

# HUMAN FERTILITY DATABASE DOCUMENTATION: DENMARK

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## **1 General information**

This report documents the Danish data collected for the Human Fertility Database: namely, age- and birth order-specific data on births in Denmark, data on births by calendar month, and data on the number of women by age and parity.

The data for Denmark in the Human Fertility Database contain information on:

- The number of (live) births by single years of age of the mother for the single calendar years 1916-1989;
- The number of live births by age of the mother and birth order for the single calendar years 1968-2016; and
- Monthly data on births for the single calendar years 1891-2016.

At the beginning of 2018, the total population of Denmark amounted to 5.8 million, of whom 8.8 percent were foreign nationals, and 10.2 percent were people of non-Danish origin who were born abroad. The largest groups of foreign-born people of non-Danish origin living in Denmark were from Poland, Syria, Turkey, Germany, Romania, and Iraq (Statistics Denmark 2018).

### **1.1 Territorial coverage**

The information in this section was obtained from the background and documentation file of the Human Mortality Database (Andreeva 2018). There have been some territorial changes in Denmark over the years. Until 1921, the data on population and births refer to the territory of Denmark excluding South Jutland (*Sønderjylland, hertugdømmet Slesvig*), Iceland, the Faroe Islands, and Greenland. This territory was usually denoted in historical vital statistics publications as the *Hele Kongeriget Danmark*. The *Hele Kongeriget Danmark* did not include Schleswig and Holstein before they were ceded to Prussia and Austria in 1864, as the population data for these territories were collected separately.

In 1920, South Jutland became part of Denmark again, and the population data for this area are included in the Danish data from the following year onwards. Thus, the Danish data in the Human Fertility Database cover two periods: the first refers to the territory of Denmark before 1921, which excludes South Jutland; and the second refers to the territory of contemporary Denmark. The populations of Iceland (independent since 1944), Greenland (self-governing since 1979) and the Faroe Islands (self-governing since 1948) are excluded.

Thus, the territorial coverage of the Danish data in the Human Fertility Database is comparable to that of the official Danish Statistics (Andreeva 2018).

## **1.2 Data collection and availability**

The first general order that instructed the clergy to maintain an official register of all births for each parish was issued in 1687 (Edge 1928). However, this order did not include detailed instructions on how the registers should be kept (Backer 1947). The central collection of statistical information started in 1735, when the bishops instructed the clergy to provide information on all births and deaths at the end of each year. These detailed statements were sent to the *Commerce Collegium* in Copenhagen (Backer 1947), and were summarised in a statistical publication called the *General Extract*. In the initial period after this system was established, only information on the total number of births by sex and data on nonmarital births were collected. In 1796, the first statistical office (*Tabelkontoret*) was founded. The collection of statistical information on stillbirths did not become compulsory until around 1797. A stillbirth was defined as an infant born after the seventh month of pregnancy who showed no signs of life. However, these early records of stillbirths were very unreliable. In order to improve the information on stillbirths, midwives were instructed in 1802 to inform vicars of each stillbirth or other birth event in which the child died within 24 hours of being born (Backer 1947). From 1812-1814 onwards, the clergy were instructed to keep two copies of the register in separate locations in order to reduce the risk of both copies being destroyed at the same time (Andreeva 2018). In 1850, the national statistical office was founded. In 1877, the issuing of birth certificates became compulsory throughout Denmark; and starting in 1911, the clergy were obliged to send individual data on births to the national statistical office.

The first modern census was carried out in Denmark in 1769, and further censuses were performed in 1787, 1801, and 1834. Between 1840-1860, Denmark conducted censuses in quinquennial intervals. After a period when censuses were carried out about every 10 years (1870, 1880, 1890, 1901), there was a period when censuses were conducted about every five years (1906, 1911, 1916, 1921, 1925, 1930, 1935, 1940, 1945, 1950, 1955, 1960, 1965, 1970). In 1968 the Central Population Register (CPR) was established, which was able to measure population change on a continuous basis. Thus, the 1970 census was the last classical census conducted in Denmark (Andreeva 2018).

## **2 Birth count data**

### **2.1 Coverage and completeness**

#### ***(Live) births by age of the mother***

For the 1916–1967 period, data on births by calendar year and age of the mother are available for single-age categories. The age ranges vary, with the age range 16-48 being covered by single-age categories throughout the period.

Up to 1940, all deliveries, ***including stillbirths***, are covered by the data. Multiple deliveries are recorded as a single delivery. However, for the years 1916-1940, counts of live births by month are available. Based on these data, estimates of live births by age for the years 1916-1940 were generated. For the description of the method, see Appendix 2.

### ***Live births by age of the mother and birth order***

For the period from 1968 onwards, we were able to obtain data by age and birth order. These data came from two different sources. The data for the period 1968-1980 were derived from the European Demographic Observatory. From 1981 onwards, we used data from the Danish Fertility Database. For the 1981-1985 period, the documentation states that the data are provided by age of the mother at birth (ACY). However, the results of a thorough check strongly suggest that the data denote the age of the mother at the end of the year (ARDY). Thus, we used the latter age definition when preparing the data for the database.

### ***Live births by month***

Monthly data on live births are available from the year 1891 onwards. The data for the period 1891-1900 were derived from historical vital statistics publications, while the data from 1901 onwards were obtained from the StatBank database of Statistics Denmark. Between 1981 and 2017 there are small deviations between the annual totals of the live births by month and the live births by age of the mother. The maximum deviation is 159 births in a year. After consulting with Anita Lange from Statistics Denmark, we concluded that these differences can be attributed to the late registration of births. The data for these statistics were derived at different points in time, and cover only those late registered births that were recorded prior to the date at which the data were extracted.

## **3 Population count data**

### ***3.1 Population count data by age***

The annual age structure of the female population is taken from the Human Mortality Database (HMD).

### ***3.2 Population count data by age and parity***

The data on the distribution of women by age and the number of live-born children are available from the Danish Fertility Database for the period 1986-2017, and refer to the beginning of each year. The data cover all live-born children from the fertility register, including childbirths outside of Denmark that were reported in Denmark. Some of the older data include adopted children. If, however, there was an indication that a child was adopted, s/he was excluded from the computation of parity distribution. While 67 children were excluded in 1997, this number had declined to zero by 2015. Statistics Denmark expects that in the future, there will be no child or only a few adopted children who cannot be linked to the woman who was first registered as the mother of the child (Communication by Amy Frølander).

## **4 Specific details**

### **4.1 Danish Population Register**

#### ***The Danish Fertility Database (FTDB)***

The FDTB was launched by Statistics Denmark in 1993. Its main purpose is to enhance opportunities for conducting research on fertility from a social and a demographic point of view. It covers women as well as men (Tølbøll Blenstrup and Knudsen 2011).

## 4.2 Definitions

### **Definition of a live birth**

A *live-born* child is defined a foetus who has shown any signs of life (irrespective of the gestational age); according to Danish practice, breathing, yelling, and crying are considered signs of life. A *stillborn* child is defined as a foetus born after 23 weeks of pregnancy who has shown no clear signs of life. If a foetus has been born after 22 weeks of pregnancy or earlier and has shown no clear signs of life, the birth is defined as a *spontaneous abortion*. During the period from the introduction of stillbirth statistics in the late 18<sup>th</sup> century until 2004, the cut-off point between a stillbirth and a spontaneous abortion was the 28<sup>th</sup> week (Backer 1947, Communication by Niels Keiding, Statistics Denmark 1966, Statistics Denmark 2005, Statistics Denmark 2006).

### **Definition of birth order**

Birth order is a tabulated variable, and refers to the total number of live births a women had in her lifetime. A prior child who was born abroad to foreign parents might not be taken into account in deriving the order of a subsequent child if the former was never registered in Denmark. This can, for example, happen if the child died prior to the immigration of the parents to Denmark. It also cannot be ruled out that in some cases a child who was born abroad was not born to the woman who is registered as his/her mother. In cases of multiple deliveries, each child is assigned a separate birth order (Statistics Denmark 2004).

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**APPENDIX 1  
INPUT DATA USED FOR HFD CALCULATIONS**

**BIRTHS**

Period	Type of data	Age scale	Birth order	RefCode(s)
1916-1967 <sup>1</sup>	Annual number of live births by age of mother (Lexis squares)	≤14, 15,..., 47, 48+/55+ <sup>2</sup> , unknown <sup>3</sup>	Total	2, 3, 11
1968-1980	Annual number of live births by age of mother and birth order (Lexis squares)	≤14,15,...,47, 48+/49+	1,2,..., 6+	3
1981-1985	Annual number of live births by mother's year of birth and birth order (vertical parallelograms) <sup>4</sup>	13, 14,...,50/55 <sup>2</sup>	1,2,..., 10+	4
1986-2018	Annual number of live births by age of mother and birth order (Lexis squares)	13, 14,..., 49	1,2,..., 10+	17, 18
1891-2016	Annual number of live births by month	Total	Total	1, 7, 14, 17, 18

<sup>1</sup> For the years 1916–1940, birth counts by age were originally available for all births with multiple deliveries being counted as one birth (including stillbirths). Estimates of live births were generated using the method described in Appendix 2.

<sup>2</sup> The bottom and the top age categories vary across the years.

<sup>3</sup> Births with unknown age of the mother are available in the data for 1916-1932.

**FEMALE POPULATION: Distribution by age and parity**

Period	Type of data	Age scale	Year of birth, range	Parity	RefCode(s)	Notes
01.01.1986-01.01.2017	Women by age and parity	13, 14,..., 48, 49	-	0, 1,..., 9, 10+	17,18	The first year is used as the 'Golden' census

**FEMALE POPULATION: Exposure by age and year of birth**

The female exposure population by calendar year, age, and year of birth (Lexis triangles) is estimated using data on population size and deaths from the Human Mortality Database, which is available at <http://www.mortality.org> or <http://www.humanmortality.de>.

## APPENDIX 2 ADJUSTMENT OF ALL BIRTHS BY AGE TO LIVE BIRTHS

For the years 1916-1940, all deliveries, including stillbirths, are covered by the data. Multiple deliveries are recorded as a single delivery. We benefit from the fact that for the whole 1916-1940 period, counts of live births by month are available. This information will be used to estimate the total number of live births by age in a year.

In order to estimate the number of live births by age  $B^*(x,t)$  for a specific year, we calculate the ratio  $r(t)$  of live births to all births for the year using equation 1 and then multiply the counts of births by age  $B^A(x,t)$  by this ratio to produce the estimate (equation 2).

Note that this correction may result in a non-integer estimate of the number of live births by age.

$$r(t) = \frac{B(t)}{B^A(t)} \quad (1)$$

$$B^*(x,t) = r(t) \cdot B^A(x,t) \quad (2)$$