ABOUT MORTALITY DATA FOR PORTUGAL

by Vladimir Canudas-Romo, Edviges Coelho, & Cláudia Antunes Pina

Revised by Gabriel Borges,Timothy Riffe, Felipe Menares, and Denys Dukhovnov

Last Updated by Denys Dukhovnov: September 8, 2023

GENERAL

The collection of official demographic statistics for Portugal started with the census of 1864. All figures relating to the nation's inhabitants prior to that date are estimates based on counts taken for administrative, fiscal, military or ecclesiastical purposes, which did not record the entire population (INE, 2001). The institution responsible for the publication of Portuguese statistics has changed over time. Until the end of the nineteenth century the Treasury (*Ministério dos Negócios da Fazenda*) held this responsibility, but during the first decade of the twentieth century the responsibility was transferred to the Ministry of Finance (*Ministério das Finanças*). In the 1920s, the publication of population statistics was undertaken by the Archives of the Central Institute of Hygiene (*Arquivos do Instituto Central de Higiene*) and at the beginning of the 1930s, by the General Directorate of Statistics (*Direcção Geral de Estatística*). The National Institute of Statistics (*Instituto Nacional de Estatística*, INE) was created in 1935 and is currently the official statistical office that collects and publishes population statistics for Portugal.

Censuses have been conducted in Portugal approximately every 10 years since 1864; census years were 1864, 1878, 1890, 1900, 1911, 1920, 1930, …1970, 1981, 1991, 2001, and 2011. The first two censuses were conducted on January 1st. From 1890 to 1930, censuses were conducted decennially on December 1st with an interruption in 1910 when the monarchy was overthrown and the republic created. In 1940, the census took place on December 12th, and from 1950 to 1970 on December 15th. For the most recent censuses, changes in timing followed the recommendations of the European Community in order to allow greater comparability of census data across Europe (see Appendix I for reference dates; INE, 2001).

Since 1940, censuses have been carried by the INE. The censuses referred to the *de facto* population until 1950 and have referred to the resident population (*de jure)* since 1960 (Goyer and Draaijer, 1992). In Portugal, vital statistics data, which complemented the information provided by the censuses, only began to be published on a regular basis after 1886, and it was not until April 1st 1911 that the registration of births was made compulsory. Until this date, birth statistics were based on the records of baptisms rather than birth registers (Livi-Bacci, 1971: 25).

Source of Data

At different points in time, several institutions have published statistics on population movements: from 1887 to 1890, the *Direcção Geral do Comércio e Indústria - Ministério das Obras Públicas, Comércio e Indústria*; from 1891 to 1896, the *Direcção Geral da Estatística e dos Próprios Nacionais - Ministério dos Negócios da Fazenda*; and from 1907 to 1921, the *Direcção Geral de Estatística – Ministério das Finanças* published the *Movimento da População* with information on vital statistics. For some overlapping years (1900-1926), the *Instituto Central de Higiene* also published the *Estatística do Movimento Fisiológico da População de Portugal*. During 1929 to 1934, the *Direcção Geral de Estatística* took over the collection and publication of vital statistics in the *Anuário Demográfico*. When

the INE was founded in 1935, the collection of vital statistics and the publication of the *Anuário Demográfico* became its responsibility. In 1967, the *Anuário Demográfico* was replaced by the *Estatísticas Demográficas*. All of these data are available in computerized data files from the [digital archives of the INE website](http://inenetw02.ine.pt:8080/biblioteca/index.jsp) (http://inenetw02.ine.pt:8080/biblioteca/index.jsp). The format of the data varies across time (see Appendix I for details). Population counts are based on published census counts and population estimates for the most recent years.

Specific Episodes in Portugal's Demographic History

The Portuguese population had a fairly moderate growth rate between 1864 and 1920 with an annual growth rate of 0.65%. After 1920, there was a sharp increase in population until the 1950s. After this date, the population again grew at moderate rates, and actually declined between 1960 and 1970 as a result of the high rates of emigration and the colonial war. The decade of the 1970s marked the highest growth rate in the whole century, resulting from the combination of the following factors: the return of five hundred thousand Portuguese citizens from the colonies; the return of a considerable number of immigrants from France and Germany; and the difficulties of emigrating due to the anti-immigration policies pursued by the main countries that had previously welcomed Portuguese emigrants (INE, 2001).

In the 1980s, the annual growth rate was very close to zero as fertility dropped below replacement level and emigration increased slightly. At the beginning of the 1990s, Portugal reversed a long tradition of emigration to become a country of net immigration. In the last decade of the century, an increase in fertility, a strong increase in immigration, and a decline in emigration produced a slight increase in population (Carrilho and Patrício, 2002).

TERRITORIAL COVERAGE

During the period covered by the Human Mortality Database (HMD), the national territory of Portugal includes the south-west of the Iberian Peninsula, and the autonomous regions of Madeira and the Azores. The deaths, births, and census counts cover this same territory throughout the twentieth century. However, at various points in history the Portuguese state has held possessions in fifteen regions around the world: Morocco, Guinea, Cape Verde, the coast of the Gulf of Guinea, South-West Africa, East Africa, Abyssinia, India, the Persian Gulf, Malaysia, China, East Indies, Brazil and the North-West Atlantic (INE, 2001).

DEATH COUNT DATA

Coverage and Completeness

Death data prior to 1955 covered the *de facto* population, whereas since 1955, data have covered the *de jure* (usual resident) population. In the second and third decades of the twentieth century there was particular interest in knowing the longevity of the Portuguese population, and by the census of 1911 detailed data became available for ages 80 and older (DGE, 1914). Declines in mortality occurred at a later stage for Portugal than for other European countries, although mortality improved at a faster than usual pace once it began. This rapid mortality decline was mainly concentrated in the last quarter of the twentieth century (Coelho, 2005).

Specific Details

For the period since 1980, the HMD uses death counts by sex, age and birth cohort produced by INE. For some years, this information is slightly different from the death data published annually in *Estatísticas Demográficas.* The reason for these discrepancies is that:

"*In Portugal, the demographic data on deaths and the health data (causes of death) are jointly collected, but the validation and coding process inherent to causes of deaths is more time demanding and, in general, demographic data are made available earlier. Whenever this happens, there is the possibility to correct the demographic data [based on updated information] after they have been published in Estatísticas Demográficas. For these reasons, some minor discrepancies may be found between the published data and the data that we have sent to HMD.*" (Coelho, 2006)

POPULATION COUNT DATA

Coverage and Completeness

Prior to 1960, most of the published census data were for the *de facto* population. Since 1960, most census data refer to the *de jure* (usual resident) population. (see "Specific Details" below).

Specific Details: 1991-2022 Population estimates

For the three intercensal periods 1991-2000, 2001-2010, and 2011-2020, HMD population inputs are based on INE intercensal estimates. These data are available by single year of age up to an open age interval of 85 years and older. For December 31st of the years 2011-2020, intercensal resident population estimates are available up to age 100+, and are considered of high quality. For the most recent years, official population estimates for cohorts who have not reached age 90 at the end of the observation period are used, while survivor ratio estimates are used for older cohorts as per the HMD Methods Protocol (see Figure 6 in the Methods Protocol).

As of September 2023, population estimates for 2022 are based on the new 2021 census and are preliminary, while 2021 are definitive postcensal. Population estimates for 2011-2020 have been re-estimated and are now official intercensal, taking into account the 2011 and 2021 census data.

BIRTH COUNT DATA

Coverage and Completeness

In general, the data are believed to be of good quality. The birth series used here begins in 1947, although data for earlier years is being sought out.

DATA QUALITY ISSUES

The data prior to 1970 should be used with extra caution due to age heaping problems, as detailed below.

- Prior to 1960, the raw death counts exhibit patterns of age heaping at ages 40, 50, …, 90 (see Figure 1). By 1960, the age heaping had largely disappeared.

- The census counts for 1960 and 1970 also show considerable age heaping at ages 30, 40, …, 80 and to some extent, at age 20 (see Figure 2), which virtually disappears by the 1981 census.

- The age heaping in the death rates is minor but still present, as observed in Figure 3. For more recent years, these fluctuations in the mortality age-pattern disappear.

- This phenomenon carries over cohorts in early intercensal periods.

- This problem has only small effects on summary indices, such as life expectancy, and we do not consider it problematic on the whole.

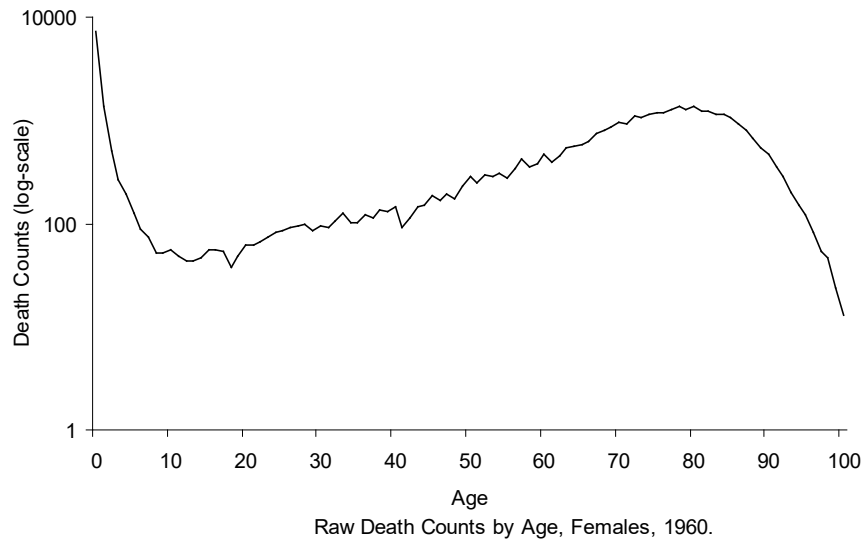Figure 1: Raw Death Counts by Age, Females, 1940 and 1960

Raw Death Counts by Age, Females, 1940.

Raw Death Counts by Age, Females, 1960.

Figure 2: Raw Census Counts by Age, Females, 1940, and 1981

Raw Census Counts by Age, Females from Portugal in 1940.
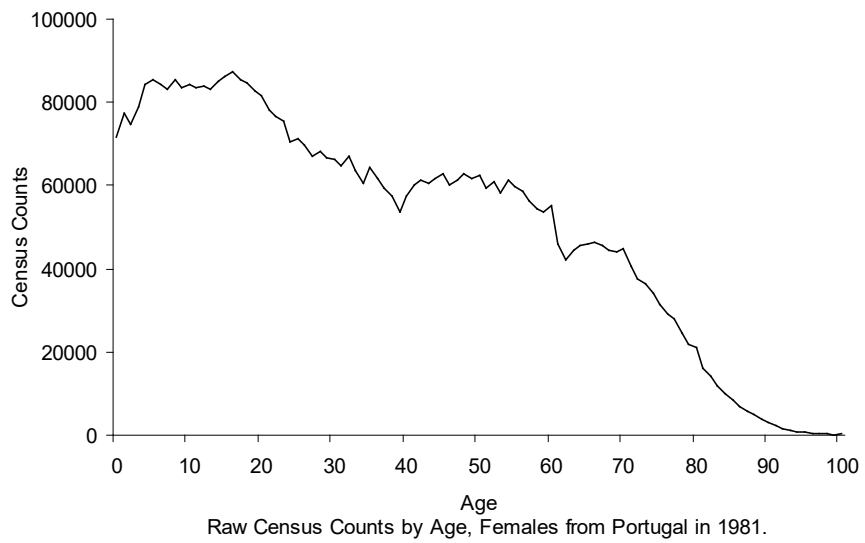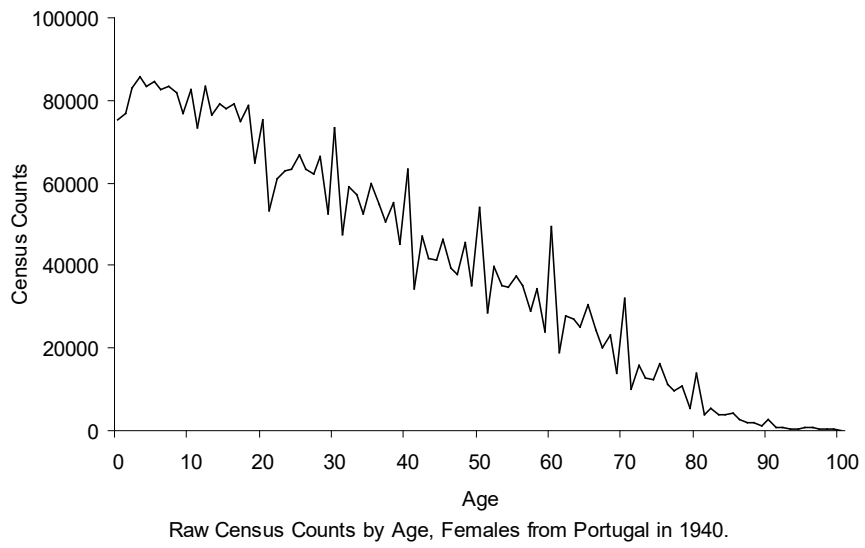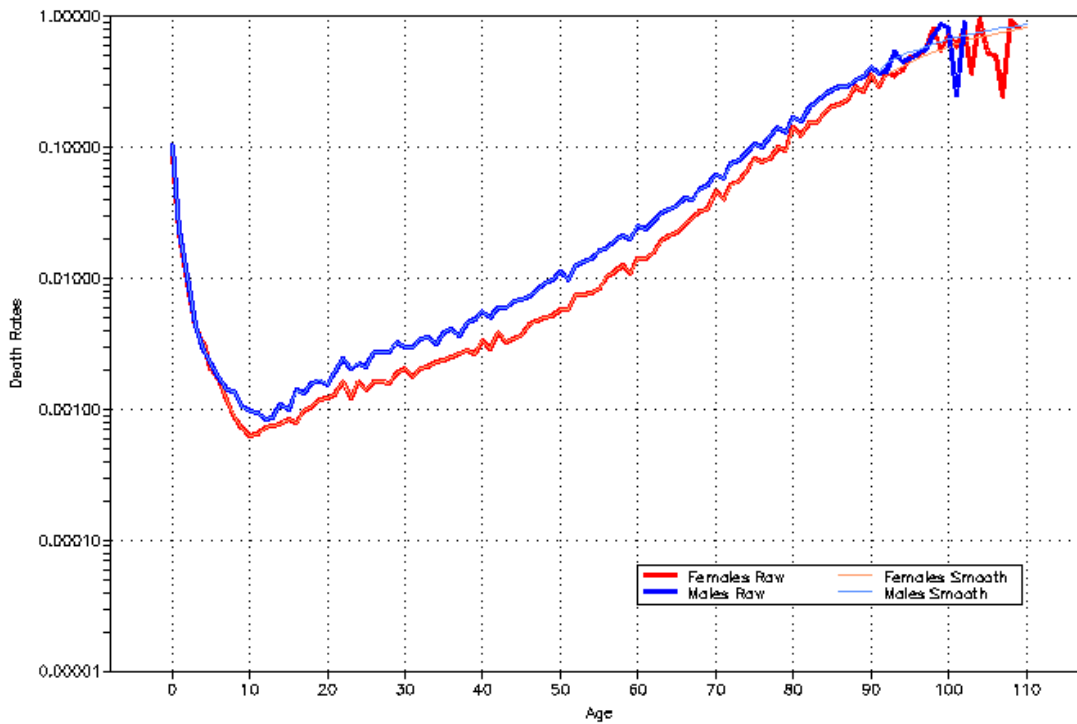

Raw Census Counts by Age, Females from Portugal in 1981.

5

Figure 3: Estimated Death Rates by Age, Females and Males, 1956

REVISION NOTES

Changes with the January 2014 revision:

Population Counts: New official intercensal estimates are now in use connecting the 1991, 2001 and 2011 censuses. Previously the 1991-2001 intercensal estimates were based on standard HMD intercensal methods, while population estimates after 2001 were official postcensal estimates.

Births: A series of monthly total births was acquired for years 1901 onward (mostly from the HFD). The monthly series has gaps for years 1911-1917 and 1926-1928. Data for those years is still being sought out. This monthly series will only affect exposure estimates upon adoption of version 6 of the HMD Methods Protocol. It is expected that the subsequent version 6 exposures will mitigate some rate biases in particular cohorts (1918 and 1919 in these data) where births were not uniformly distributed throughout the calendar year. The annual and monthly births series are *not* constrained to match totals.

Changes with the January 2017 revision:

Population Counts: Prior updates used the Survival Ratio method to estimate population for all cohorts older than age 85 at the end of the observation period rather than at age 90, which is the threshold recommended in the HMD Methods Protocol. Postcensal resident population estimates

up to age 100+ have now been made available by the national statistics office for all years since 2011. Starting with the current update, the Survival Ratio method is thus implemented for cohorts aged 90+ years. This change only affects mortality estimates at older ages and it has a negligible impact on life expectancy estimates. The largest difference in life expectancy between old and new estimates was at age 80 (e_{80}) and it reaches 0.1 year for women in 2008.

ACKNOWLEDGEMENTS

REFERENCES

Carrilho, M.J., Patrício, L. (2002). A Situação Demográfica Recente em Portugal. Revista de Estudos Demográficos, Nº 32.

Coelho, Edviges. (2006). Personal communication by e-mail on January 31st 2006.

Coelho, Edviges. (2005). O Método de Lee–Carter para Previsão da Mortalidade. Revista de Estudos Demográficos, Nº 37.

Direcção Geral de Estatística, DGE. (1914). Censo da População *de Portugal, Parte IV: Longevidade-Individuos de 80 ou mais anos agrupados por idades, distinguido o sexo*. Lisboa, Portugal: Ministério das Finanças - *Direcção Geral de Estatística.*

Goyer, D.S., Draaijer, G.E. (1992). The Handbook of National Population Censuses: Europe. New York: Greenwood Press.

Instituto Nacional de Estatística. (2006). Population estimates produced by INE and provided by Cláudia Antunes Pina.

Instituto Nacional de Estatística. (2001). Estatísticas históricas portuguesas, CD-ROM [Portuguese historical statistics] / Coordinator, Nuno Valerio. Lisboa, Portugal: Instituto Nacional de Estatística.

Livi-Bacci, Massimo. (1971). *A Century of Portuguese Fertility*. Princeton, NJ: Princeton University Press.

de Sousa, Fernando (1995). *História da Estatística em Portugal*. Lisboa, Portugal: Instituto Nacional de Estatística.

APPENDIX I: DESCRIPTION OF DATA USED FOR LEXIS DATABASE

DEATHS

Period	Type of Data	Age Grouping	Comments	RefCode(s)
1940-1954	Annual number of deaths (*de facto* population) by sex and single year of age (1x1)	0,1, ..., max	Data also include some deaths of unknown age. No upper age limit	7, 8
1956-1975	Annual number of deaths (*de jure* population) by sex and single year of age (1x1)	0,1, ..., max	Data also include some deaths of unknown age	9, 10
1976-1979	Annual number of deaths (*de jure* population) by sex and single year of age (1x1)	0,1, ..., max		11
1980-2005	Annual number of deaths (*de jure* population) by sex, age, and birth cohort (Lexis triangles) to age 99 and open age interval 100+	0,1, ..., 99, 100+	These unpublished death counts were provided by INE upon request	12, 22
2006-2022	Annual number of deaths (*de jure* population) by sex, age, and birth cohort (Lexis triangles) to the maximum age recorded.	0,1, ..., max	These unpublished death counts were provided by INE upon request. Data also include some deaths of unknown age	22, 25, 32, 36, 40, 44, 48

max=maximum age attained; unk=deaths of unknown age

POPULATION

Period	Type of Data	Age Grouping	Comments	RefCode(s)
1940	Census counts (*de facto* population) as of December 12th, by sex and single age to 119	0, 1, …, 119.	Data also include some population of unknown age.	13
1950	Census counts (*de facto* population) as of December 15th, by sex and single age to 124.	0, 1, …, 124.		14
1960	Census counts (*de jure* population) as of December 15th, by sex and single year of age to 122	0, 1, …, 122		15
1970	Census counts (*de jure* population) as of December 15th, by sex and single year of age to 120	0, 1, …, 120		16
1981	Census counts (*de jure* population) as of March 16th, by sex and single year of age to 100+	0, 1, …, 99, 100+		17

Period	Type of Data	Age Grouping	Comments	RefCode(s)
1991-2010	Population estimates (*de jure*) as of December 31st, by sex and single year of age to 85+.	0, 1, …, 84, 85+	Intercensal estimates covering the jumps from 1991-2001-2011. For consistency, we use the estimates for December 31 of the census years rather than inserting the census data as well.	24
2011-2020	Population estimates (*de jure*) as of December 31st, by sex and single year of age to 100+.	0, 1, …, 99, 100+	Intercensal estimates by Statistics Portugal. Same series as prior, but with higher open age group.	47
2021-2022	Population estimates (*de jure*) as of December 31st, by sex and single year of age to 100+	0, 1, …, 99, 100+	Official post-censal estimates based on the 2021 census. Otherwise, similar in technical attributes to the existing series.	47

ANNUAL BIRTHS

Type of data:

Annual live birth counts by sex

Period covered:

1886-2022

RefCode(s):

1, 2, 3, 4, 23, 26, 33, 37, 41, 45, 49

MONTHLY BIRTHS

Type of data:

Annual live birth counts by month

Period covered:

1901-2022

RefCode(s):

27, 28, 29, 30, 34, 38, 42, 46, 50