ABOUT MORTALITY DATA FOR FRANCE, TOTAL POPULATION

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GENERAL

       In 1833, France established its first statistical agency in the Ministry of Trade. This informal office was renamed *Statistique générale de la France* (SGF) in 1840 when it took over the responsibility for conducting population censuses. In 1941, the SGF was replaced by the *Service National des Statistiques* (SNS), which shifted the focus of statistical work toward the use of administrative records. Today, the official statistical agency for France is the *Institut national de la statistique et des études économiques* (INSEE, www.insee.fr), which replaced the SNS on April 27, 1946 (INSEE, 2008).

       National population data and vital statistics have been collected since the first decade of the 19th century, although relatively complete data became available near the end of the 19th century. The HMD data series begins in 1816.

Source of Data

       Most of the vital statistics data come from official publications (e.g., *Statistique de la France; Annuaire statistique de la France; Statistique générale de la France; Mouvement de la population: Statistique anuelles; La situation démographique*). The entire data series from 1899 to 1997 were republished on CD-ROM by Vallin and Meslé (2001).[1] For births in 1899-1975, we use estimates corrected for "*faux mort-nés*" by Vallin and Meslé (2001); see the "Birth Count Data" section for details. Some data on death counts at older ages come from unpublished sources collected with the assistance of researchers at INSEE or the *Institut national d'études démographiques* (INED, www.ined.fr). In particular, death count data above age 100 in some years were available only from handwritten tables from the personal files of Paul Vincent (INED), Françoise Depoid (INED), and Solange Hémery (INSEE) or from computer-generated tables provided by INSEE. For periods during World War I and II, we use death counts that have been adjusted by Vallin and Meslé (2001) to account for military losses.

       Population estimates for the period prior to 1899 come from Bourgeois-Pichat (1951). For 1899-1990, we use the annual population estimates published on CD-ROM by Vallin and Meslé (2001): estimates since 1946 were calculated by INSEE, while those before 1946 came from Vallin (1973). Since 1991, we use the official January 1st population estimates published by INSEE.

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[1]   The data republished by Vallin and Meslé (2001) are not always identical to the original published data for various reasons. For example, corrections were made for "*faux mort-nés*" during 1899-1975 (see details in section on birth count data). Moreover, all death counts were systematically split into lexis triangles by single year of age in cases where the original data were not in that format. Finally, corrections were made for errors in the original data (see details in section on death count data).

Specific Episodes in French Demographic History

The remarkable rise in French life expectancy during the 20th century was interrupted by the two world wars, as well as the Spanish flu epidemic during 1918-1919. France entered World War I (WWI) on August 3, 1914, and the armistice was signed on November 11, 1918. France entered World War II on September 3, 1939; although the war in Europe did not end until "V.E. day" (May 8, 1945), French war operations ended in June 1940. Notably, the impact of the two world wars differed for men and women. World War I (1914-18) had a much greater impact on mortality among men than women, although mortality among women increased as a result of the flu epidemic. In contrast, during World War II (1939-45), mortality increased among women as well as men (both of whom found in the resistance), mainly due to bombing by the Allies and exceptional infant mortality in 1945 as a result of problems with the milk supply.

Events during the 1800s also resulted in periodic increases in mortality. The Napoleonic Wars (1805-1815), which were conducted outside of France, had a big impact on deaths among males, but little effect among females. On the other hand, epidemics of cholera (1832, 1849, 1854), influenza (1834), and dysentery (1859) increased mortality for both sexes (Meslé and Vallin, 1989). The Crimean War (1853-56) affected mortality for young adult males primarily. Mortality increased among both sexes when France was invaded by Prussian troops during the Franco-Prussian War of 1870 and even more so during the repression of the '*Commune de Paris*' in 1871."

TERRITORIAL COVERAGE

Several changes in territorial coverage have occurred in France during the 19th and 20th centuries. In 1860, Savoy and the county of Nice were annexed by France. Following the Franco-Prussian War in the early 1870s, France ceded Alsace-Lorraine to Germany (Prussia) and the territory was not regained until the end of World War I. During World War I, additional occupied areas were not included in the collection of French national statistics. The data for 1920 to 1938 correspond almost exactly to the current territory of France. During World War II, the French territory was again reduced in size (Alsace-Lorraine was re-annexed by Germany during the entire war, as was Corsica from 1943 to 1944 due to military operations). The current territory of mainland France (*France métropolitaine*)² has been in place since 1946; it comprised 90 *départements* until 1960, after which the Paris region was split (making 95 *départements),* and then Corsica was split into two *départments (*making the current total 96). The following table summarizes these changes (see also Meslé and Vallin, 1989, p. 1129; Vallin and Meslé, 2001, p. 14-15):

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²   INSEE currently provides demographic statistics (e.g., births, deaths, population estimates) for "*France métropolitaine"* (which excludes all overseas territories-*départements, régions, collectivités and pays d'outre-mer*) as well as for "*France entière*" (*métropolitaine* plus *départements and régions d'outre-mer*) (Pison, 2006). Current statistics for *France* have included *départements d'outre-mer* since 2002. For the HMD, we continue to use the data for *France métropolitaine* only in order to maintain continuity since 1946.

Dates	Territory	Area Code†
1806-1860	Current territory minus Savoy (the *départements* of Savoie and Haute-Savoie) and the County (*Comté*) of Nice (part of the *département* of Alpes-Maritimes)	20
1861-1868	Current territory	90
1869-1913	Current territory minus Alsace-Lorraine, which includes 3 *départements* (Moselle, Bas-Rhin, Haut-Rhin)	30
1914-1919	Current territory minus the areas affected by the military operations (Alsace-Lorraine, plus Aisne, Ardennes, Marne, Meurthe-et-Moselle, Meuse, Nord, Oise, Pas-de-Calais, Sommes, and Vosges)	40
1920-1938	Current territory excluding a few areas within the Alpes-Maritimes that were annexed after the Second World War	50
1939-1942	Current territory minus Alsace-Lorraine	60
1943-1944	Current territory minus Alsace-Lorraine and Corsica	70
1945	Current territory minus Alsace-Lorraine	80
1946-present	Current territory refers only to mainland France (*France métropolitaine*); French overseas *départements* (Guadeloupe, Guyane, Martinique, and Réunion) and territories are excluded.	90

† The area code is an arbitrary number used in the raw data files (Input Database) to denote the geographic area covered by the data.

All data in the Human Mortality Database (HMD) refer exclusively to those areas included in French national statistics during the year in question. In other words, we have not adjusted the data in an attempt to make it correspond to a constant territory. Territorial changes are reflected in data files on population size, which contain estimates of the population by age and sex immediately before and after a territorial change. The population just before a territorial change is identified as year "xxxx– " and the population just after the territorial change is identified as year "xxxx+". For example, the data for "1914–" reflect the population of the prior territory (1869-1913), while the data for "1914+" reflect the new territory. You might also think of these data as the population of France as of 31 December 1913 and as of 1 January 1914, respectively. Territorial changes are always reflected in the statistics as of January 1st, even if the national border change occurred at some other point during the year, because the statistical system is organized by calendar years.

DEATH COUNT DATA

Coverage and Completeness

The data cover all deaths to residents (regardless of where they occur) as well as deaths to non-residents that occur in France (Eurostat, 2003). Vallin and Meslé (2001) made adjustments for military deaths during World War I and II (1914-19 & 1940-45 among males; 1942-45 among females; for details see also Chapter V in Vallin, 1973 and Section 3 in Glei et al., 2005). Data are thought to be very close to complete during the entire 20th century.

Prior to 1975, newborns who were born alive but died before the birth was registered were reported as stillbirths rather than infant deaths. For 1899-1974, we use counts of infant deaths that have been corrected to include these "false stillbirths" (Vallin and Meslé, 2001; see the section on "Birth Count Data" for more details).

Specific Details

Age misreporting in the early part of the 20th century seems to produce underestimates of death rates at very high ages. As the quality of data improves, this leads to a spurious pattern of mortality increase over time at older ages. An analysis of trends in extreme ages at death also provides evidence of age exaggeration in the first part of the 20th century (Wilmoth and Lundström, 1996).

The available raw data come in a variety of formats. Death counts for many years are available by Lexis triangle (i.e., by calendar year, single year of age, and birth cohort). Nonetheless, data are sometimes less detailed, especially in earlier years. Some years (e.g., 1947) include an open age interval at the oldest ages. Other years (e.g., 1946-1967) include only period-cohort data (i.e., deaths by calendar year and birth cohort) above age 100. Finally, death counts during 1899-1906 are available only by 1x1 Lexis square (i.e., by calendar year and single year of age). The details regarding the format of the input data in any particular year are given in the Appendix.

1860
The published death counts by sex and age group are given separately for the Department of Seine and for the rest of France. We sum the two sets of counts to obtain deaths for all of France (see *NoteCode*=46 in the raw data files for details).

1870
Death counts for the whole of France were not published by age group in 1870. The published death counts by sex and age group exclude the Department of Seine. Death counts for the Department of Seine are given by sex but not age. Following the practice of Meslé and Vallin (1989, p. 1127), we distributed deaths in the Dept. of Seine by age based on the age distribution among deaths in the rest of France. Then, we summed the two sets of death counts in order to obtain death counts by sex and age group for all of France (see *NoteCode*=45 in the raw data files for details).

1899-1997

Vallin and Meslé (2001) republished (on CD-ROM) the 1899-1997 death counts by Lexis triangle even if the original data were not available at that level of detail. We use their data files as inputs but reformat to match the original raw data, and then use the methods described in the Methods Protocol to split the data into triangles. Vallin and Meslé (2001) made the following corrections to the original data (all of which are included in our database):

- 1910: There was an error on the published table: the total male deaths was shown as 366,192, but the sum of deaths across all ages was only 366,142. Based on other sources, Vallin and Meslé determined that the missing 50 deaths should be added at age 31, upper triangle (n=1,155 rather than 1,105).
- During 1914-1918, deaths for males of all ages were adjusted for deaths during World War I (see Vallin, 1973).
- 1915: There was an error on the published table: female deaths at age 32, lower triangle should be 837 rather than 887 and were corrected.
- 1916: There was an error on the published table: female deaths at age 97, lower triangle should be 42 rather than 56 and were corrected.
- 1927: There was an error on the published table: female deaths at age 96, lower triangle should be 92 rather than 192 and were corrected.
- 1932: There was an error on the published table: female deaths at age 32, upper triangle should be 798 rather than 698 and were corrected.
- During 1940-1945, deaths for both sexes at many adult ages were adjusted for deaths during World War II (see Vallin, 1973).
- 1942: There was an error on the published table: female deaths at age 96, lower triangle should be 123 rather than 213 and were corrected.
- 1946: There was an error on the published table: female deaths at age 73, upper triangle should be 4250 rather than 4200 and were corrected.
- 1949: The split between upper triangle age 99 and lower triangle age 100 was corrected to match the notes of both Hémery (1966) and Depoid (1973).
- 1950: There was an error on the published table: female deaths at age 0, upper triangle should be 5242 rather than 4242 and deaths at age 1, lower triangle should be 1128 rather than 5128. Both counts were corrected.
- 1958: The published data were obviously flawed, placing a disproportionate number of deaths in the lower triangle age 100 and very few in the upper triangle age 100. A correction was taken from the notes of Hémery (1966) and Depoid (1973).

We also made the following additional corrections to the data published by Vallin and Meslé (2001):

- 1900: There was a discrepancy in the original table between the total deaths for males aged 40-44 (n=16,161) and the sum of death counts for the single years age 40 to 44 (n=16,160). Vallin & Meslé (2001) added an additional death at age 85+ to get the correct totals. We subtracted that extra death at age 85+ and added it back in at age 40.
- 1905: In the process of data entry, the death count to females aged 10 was mistakenly entered as 958 instead of 955 as shown on the original table. Vallin &

Meslé (2001) subtracted 3 deaths at aged 85 to get the correct totals. We corrected the data at both age 10 and age 85 in order to match the original table (n=955 and n=4121, respectively).

- 1907: The death counts for females aged 106 and 107 was entered incorrectly. We corrected these data to match the original table (lower triangle age 106 = 0; upper triangle age 106 = 3; lower triangle age 107 = 0; upper triangle age 107 = 1).
- 1932: There was an error in the published table: female deaths at age 88, upper triangle should be 1591 rather than 1491. However, Vallin and Meslé (2001) made the correction at age 92, lower triangle. We corrected the data at age 88, upper triangle (n=1591) and we also corrected the deaths at age 92, lower triangle to match the published table (n=436).
- 1935: The data at age 99+ were corrected to match the original published data and Vincent (1951).

For the data from 1968 to 1987, any deaths that occurred at age 109 upper triangle or older (likely to be few in number) were randomly redistributed into other ages by INSEE.[3] This practice was also employed from 1988 to 1997 for deaths at age 119 upper triangle or older.

POPULATION COUNT DATA

Censuses were conducted in France every 5 years from 1801 to 1946, with a few exceptions. The 1871 census was delayed until 1872 due to the Franco-Prussian War. The 1916 and 1941 censuses were cancelled due to World Wars I and II. Since 1946, censuses have occurred on an irregular schedule (1954, 1962, 1968, 1975, 1982, 1990, 1999). Since the 1999 census, France is no longer conducting a traditional census. Instead, a partial enumeration has been conducted every year by five-year cycles starting in 2004 (20% sample in rural areas; ≈8% sample in urban areas; so that after five years, all rural areas and 40% of urban areas will have been enumerated). Consequently, the national statistics office revises the estimates for all years since the previously completed census round every year, when the result of the partial enumeration becomes available. For instance, for the current update, population estimates were revised with data from the latest census survey for all years 2018-2020 and data for year 2021 were added. The HMD is updated with these revised estimates.

Coverage and Completeness

The data cover the entire national (*de jure*) population (including military). Vallin and Meslé (2001) made adjustments to the population estimates during World War I and II for military personnel (see also Chapter V in Vallin, 1973 and Section 3 in Glei et al., 2005).

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[3] We are sure that the practice started after 1960, and have some reason to believe it began in 1968, but we are unable to confirm that.

Meslé and Vallin (1989) have noted various problems with the census data during the 1800s. First of all, counts were not published by age prior to 1851. Furthermore, when the census data were available by single year of age, there were problems of age heaping and under-enumeration of very young children. Bourgeois-Pichat (1951) reconstructed the population by sex and 5-year age groups for the period 1776-1901. Later work by Henry & Blayo (1975) confirmed that the estimates produced by Bourgeois-Pichat are more reliable than the crude census counts (Meslé and Vallin, 1989). Thus, for the HMD, we use these population estimates rather than the original census counts up to 1901.

BIRTH COUNT DATA

Coverage and Completeness

Birth counts cover the *de facto* national population: births to non-residents that occur in France are included, whereas births to residents that occur abroad are excluded (Eurostat, 2003). Some corrections have been made to the published birth counts prior to 1975 to account for under-registration of live births (see below).

Specific Details

Prior to 1975, some live births were reported as stillbirths because the infant died before the birth was registered. *Faux mort-nés* (false stillbirths) were identified by a question asked on the statistical stillbirth form since 1920: "Did the newborn breath?" (The question was later expanded to include "or present any sign of life?".) Response categories were: yes, no, unknown. Those marked "yes" were added back in with live births (Vallin, 1973; Vallin and Meslé, 2001:13).[4] For 1920-52, the false stillbirths ("*mort-né ayant respiré*") were not published not by sex; therefore, Vallin and Meslé (2001) estimated the sex distribution based on the observed distribution in 1953-57. They estimated false stillbirths for 1899-19 by extrapolating from the proportion of total stillbirths that were "*mort-né ayant respiré*" after 1920.

For 1899-1974, we use these corrected live births that include false stillbirths. No such correction has been made to births for 1806-1898 because we lack data on the number of false births. The published data have included such corrections for *faux mort-nés* since 1975, but the registration procedures were not changed until 1993.

REVISION HISTORY

June 2017 revision:

> **Population:** Final population estimates for the last completed census cycle (2010-2014) have been used for this update in addition to provisional estimates for 2015, 2016 and 2017.

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[4] Some of those marked "unknown" may also have been false stillbirths, but they were not added back into live births. Thus, this correction is the most conservative one.

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://v6.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 will not be further updated.

June 2018 revision:

Population: Final population estimates for the last completed census cycle (2011-2015) have been used for this update in addition to provisional estimates for 2016 and 2017.

ACKNOWLEDGEMENTS

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APPENDIX 1:

Description of the original data used for HMD calculations

DEATHS

Period	Type of Data	Age Grouping	Comments	RefCode(s)[†]
1816-1859	Annual number of deaths, by sex and age groups with open interval for ages 100+.	5x1: 0, 1-4, 5-9,… 95-99,100+,unk		52
1860	Annual number of deaths, by sex and age groups with open interval for ages 100+.	5x1: 0, 1-4, 5-9,… 95-99,100+,unk	See *NoteCode*=46	60
1861-1869	Annual number of deaths, by sex and age groups with open interval for ages 100+.	5x1: 0, 1-4, 5-9,… 95-99,100+,unk	unk (1861-62 only)	53, 55-57
1870	Annual number of deaths, by sex and age groups with open interval for ages 100+.	5x1: 0, 1-4, 5-9,… 95-99,100+	Adjusted counts [See *NoteCode*=45]	54
1871-1884	Annual number of deaths, by sex and age groups with open interval for ages 100+.	5x1: 0, 1-4, 5-9,… 95-99,100+		49, 50, 53, 58, 59
1885-1886	Annual number of deaths, by sex and age groups with open interval for ages 100+.	1x1: 0, 1…4 5x1: 5-9,…95-99, 100+		42, 43
1887	Annual number of deaths, by sex and age groups with open interval for ages 100+.	5x1: 0, 1-4, 5-9,… 95-99,100+		42
1888-1891	Annual number of deaths, by sex and age groups with open interval for ages 100+.	0, 1…4, 5-9, 10-14, 15-17, 18-19, 20-24… 95-99,100+		40-41
1892-1896	Annual number of deaths, by sex and age groups with open interval for ages 100+.	0, 1, 2, 3-4, 5-9, 10-14, 15-17, 18-19, 20-24… 95-99,100+		35-39
1897-1902	Annual number of deaths, by sex and single year of age with open interval for ages 85+.	1x1: 0, 1, 2…84, 85+, unk		20, 34, 44
1903-1906	Annual number of deaths, by sex and single year of age	1x1: 0, 1, 2…max, unk	unk (1903 only)	20
1907-1933	Annual number of deaths, by sex, single year of age, and birth cohort	Lexis triangles: 0, 1, 2…max, unk	unk (1907 and 1914-33 only)	20
1934	Annual number of deaths, by sex, single year of age, and birth cohort to age 99 with open interval for ages 100+	Lexis triangles: 0, 1, 2…99, 100+, unk		20
1935	Annual number of deaths, by sex, single year of age, and birth cohort to age 99 LT and open interval starting in age 99 UT	Lexis triangles: 0, 1, 2…98, LT age 99, UT age 99+, unk		20
1936-1946	Annual number of deaths, by sex, single year of age, and birth cohort	Lexis triangles: 0, 1, 2…max, unk		20, 21, 22

Period	Type of Data	Age Grouping	Comments	RefCode(s)[†]
1947	Annual number of deaths, by sex, single year of age, and birth cohort to age 100 LT and open interval starting age 100 UT	Lexis triangles: 0, 1, 2…99, LT age 100, UT age 100+		21, 23
1948	Annual number of deaths, by sex, single year of age, and birth cohort	Lexis triangles: 0, 1, 2…max, unk		21, 23
1949	Annual number of deaths, by sex, single year of age, and birth cohort (Lexis triangles) to age 100 LT and period-cohort data starting at age 100 UT (one-year intervals)	Lexis triangles: 0, 1, 2…99, LT age 100 Period-cohort data: 100, 101, 102, …max, unk		21, 23
1950-1953	Annual number of deaths, by sex, single year of age, and birth cohort	Lexis triangles: 0, 1, 2…max, unk		21, 23, 27
1954	*Same as data for 1949*	*Same as data for 1949*		27, 23
1955	Annual number of deaths, by sex, single year of age, and birth cohort	Lexis triangles: 0, 1, 2…max, unk		27, 23
1956-1967	*Same as data for 1949*	*Same as data for 1949*		27, 26, 23
1968-1997	Annual number of deaths, by sex, single year of age, and birth cohort	Lexis triangles: 0, 1, 2…max		27, 23, 24, 26
1998-2004	Annual number of deaths, by sex, single year of age, and birth cohort	Lexis triangles: 0, 1, 2…max		31
2005-2012	Annual number of deaths, by sex, single year of age, and birth cohort to age 105+	Lexis triangles: 0, 1,…105(TL), 105(TU)+		51, 65, 70, 73, 74, 78, 83, 86
2013-2019	Annual number of deaths, by sex, single year of age, and birth cohort to age 105+	Lexis triangles: 0, 1,…104 (TL), 104 (TU), 105+ (TU)		91, 93, 96, 106, 113,117, 120

† The reference code is used in the raw data files (Input Database) to link data with sources.
UT=upper triangle; LT=lower triangle; RR=rectangle; max=maximum age attained; unk=deaths of unknown age

POPULATION

Period	Type of Data	Age Grouping	Comments	RefCode(s)
1816,1821,1826,1831, 1836,1841,1846,1851, 1856,1861,1866,1871, 1876,1881,1886,1891, 1896	Population estimates as of January 1st, by sex and 5-year age group to 90+	0-4,5-9,… 89,90+		64
1899-1953	Annual population estimates as of January 1st, by sex and age	0,1,2…89, 90+		10
1954-1974	Annual population estimates as of January 1st, by sex and age	0,1,2…94, 95+		10
1975-1998	Annual population estimates as of January 1st, by sex and age	0,1,2…99, 100+		10, 11
1999-2020	Annual population estimates as of January 1st, by sex and age	0,1,2…99, 105+		11, 71, 75, 77, 84, 99, 107, 108,

				114, 121

BIRTHS BY SEX

Type of data: Annual live birth counts by sex for the *de facto* population

Period covered: 1806 to 2019

RefCode(s): 1, 32, 45, 46, 47, 48, 69, 72, 76, 82, 85, 88, 94, 97, 104, 111, 115, 118.

BIRTHS BY MONTH

Type of data: Annual live birth counts by month for the *de facto* population

Period covered: 1861 to 2019

RefCode(s): 80, 81, 95, 98, 105, 112, 116, 119.

APPENDIX 2: ADJUSTMENTS TO THE ORIGINAL RAW DATA

The table below described the original data upon which the adjusted numbers are based. Although these data are included in the indicated raw data file, we use the adjusted figures described in Appendix 1 for HMD estimates.

DEATHS

Period	Type of Data	Age Grouping	RefCode	Area Code
1860	Number of deaths by sex and 5-year age group to 100+ for the national territory excluding the Department of Seine	0, 1-4, 5-9,…95-99, 100+	60	25
1860	Number of deaths by sex and 5-year age group to 100+ for the Department of Seine	0, 1-4, 5-9,…95-99, 100+	60	101
1870	Number of deaths by sex and 5-year age group to 100+ for the national territory excluding the Department of Seine	0, 1-4, 5-9,…95-99, 100+	54	35
1870	Number of deaths by sex for the Department of Seine	Not available	54	101

Area Codes

25 = Same territory as Area=20 except that the Department of Seine is excluded.
35 = Same territory as Area=30 except that the Department of Seine is excluded.
101 = Department of Seine