HUMAN FERTILITY DATABASE DOCUMENTATION: FINLAND

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1 General information

This report documents Finnish data collected for the Human Fertility Database project, namely age- and birth order-specific data on births, data on births by calendar month, and data on population exposures (women by age and the number of live-born children). The Human Fertility Database (HFD) for Finland is based on the official data on birth counts published in vital statistics publications and population structure publications.

Data used in producing the HFD output are specified in Appendix 1.

1.1 Territorial coverage

Finland, which was constituted as an independent republic in 1917, has not experienced any changes to its state borders since 1945. These borders were established after Finland lost the Winter and the Continuation Wars with the Soviet Union over the course of World War II. Finland had to cede a portion of Karelia and of Northern Finland to the Soviet Union. As a result, approximately 430,000 people were forced to move from these ceded areas to other parts of Finland.

1.2 Data collection and availability

The origins of statistical organization in Finland date back to the mid-18th century, when Finland was under Swedish rule and the *Tabellverket* (Tables Office) was set up in Sweden for the purpose of keeping population statistics. This marked the beginning of the world's longest, continuously maintained set of population statistics. An independent Central Statistical Office of Finland (Tilastollinen Päätoimisto) was founded on 4 October 1865, while Finland was an autonomous Grand Duchy of the Russian Empire. The work of the Statistical Office continued uninterrupted after Finland gained independence in 1917.

In 1971 the Central Statistical Office was renamed Statistics Finland (*Tilastokeskus*).

2 Birth count data

All birth data included in the HFD originate from the official vital statistics and population structure publications or databases. Different kinds of birth data cover different calendar periods. This has to do with tabulation practices of the time. Finland has a very long time series of monthly data on births, starting in 1878. Live births by the age of the mother (or, alternatively, by the mother's year of birth) are available from 1939 onwards. From 1939 to 1981, the tabulations of live births by the age of the mother and by birth order were made separately for

marital and non-marital births. Thus, data on births by the age of the mother and by the true (biological) birth order do not become available until 1982[1], while data on births by the age of the mother (without birth order) are available from 1939 onwards.

The range of birth order in the birth tabulations varies substantially from year to year. For example, in 1939 the last category is "17-21"[2], while in 2008, the last category is "8+".

Table 1: Data on births by age of the mother and/or the mother's year of birth; and, when available, by birth order provided to the HFD

Period	Age of mother	Birth order (biological)	Lexis element	Data source***
1939–1944*	14/15, 16…53/54/55, unknown	NA	Square	7, 8
1945–1981**	12, 13…51, 52+	NA	Square	8-11
1982–1986	13/14, 15..48, 49/50	1, 2..9, 10+, unknown	Square	12-14
1987–1999	12, 13…50, 51+	1, 2…7, 8+, unknown	Square	15-17
2000–2007	12/13/14, 15…48, 49/52/54/55	1, 2…7, 8+	Square	17
1975–1996	12/13, 14…47, 48/49/50/51/52	NA	Triangle	10-16
1997–2007	13/14, 15…48, 49/50/51/52	NA	Triangle	17
1987-2023	12/13/14/15,…, highest age recorded	1, 2,…,highest birth order recorded, unknown	Triangle	20-24, 30, 34-35, 37-39

* These data were obtained by adding up marital and non-marital births tabulated by the age of the mother.
** There were some births of unknown age in the period before 1969. They were distributed proportionally across all known age categories.
*** Data sources behind these numeric codes are listed in the references file (see the document *FINref.pdf* in the section "Input Data" on the HFD country page for Finland.

Birth data for the years 1983 and 1985-2023 include late-registered births. Since only mother's year of birth and mother's age at birth are known for these births in the Finnish dataset, late-registered births are provided as horizontal parallelograms (VH) in the input file. (Note that horizontal parallelogram combines births occurring for one birth cohort at specific age *x* during two consecutive calendar years). During the data processing late-registered births are moved to the years of their occurrence. They are proportionally split into Lexis triangles and are combined with the respective normally-registered births by Lexis triangle.

3 Population count data

The annual age structure of women is taken from the Human Mortality Database (www.mortality.org).

The distribution of women by the number of live-born children is available for the period 1986-2023 (December).

One piece of history concerning data on the number of children is worth mentioning in this context. The Central Population Register — now called the Population Information System — was established in 1969. This system is maintained by the Population Register Centre and by local register offices. Prior to the implementation of the Population Information System, only those children who still lived at home were registered on their mother's and father's records. Thus, only since the beginning of the 1970s have all live-born children been linked to their mothers, and vice versa. This means, for example, that women who were 72 years old at year-end 2007 were 37 in 1972, or at an age or family phase when almost all their children still lived

[1] Previous research on cohort reproductive patterns in Finland provides estimates on cohort childlessness for the cohorts born between 1930 and 1960 based on birth order data obtained by combining data for marital and non-marital births for the period 1939-1981. However, combining the two datasets did not sum up to the total number of biological births by birth order. As a result, a possible discontinuity between the HFD cohort estimates, which use data on biological birth order (1982-2009) and previously published ones could occur.
[2] Please note that before 1982 birth order was registered within current marriage.

at home. But note that if the child had died in 1960s, her or his record would still be missing from the system.

4 Specific details

4.1 Definitions of live birth

At least as far back as 1950, Finland followed the conventional WHO definition of a live birth, according to which a live birth is the complete expulsion or extraction of a product of conception from its mother, irrespective of the duration of pregnancy, which, after separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live-born (World Health Organization. Technical Report Series 1950: 25). Prior to the adoption of the WHO definition, the definition of a live birth was not as precise. There was a time when a live birth simply referred to a newborn who showed “signs of life” after birth. Later, this expression “signs of life” was classified more exactly: a live-born infant was a term used to refer to a newborn who was breathing and showed other signs of life after birth.

When considering these definitions of a live birth, it is important to keep in mind where in Finland deliveries took place before 1950. At the end of 19th century, about 96% of all deliveries were home births. Of these, only about 20% were assisted by midwives. A quarter of a century later, in 1925, the percentage of all women who gave birth in maternity hospitals or who were assisted by a professional midwife was still only 53%. Over the following decades, the shift away from home births was rapid: by 1950, over 90% of women gave birth in maternity hospitals. Given these figures, it is natural to assume that the concept of live birth must have been quite simple in the past. The same also holds for the definition of a stillbirth. But the dividing line between stillbirth and miscarriage is difficult to identify before most deliveries took place in maternity hospitals (Fougstedt 1941).

4.2 Stillbirth

At the beginning of the 1930s, there was no official definition of a stillbirth in Finland. In principle, however, Finland had the same definition that was used in Denmark and Norway at that time: A stillborn child is a fetus or a newborn that shows no signs of life after delivery, or is born dead after a pregnancy lasting at least 28 weeks. This definition was included in a presentation given by Gunnar Fougstedt in 1941 on Finnish birth statistics that were revised in 1939 (Fougstedt 1941). This definition remained valid throughout the first decade of the revised birth statistics.

In early 1951, the Statistical Office sent a letter to all bodies in charge of collecting statistics on vital events. As well as providing general instructions on recordkeeping, this letter contained a definition of stillbirth: A stillborn is a fetus that shows no signs of life, and whose birth weight is at least 600g (Kiertokirje kirkkoherranvirastoille 1951, Kuolemansyyt 1955).

This definition was modified in 1969. The duration of the pregnancy was added to the previous definition: A pregnancy had to last at least six months, and the birth weight had to be at least 600g (Väestönmuutosket 1969). From 1975 to 1986, the following definition was used: A stillborn is a newborn who is born dead after a pregnancy lasting at least 28 weeks (Väestönmuutokset 1975, Väestörakenne ja väestönmuutokset 1986).

From 1987 to 1996, a stillborn was considered to be a fetus or a newborn that shows no signs of life after a delivery, which is born dead after a pregnancy lasting 22 weeks or more, or has a birth weight of at least 500g. From 1997 to 2002, the definition was slightly modified to match the WHO’s definition: A stillborn is a newborn with no signs of life with a birth weight of at least 500g, or, if the birth weight is not available, a newborn born dead after a pregnancy lasting 22 weeks or more. Since 2003, the definition applied in 1987-1996 has been used again (Väestönmuutokset 1996, 1997 and 2007).

4.2 Marital live birth

A child born in wedlock is a marital child. Before 1982, a widowed or a divorced woman could also give birth to a marital child if the pregnancy began while the woman was still married. From 1982 onwards, a widowed, but not a divorced woman could give birth to a marital child if the pregnancy began while the woman was still married.

4.3 Age

In Finnish birth statistics, the age of the mother is the age in completed years at the time of birth. The distribution of women by age and the number of children ever born is taken from population structure statistics. This age refers to the age of the women in full years on the last day of the year.

4.4 Birth order

Between 1939 and 1981, marital birth order contained all children born in a valid marriage, also including stillbirths. Meanwhile, non-marital birth order was calculated from all the mother's non-marital births, including stillbirths (Ohjeita syntyneisyystilastosta). Since 1982, annual tabulations for birth order have been made regarding all biological births. Therefore, the HFD includes order-specific data on births only from 1982 onwards.

4.5 Cases with unknown birth order

The issue of unknown cases of birth order was only problematic in the first year after the birth statistics were renewed. In 1939, the child's birth order was unknown for 24% of all marital births and for 28% of all non-marital births. In the following year, the number of cases of unknown birth order dropped dramatically, to 0.3% for marital births and to 0.7% for non-marital births. Levels remained similarly low thereafter, and eventually tapered off to just a few cases.

5 Revision history

Changes with the February 2016 revision:

Due to a refinement of the HFD method there are minor changes to the redistribution of late registered births (we switched from 50/50 to proportional splitting). These changes are negligible, as the share of late registered births is very small.

Changes with the February 2017 revision:

Data for years 2013-2015 were added. In addition, information on births by month for the years 1878-1899 was included, which had minor effects on population exposures at high childbearing ages in the period 1939-1950.

Changes with the January 2020 revision:

There are minor changes in birth estimates for the years 2012-2015 caused by the redistribution of births with delayed registration, i.e. these births, registered in 2016-2018, were moved to the years of their actual occurrence. In addition, data on births by month for the years 1859-1877 were added to the monthly birth data series.

Changes with the October 2020 revision:

Data for 2019 were added. There are minor changes in the birth estimates for the years 2014-2018 at some ages, which were caused by the redistribution of births of delayed registration to the years of their actual occurrence.

Changes with the October 2021 revision:

Data for 2020 were added. Minor changes are visible in the birth estimates for the years 2016-2019 at some ages. These changes result from the redistribution of late-registration births to the years of their occurrence.

Changes with the August 2022 revision:

Data for 2021 were added. There are some minor changes in the birth estimates for 2018-2020 due to redistribution of births of delayed registration to the years of their occurrence.

Changes with the September 2023 revision:

Data for 2022 were added. There are some minor changes in the birth estimates for 2018-2021 due to redistribution of births of delayed registration to the years of their occurrence.

Changes with the October 2024 revision:

Data for 2023 were added. There are some minor changes in the birth estimates for 2017-2021 due to redistribution of late-registered births to the years of their occurrence. The release also includes some revisions. Late-registered births reported in 2021 and 2022 had been misplaced (i.e. moved to wrong years of occurrence) in the previous data updates because of a mistake in the input file. This was corrected.

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APPENDIX 1
INPUT DATA USED FOR HFD CALCULATIONS

BIRTHS

Period	Type of data	Age range	Birth order	RefCode(s)
1939-1944	Annual number of live births by age of mother (Lexis squares)	14/15, 16…53/54/55, unknown	–	7,8
1945-1974	Annual number of live births by age of mother (Lexis squares)	12, 13…51, 52+*	–	8,9
1975-1986**	Annual number of live births by age of mother and mother's year of birth (Lexis triangles)	12/13, 14…47, 48/49/50/51/52	–	10-16
1982-1986	Annual number of live births by age of mother and birth order (Lexis squares)	13/14, 15..48, 49/50	1, 2,…, 9, 10+, unknown	12-14
1987-2023**	Annual number of live births by age of mother, mother's year of birth and birth order (Lexis triangles)	lowest age,…, highest age recorded	1, 2,…,highest parity, unknown	20-24, 30, 34-35, 37-39
1859-2023	Annual number of live births by month	–	–	1-13, 22-25, 30-36, 39

* Births of unknown age were distributed proportionally across all known age categories.
** The data classified by Lexis triangles allow for identification of late-registration births. These births are moved to the years of their actual occurrence in the HFD outputs.

FEMALE POPULATION: Distribution by age and parity

Period	Type of data	Age range	Year of birth, range	Parity	RefCode(s)	Notes
31.12.1986-31.12.2012	Number of women by age and parity	15, 16,…, *	–	0,1,…, 9, 10+	18-20, 22, 23	First year is used as the 'golden' census
31.12.2013-31.12.2022	Number of women by age and parity	14/15, 16,…,*	–	0,1,…, highest parity	23-24, 30, 34-35, 37-38	

* Upper bound of the age range moves beyond the age 80 for some years but it is noteworthy statistics on elderly women are not reliable.

FEMALE POPULATION: Exposure by age and year of birth

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.