ABOUT MORTALITY DATA FOR THE NETHERLANDS

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GENERAL

The Netherlands emerged as an independent state in the 17th century. Before the French invasion at the end of the 18th century, it was one of the greatest economic and political powers in the region. After the defeat of Napoleon's France, the Netherlands became united with Belgium and Luxemburg to form the United Kingdom of the Netherlands. However, Belgium and Luxemburg separated to form independent states in 1830. Since then, the Netherlands has not experienced any territorial changes.

The early 19th century marks the foundation of the statistical system of the Netherlands. However, due to the lack of co-ordination between different governmental agencies, the quality of socio-economic statistics was rather low during this century (van Maarseveen, 1999). The collection and processing of population statistics (including censuses) was the responsibility of the Ministry of Interior and some other governmental bodies (van Maarseveen, 1999).

Statistics Netherlands (*Centraal Bureau voor de Statistiek* (CBS)) was established on January 9, 1899. The CBS became the main institution responsible for the collection of statistical data (including population statistics) in the Netherlands.

The first census of the Netherlands was conducted in 1795 (when the country was under French rule) (van Bochove, 1999). From 1829 to 1971, population censuses were conducted regularly (every ten years from 1849 to 1909, then in 1920, 1930, 1947, 1960, and 1971). The 1971 population census was the last one in the Netherlands. Since then, enumeration of the population has relied on information from the population registers, population surveys, or mini population censuses only (e.g. surveying about 5% of the labour force, etc.) (van Bochove, 1999).

Official population estimates date back to the beginning of the 1870s. During the period 1870-1930, these data were published together with the outcomes of the censuses or in the publications of the Dutch life tables (Tabeau, van Poppel, & Willekens, 1994). Since 1931, information about the population has been published by the CBS on an annual basis.

Historical data on births and deaths, based on church registers, are available dating back to the 16th century. However, these data are considered incomplete until the municipal population registers were started in 1811-1815 (Tabeau, van Poppel, & Willekens, 1994). The population register of the Netherlands was established in 1850. Consequently, the registration of births and deaths has become compulsory. Data on deaths were published for the first time in 1827. Later, data and information on births were published in different

statistical abstracts (first by the Department of Internal Affairs, and later by the CBS) (for more details see Tabeau, van Poppel, & Willekens, 1994).

Detailed demographic data (since 1950) are freely available via an Internet database managed by Statistics Netherlands (https://opendata.cbs.nl/). Historical data (from 1850 to 1949) have been harmonised and adjusted by the scientists from the Netherlands Interdisciplinary Demographic Institute (NIDI). For a more detailed description of the NIDI mortality database, see a report published by Ewa Tabeau, Frans van Poppel, and Frans Willekens (1994).

Source of data

Official data on births, deaths, and population since 1950 were provided by Statistics Netherlands (*Centraal Bureau voor de Statistiek*). Data for the most recent years have been obtained via the online database of Statistics Netherlands (CBS StatLine). Corrected figures on deaths at advanced ages (after the age of 98) and adjusted historical data (population estimates, death counts and births for the period 1850-1949) come from the NIDI mortality database (see Tabeau, van Poppel, & Willekens, 1994). The NIDI mortality database includes both the official and adjusted data.

TERRITORIAL COVERAGE

There were no territorial changes in the Netherlands during the period covered by the available data (1850-2022).

DEATH COUNT DATA

Coverage and completeness

Since 1815, registration of deaths has been considered complete and has covered the whole territory of the Netherlands. Starting in 1869, the systematic production of a medical death certificate (completed by the medical examiner or general practitioner) became compulsory (Tabeau, van Poppel, & Willekens, 1994).

During the period 1850-1917, live-born children who died before notification (by a doctor or another person who was present at the delivery) were counted as stillbirths (these are thus considered “false stillbirths”). Such notification was required within three days after the birth. Starting in 1918, these newborns were classified as live births and infant deaths. During the period 1918-1923, the CBS continued publishing statistics on stillbirths, infant deaths, and live births according to the old definition, but also maintained statistics according to the new definition (i.e., “false stillbirths” were classified as live births and infant deaths). The CBS has estimated the statistical relations between the old and new categories of stillbirths: “false stillbirths” constituted about 32% of the total number of

stillbirths according to the old definition. The CBS used such proportions to adjust figures on live births and infant deaths for the period 1900-1923 to include these “false stillbirths.” The NIDI researchers completed this work, extending the series of live births and infant deaths (according to the new definition) backwards to 1850. Although these adjustments improved the quality of data on infant deaths and live births, they were still inadequate to ensure full compliance with the international definitions of live birth and infant death. An unresolved problem concerns the period 1850-1949, when a minimal duration of pregnancy was used to define viable and nonviable births (Tabeau, van Poppel, & Willekens, 1994).

The gestational requirement used to define live and nonviable births has changed several times since 1850:

- Prior to 1924: there was no requirement regarding length of gestation.
- 1924-1940: the definition of live birth required a gestation of at least 24 weeks.
- 1941-1949: the minimal gestation criterion was changed to 26 weeks.
- 1950-1963: the minimal gestation criterion was extended to 28 weeks. Retrospectively, the CBS has made adjustments to these data to conform to the international (WHO) definition (i.e., no requirement for minimum gestation).
- 1964-present: data conform to the WHO definition with no requirement for minimum gestation.

For more details, see Tabeau, van Poppel, & Willekens (1994). Both the harmonised official data (1950-present) and the adjusted data coming from the NIDI mortality database (1850-1949) have been used for the present calculations. Although the NIDI mortality database does not include adjustments for the changing gestation criterion, authors suggest that problems of comparability have a negligible impact on infant mortality rates at the population level (Tabeau, van Poppel, & Willekens, 1994).

POPULATION COUNT DATA

Coverage and completeness

Series of official population estimates date back to 1870. For the earlier periods, official data on the Dutch population are available from the censuses only. For the present calculations, the adjusted population estimates from the NIDI mortality database have been used. Descriptions of the adjustments are given in the NIDI report on "Mortality in the Netherlands: the Database" by Ewa Tabeau, Frans van Poppel, and Frans Willekens (1994). For the most recent years, only the CBS and EUROSTAT data have been used. Several inconsistencies in the adjusted data are discussed in the section on “Data Quality Issues.”

BIRTH COUNT DATA

Coverage and completeness

Since 1815, the registration of births is considered complete and covers all the territory of the Netherlands. The CBS has attempted to harmonise data on live births according to the uniform international standards for the period since 1900. However, some data quality issues related to the comparability of definitions across time remain unresolved. As noted earlier, the minimal gestation required in the definition of a live birth has changed several times prior to 1950 (see “Death Count Data” section for details). For the present calculations, both the official data (1950-present) and the adjusted data from the NIDI mortality database (1850-1949) have been used. Totals of live births by month of birth are available for 1840-1877 and 1893-2019 (in 1878-1892 only totals by whole year are available).

DATA QUALITY ISSUES

Problems with the population estimates

The period 1850-1870

There are two disruptions between different series of historical inter-censal population estimates (from NIDI) for the period 1850-1870. Figure 1 shows a sudden drop in the total male population for the years subsequent to the 1859 and 1869 censuses. Such decreases are less notable among females. These discontinuities are reflected by artificial dips in implied net-migration in 1859 and 1869 (Figure 2). The inconsistencies are at least partly attributable to changes in population coverage between the 1849 (*de facto*) and subsequent (*de jure*) censuses.

In their description of the NIDI mortality database (our main data source for the period prior to 1950), Tabeau, van Poppel, and Willekens (1994) acknowledge that “problems related to the definition of ‘*de jure* population’ and ‘*de facto* population,’ under-registration of sailors and military personnel, and the definition of still-born children still have to be solved.” To date no attempt has been made to introduce any adjustment to overcome the aforementioned disruptions or unusual fluctuations in the NIDI population estimates. Possible solutions will be sought in the future.

Figure 1. Changes in the estimated total population of the Netherlands, 31 December 1850 – 31 December 1880

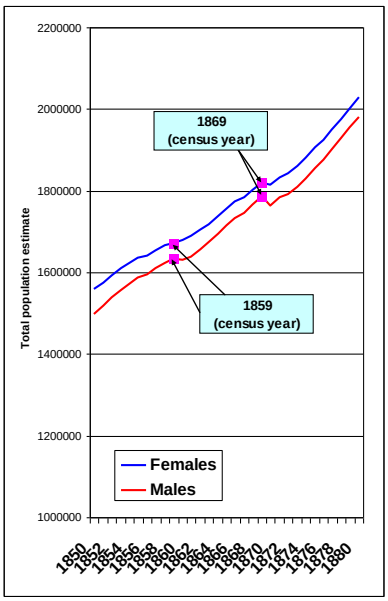
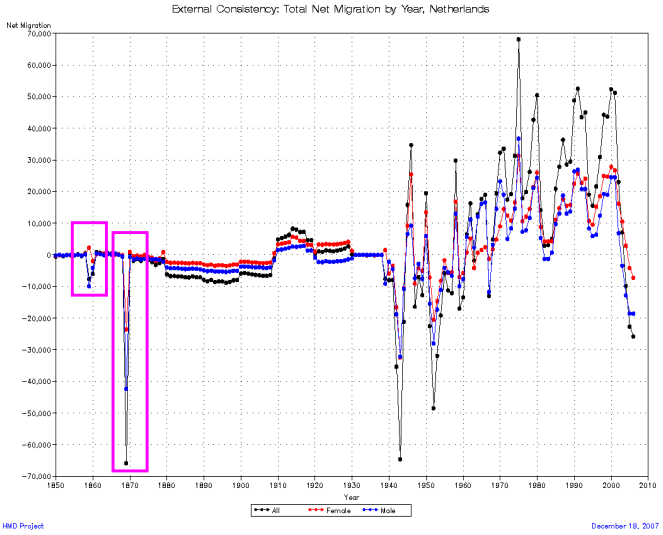


Figure 2. Implied net migration (total change in population minus natural increase), 1850-2006.



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 a0, 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.

REFERENCES

van Bochove, C. (1999). "Census, no census, virtual census". Pp. 151-164 in: *A Century Rounded Up: Reflections on the History of the Central Bureau of Statistics in the Netherlands*. Amsterdam, The Netherlands: CBS, Voorburg/Stichting beheer IISG.

van Maarseveen, J. (1999). " A bird's eye view of CBS history". Pp. 13-46 in: *A Century Rounded Up: Reflections on the History of the Central Bureau of Statistics in the Netherlands*. Amsterdam, The Netherlands: CBS, Voorburg/Stichting beheer IISG.

Tabeau, E., van Poppel, F., Willekens, F. (1994). *Mortality in the Netherlands: the Data base.* NIDI, The Hague, Netherlands: 85p.

APPENDIX 1: DESCRIPTION OF ORIGINAL DATA USED FOR HMD CALCULATIONS

DEATHS

Period	Type of Data	Age grouping	Comments	RefCode(s)†
1850-1949	Annual number of deaths by sex, single year of age, and birth cohort (Lexis triangles, except for the open-ended interval). Recalculated and adjusted data.	1850-1859: 0, 1, 2, …, 100+ 1860-1869: 0, 1, 2, …, 101+ 1870-1879: 0, 1, 2, …, 102+ 1880-1889 & 1910-1919: 0, 1, 2, …, 104+ 1920-1929: 0, 1, 2, …, 105+ 1900-1909 & 1930-1949: 0, 1, 2, …, 106+ 1890-1899: 0, 1, 2, …, 110+	For a description of adjustments, see reference.	1
1950-1979	Annual number of deaths by sex, single year of age, and birth cohort. Data are by period-cohort parallelograms for ages 0-98; by Lexis triangles for ages 98-107 and age 0 (lower triangle); and open age interval for age 108+. Data for females for 1968 are classified by single year of age and birth cohort (period-cohort parallelograms) up to age 107.	0, 1, 2, …, 107, 108+		2
1980-1995	Annual number of deaths by sex, single year of age, and birth cohort (Lexis triangles, except for the open-ended interval).	0, 1, 2, …, 107, 108+		3
1996	Annual number of deaths by sex, single year of age, and birth cohort (Lexis triangles).	0, 1, 2, …, max		4
1997-1998	Annual number of deaths by sex, single year of age, and birth cohort (Lexis triangles, except for the open-ended interval).	1997: 0, 1, 2, …, 110, 111+ 1998: 0, 1, 2, …, 109, 110+		5

DEATHS (CONTINUED)

Period	Type of Data	Age grouping	Comments	RefCode(s)†
1999	Annual number of deaths by sex, single year of age, and birth cohort (Lexis triangles).	0, 1, 2, …, max		6
2000-2010	Annual number of deaths by sex and single year of age (1x1).	0, 1, 2, …, max		7, 8, 23, 24, 28
2011-2012	Annual number of deaths by sex and single year of age (1x1).	0, 1, 2, …, 110+		29
2013-2022	Annual number of deaths by sex and single year of age (1x1).	0, 1, 2, …, 100+		33, 39, 43, 47, 51, 55

max=maximum age attained

POPULATION

Period	Type of Data	Age grouping	Comments	RefCode(s)
1850-1949	Annual population estimates as of December 31st by sex and single year of age. Recalculated and adjusted data.	1850-1869, 1930-1938: 0, 1, …, 99, 100+ 1870-1919: 0, 1, …, 89, 90+ 1920-1929, 1939-1948: 0, 1, …, 94, 95+	In the original source, data for the total number of females and for the number of females at age 90+ for the period 1870-1878 were not available. For a description of adjustments, see the reference.	9
1950-2000	Annual official population estimates as of January 1st by sex and single year of age.	0, 1, …, 107, 108+		10 11 12
2001-2002	Annual official population estimates as of January 1st by sex and single year of age.	0, 1, …, maximum age attained		13
2003-2009	Annual official population estimates as of January 1st by sex and single year of age.	0, 1, …, 98, 99+		14, 15, 16 22
2010-2015	Annual official population estimates as of January 1st by sex and single year of age.	0, 1, …, 94, 95+		25, 30, 34
2016-2023	Annual official population estimates as of January 1st by sex and single year of age.	0, 1, …, 99, 100+		40, 44, 48, 52, 53

BIRTHS

Period	Type of Data	Comments	RefCode(s)
1850-1949	Annual counts of live births by sex. Recalculated and adjusted data.	For a description of the adjustments, see the reference.	17
1950-2022	Annual counts of live births by sex.		18, 19, 20, 21, 26, 27, 35, 37, 41, 45, 49, 54

BIRTHS BY MONTH

Type of data: Annual live birth counts by month
Period covered: 1840-1877, 1893-2022.
RefCode(s): 31, 32, 36, 38, 42, 46, 50, 56