>nx1</i> rectangles) | 0, 1, 2, 3, 4, 5-9, ..., 100+, unknown | 2 |
| 1963-2022 | Annual number of deaths to the <i>de facto</i> population, by sex and age groups (<i>1x1</i> rectangles) | 0, 1, 2, ..., maximum age attained, unknown | 3, 4, 5, 6, 7, 8, 18, 21, 25, 28, 35, 39, 43, 48, 52, 59 |

POPULATION

| Period | Type of Data | Age grouping | Comments | RefCode |
|------------------------------|---|---|--|------------|
| 1861, 1871, 1881, 1891, 1901 | Census counts | 0, 1, 2, 3, 4, 5-9, ..., 105+, unknown | <i>de facto</i> population | 9, 10, 11, |
| 1911, 1921 | Census counts | 0, 1, 2, 3, 4, 5-9, ..., 95-99, 100+, unknown | <i>de facto</i> population | 12 |
| 1931 | Census counts | 0, 1, 2, 3, ..., 100+, unknown | <i>de facto</i> population | 13 |
| 1912-1938 | Annual mid-year population estimates (of permanent residents) | 0-4, 5-9,, 85+, unknown | The data for 1912-20 exclude the military population | 14 |
| 1939-1970 | Annual mid-year population estimates (of permanent residents) | 0,1,2,3,.....,85+, unknown | The data for 1939-50 exclude the military population | 15 |
| 1971-2001 | Annual mid-year population estimates (of permanent residents) | 0,1,2,3,.....,90+, unknown | The data are revised according to the 2001 census results | 15 |
| 2002-2021 | Annual mid-year population estimates (of permanent residents) | 0,1,2,3,.....,90+, unknown | Inter-censal estimates based on the 2011 (2002-2010) and 2022 (2011-2021) censuses | 54 |

POPULATION

| Period | Type of Data | Age grouping | Comments | RefCode |
|---------------|---|---------------------------|--|----------------|
| 2022-2023 | Annual mid-year population estimates (of permanent residents) | 0,1,2,3,....,90+, unknown | Post-censal estimates based on the 2021 census | 55 |

BIRTHS

| Period | Type of Data | RefCode |
|---------------|----------------------------------|---|
| 1855-2022 | Annual live birth counts, by sex | 1, 17, 20, 24, 29, 33, 37, 41, 45, 46, 50, 57 |

BIRTHS BY MONTH

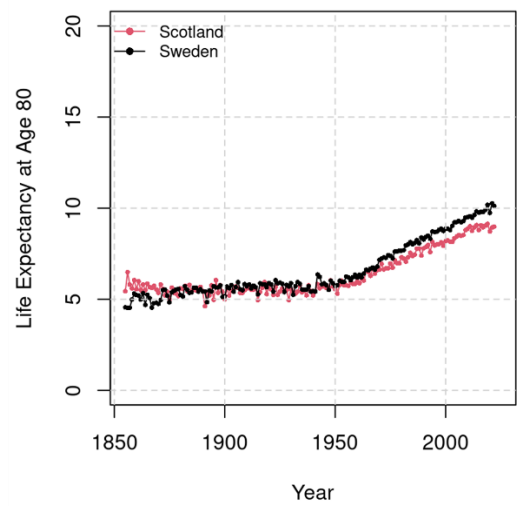
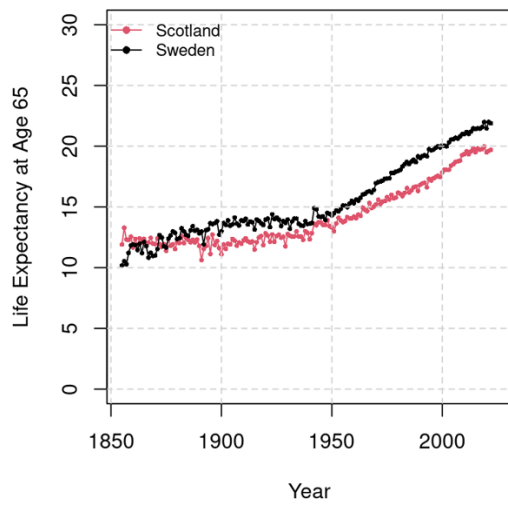
Type of data: Annual live birth counts by month

Period covered: 1954-2019, 2021-2022.

RefCode(s): 23, 30, 34, 38, 42, 47, 51, 58.

APPENDIX 2:

Figure 1. Female life expectancy at ages 65 and 80 in Scotland and Sweden, 1855-2022.



APPENDIX 2:

Figure 2. Ratio of new to old male population counts, 1850-2022.

