

HUMAN FERTILITY DATABASE DOCUMENTATION: BELARUS

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1 General information

This report documents the fertility data for Belarus collected for the Human Fertility Database (HFD): age- and birth order-specific data on births, data on births by calendar month, and data on the distribution of women by age and number of live-born children. The data provided for the HFD are collected by the official statistical agency of Belarus (National Statistical Committee of the Republic of Belarus), which is responsible for the collection, processing, and dissemination of population data for Belarus.

The collection of official statistics in Belarus was initiated in August 1920 with the establishment of the Central Statistical Bureau (Belstat, 2014a). Until the dissolution of the Soviet Union the Central Statistical Bureau of Belarus functioned as a regional subdivision of the Central Statistical Office of the USSR (the Tsentralnoe Statisticheskoe Upravlenie, or TsSU). After Belarus became independent in 1991 the main responsibility for collecting population statistics was assigned to the State Committee of Statistics and Analysis of the Republic of Belarus (Goskomstat). In 1994, Goskomstat was reorganised and became the Ministry of Statistics and Analysis of the Republic of Belarus (Minstat). In 2008, Minstat was reorganised and became the National Statistical Committee of the Republic of Belarus (Belstat).

The Belarusian fertility data for the HFD comprise official tabulations (published and unpublished) of:

- Live births by age of mother and birth order for the period 1945-1959 and 1964-2016, compiled from birth certificates

- Live births by calendar month (1945-1959, 1964-1990, and 1997-2016)
- Distribution of women by age and number of live-born children from the 1989, 1999, and 2009 population censuses.

Detailed information about the data used in the HFD calculations is provided in Appendix 1.

1.1 Data collection

Birth data by age of the mother and biological birth order, as well as monthly birth data for the period after 1997, were provided by Belstat. The respective data for the period 1974-1990 were collected at the Russian State Archive of the Economy in Moscow. Birth counts for the period 1945-1973 were collected at the Central Archive in Minsk.

Birth data for the period 1960-1963 are missing. It was not possible to locate these data at any of the three institutions mentioned above. Therefore, in the HFD calculations only data for the period 1964-2014 have been used.

Data from the 1989 population census were collected at the Russian State Archive of the Economy. The 1999 and the 2009 population census results were obtained from the official publications of Minsstat and of Belstat.

1.2 Territorial coverage

There were no territorial changes in Belarus between 1964 and 2016, the period for which Belarusian data are available in the HFD.

2 Birth Count Data

2.1 Coverage and completeness

Data on live births are compiled from the birth certificates and cover all births to permanent residents of Belarus, irrespective of the location (i.e., the country) the birth took place. Births are published by the year in which they occurred. The official statistics do not include vital events of Belarusian citizens who live abroad permanently (Minsstat 2007).

The national law requires that all births are registered within three months of the date of birth. Registration is based on the medical certificate of birth issued by a medical institution and the statement of birth made by the parents. Births can be registered at the place of birth or at the parents' place of permanent residence. Upon registration, two duplicates of the birth certificate are issued by the local (district) civil registration office: one for the parents and the other for the district statistical bureau. The birth is then recorded and counted in accordance with the established procedures.

The completeness of birth registration in Belarus has depended primarily on the parents' willingness to register the births of their children. As there are potentially adverse financial and legal consequences for the failure to register a birth, we assume that the registration of births in the period 1964-2016 is reasonably complete.

The following types of data on births were collected for the HFD:

- Live births by age of the mother and birth order (1945-1959 and 1964-2016);
- Live births by month (1945-1959, 1964-1990, and 1997-2016).

Data on births by age of the mother for the periods 1964-1977 and 1991-1996, as well as for the year 1986, are provided by five-year age groups. For the years 1985 and 1991-1996 the birth counts for the youngest age group were aggregated in a broader age group ≤ 19 . Because current HFD methodology (see the Methods Protocol, section 4) does not produce a plausible redistribution of the birth counts by single ages for such a broad age group, the original data were first split into the narrower age groups¹ ≤ 15 and 16-19 using the method described in Appendix 2.

Data by calendar year and month for the period 1945-1959 revealed that there was an unrealistically small number of births in the last three months of each calendar year (particularly in December), which was compensated for by an unrealistically large number of births in the first three months of the following year (particularly in January). Such a skewed distribution of births within a calendar year is an indication of data registration problems in that period; for this reason, the monthly data for the period 1945-1959 were not used in the calculations.

3 Population Count Data

3.1 Population count data by age

Data on the female population by single year of age are taken from the Human Mortality Database (HMD). Before the first post-war population census of 1959 there had been no continuous and reliable collection of population data; thus, the HMD provides data on female population exposure for the period since 1959 only. However, because the quality of the population estimates before the 1970s is questionable, for the computation of parity-specific fertility tables we use only the population estimates and the birth data since 1970 (Grigoriev 2013).

3.2 Population count data by age/cohort and parity

The enumeration of the population in the territory of Belarus dates back to the 17th century, when the Belarusian statistics were incorporated into the statistical system of the Russian Empire. Ten population counts took place between 1719 and 1859 (Shakhotko 2009). However, these "population revisions" were not real censuses. The first population census in the territory of

¹ The age intervals ≤ 15 and 16-19 were selected to ensure consistency with the age categorisation of the data in the periods before and after the periods with less detailed data.

Belarus (as a part of the Russian Empire) was conducted in 1897. This census became the first official data source for scientific analyses and publications. During the period of Soviet rule (1922-1991) a population census was conducted roughly once every decade (except during World War II). In seven censuses (1920², 1926, 1939, 1959, 1970, 1979, and 1989) the population of Belarus was covered as a Belarusian republic of the USSR (BSSR). Unlike in many other countries of the former USSR, the practice of retaining a 10-year interval between censuses continued after Belarus had declared its independence in August 1991. Two censuses have been conducted since then: one in 1999 and the second in 2009.

The question concerning the number of children ever born was introduced in the 1979 population census, and has been part of the census programme ever since. However, data from the 1979 census could not be collected from either the Central Archive in Minsk or the Russian State Archive of the Economy in Moscow. For the HFD, data on the distribution of women by age and number of live-born children were obtained from the 1989, 1999, and 2009 population censuses.

According to the 1989 census programme, the question of the number of live-born children was part of a fertility survey that covered a 25% sample of households, and was posed to all women aged 15 and over in the household. The distribution of women by age and parity obtained was generalised by the census organisers for the entire female population of Belarus. In the 1999 and the 2009 censuses, the question regarding the number of live-born children was posed to all women aged 15 and over (Belstat 2014b).

The 1989 population census is referred to as the “Golden Census”; i.e., the data on age-parity distribution of women are used for estimating the initial parity weights $w_i(x)$ that are in turn used for the calculation of the period fertility tables (for more details on the construction of period fertility tables in the HFD, see the Methods Protocol, section 8.1.2).

4 Specific details

4.1 Definitions

Definition of a live birth

Until 1993, Belarus adhered to the definition of a live birth used in the Soviet Union. According to this definition, infants born before 28 weeks of gestation and weighing less than 1000 grams or measuring less than 35 centimetres were not counted as live births if they died before completing the first seven days of life. Such a restrictive rule led to the underestimation of births and population at age zero, as well as the underestimation of neonatal and infant mortality (Grigoriev 2013, Grigoriev et al. 2012).

In 1994, Belarus started using a new definition of live birth that is closer to the WHO definition. According to this new standard, live births are defined as products of conception when: i) the birth weight is greater than 500 grams, the length is 25 centimetres or more, or the duration of

² The 1920 census took place during the Russian Civil War, which ended with the foundation of the Soviet Union in 1922.

gestation is at least 22 weeks; and ii) the new-born breathes or shows any other evidence of life. Notably, this definition excludes some live births as defined by the WHO (i.e., new-borns who exhibited signs of life, but weighed less than 500 grams, measured less than 25 centimetres, and whose period of gestation was less than 22 weeks). The change in the definition resulted in a 20% increase in early neonatal mortality in Belarus (Grigoriev et al. 2012). However, from a fertility analysis perspective the under-statement of births and of neonatal and infant mortality in Belarus is relatively unimportant.

Definition of age

During the entire period of 1945–2016 age of the mother was recorded as age in completed years (ACY). According to the standards used in Belarusian population statistics, women are assigned to the reproductive age group at ages 15 to 49. However, birth records are usually also provided for females under age 15 and over age 49.

Definition of birth order

Birth order is defined by the total number of previous live-born children of a woman. In cases of multiple deliveries, each child is assigned a separate birth order.

4.2 Data Quality Issues

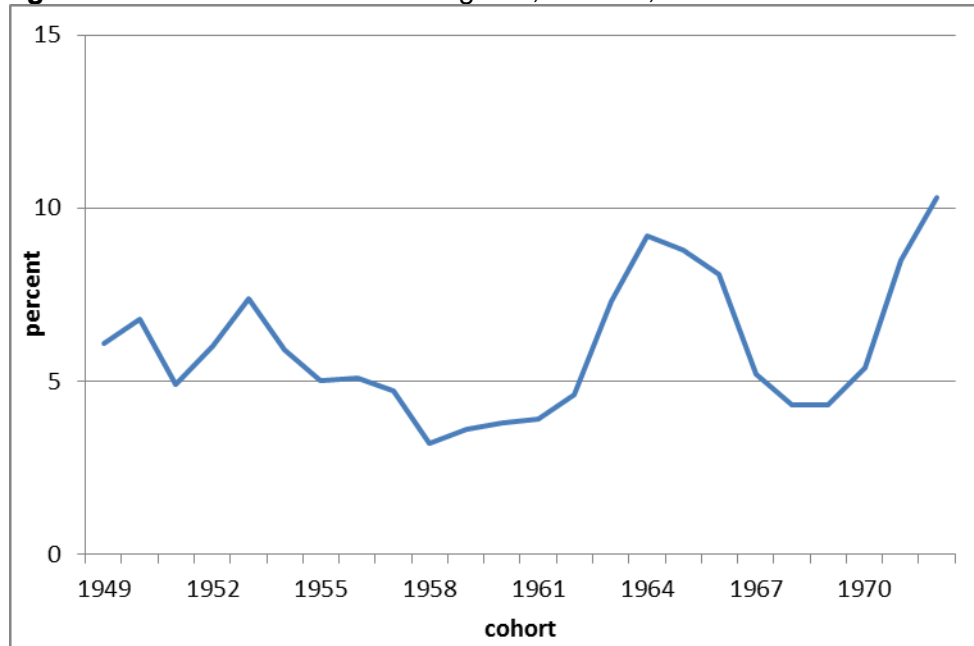
Warning: Due to quality problems in the population estimates, the data prior to 1970 should be used with extra caution.

For the computation of parity-specific fertility tables we use population estimates and birth data since 1970 only. We chose to avoid using data prior to this year because the Belarusian population estimates before the 1970s are less reliable (Grigoriev 2013), and are thus not of sufficient quality for the computation of parity-specific fertility tables.

Cohort childlessness

Special attention must be paid to the very low levels of childlessness estimated in the HFD for the cohorts born in 1955-1962. As these levels of childlessness are close to the level generally associated with primary infertility, it is possible that data problems led to the underestimation of childlessness in these cohorts.

Figure 1: Cohort childlessness at age 40, Belarus, birth cohorts 1949-1972



Source: HFD, authors' own estimates

The very low values of estimated ultimate childlessness are as follows: cohort 1955: 4.8%; cohort 1956: 4.9%; cohort 1957: 4.5%; cohort 1958: 3.0%; cohort 1959: 3.5%; cohort 1960: 3.6%; cohort 1961: 3.7%; and cohort 1962: 4.5%.

Similar levels of cohort childlessness in the respective cohorts are observed in Estonia, Lithuania, Russia, and Ukraine (www.humanfertility.org). It appears that several factors contributed to the estimation of such low values in many of the former Soviet republics. Previous investigations have suggested that the unrealistically low levels of childlessness estimated for the 1958-1962 cohorts are attributable to a combination of real fertility behaviour and limited data quality for the period before 1989 (e.g., Jasilioniene et al. 2011 for Lithuania, and Aksionova et al. 2013 for Ukraine). The level of childlessness might also be reduced by modifications made to the input data in the HFD (e.g., splitting five-year age groups³ into one-year age groups may cause irregularities in the estimated period and the cohort fertility data specified by single years of ages).

In addition, Grigoriev (2013) reported that the Belarusian population data for the period 1959-1970 have the same problems as the data for other former Soviet republics. Data quality issues, such as age-heaping or inconsistent fluctuations in the age distribution of female population counts, repeatedly affect particular cohort lines. As a result, some data quality limitations accumulate in the cohort summary indicators.

In light of these problems, we advise users to bear in mind that the HFD cohort fertility indicators should be treated as statistical models that may not fully correspond to the fertility behaviour of real cohorts.

³ Data on births by birth order for the periods 1964-1977 and 1991-1996 are available by five-year age groups only.

4.3 Revision history

Changes with the March 2016 revision:

New data for 2013-2014 were added. Compared to the data release of 3 March 2014, there are some changes in the live birth estimates at older ages (mainly at ages 50 and above) in the period 1998-2001. These changes resulted from the use of more detailed input data for these ages: the age group 50-54 was replaced by single-year ages. Because of the use of more detailed input data (the age category ≤ 15 was replaced by the age groups ≤ 14 and 15), the current update also includes some changes at young ages in the years 2000-2012.

Changes with the April 2018 revision:

New data for 2015-2016 were added.

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Data sources

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2. Central Statistical Office of the USSR (TsSU). Annual number of officially registered births by five-year age groups of mother and birth order compiled from birth certificates. Annual reporting table Forma 2a (unpublished tables, 1955-1959). [The data were collected at the National Archive of the Republic of Belarus in Minsk].
3. Central Statistical Office of the USSR (TsSU). Annual number of officially registered births by single-year age groups of mother (Annual reporting table Forma 2) and annual number of officially registered births by five-year age groups of mother and birth order (Annual reporting table Forma 2a), compiled from birth certificates (unpublished tables, 1964-1973). [The data were collected at the National Archive of the Republic of Belarus in Minsk].
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table Forma 2a), compiled from birth certificates (unpublished tables, 1974-1977). [The data were collected at the State Archive of Economics of the Russian Federation in Moscow].

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6. State Statistical Committee of the USSR (Goscomstat) [formerly Central Statistical Office of the USSR (TsSU)]. Annual number of officially registered births by single-year age groups of mother and birth order (Annual reporting table P241, formerly Forma 2) compiled from birth certificates (unpublished tables, 1989-1990). [The data were collected at the State Archive of Economics of the Russian Federation in Moscow].

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8. National Statistical Committee of the Republic of Belarus. Annual number of officially registered births by single-year age groups of mother and birth order compiled from birth certificates. Annual reporting table P241 (unpublished tables, 1997-2012). The data were received on 12 November 2013.

9. Central Statistical Office of the USSR (TsSU). Annual number of officially registered births by month of birth compiled from birth certificates. Annual reporting table Forma 1 (unpublished tables, 1945-1959 and 1964-1973). [The data were collected at the National Archive of the Republic of Belarus in Minsk].

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17. National Statistical Committee of the Republic of Belarus. Annual number of officially registered births by single-year age groups of mother and birth order compiled from birth certificates. Annual reporting table P241 (unpublished tables, 2014). The data were received on 29 September 2015.

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19. National Statistical Committee of the Republic of Belarus. Annual number of officially registered births by month of birth compiled from birth certificates. Annual reporting table A11 (unpublished tables, 2014). The data were received on 29 September 2015.

20. National Statistical Committee of the Republic of Belarus. Annual number of officially registered births by single-year age groups of mother and birth order compiled from birth certificates (annual reporting table P241) and annual number of officially registered births by month of birth compiled from birth certificates Annual reporting table A11). Unpublished tables, 2015-2016. The data were received on 11 April 2018.

**APPENDIX 1
DESCRIPTION OF DATA USED FOR LEXIS DATABASE**

BIRTHS

Period	Type of data	Age scale	Birth order	RefCode(s)
1964-1977	Annual number of live births by age of mother (Lexis squares)	≤15, 16, 17,..., 50-54, 55+, unknown	-	3, 4
1964-1977	Annual number of live births by age of mother and birth order (Lexis squares)	≤15, 16-19, 20-24, ..., 50-54, 55+, unknown	1-11+, unknown	3, 4
1978-1985	Annual number of live births by age of mother and birth order (Lexis squares)	≤15, 16, 17,..., 50-54, 55+, unknown	1-11+, unknown	5
1986	Annual number of live births by age of mother and birth order (Lexis squares)	≤15 ¹ , 16-19 ¹ , 20-24, ..., 50+, unknown	1-10+, unknown	14
1987-1990	Annual number of live births by age of mother and birth order (Lexis squares)	≤15, 16, 17,..., 50-54, 55+, unknown	1-11+, unknown	5,6
1991-1996	Annual number of live births by age of mother and birth order (Lexis squares)	≤15 ¹ , 16-19 ¹ , 20-24, ..., 49, unknown	1-6+, unknown	7
1997-1999	Annual number of live births by age of mother and birth order (Lexis squares)	≤15, 16, 17,..., 54, 55+, unknown	1-11+, unknown	8
2000-2013	Annual number of live births by age of mother and birth order (Lexis squares)	≤14, 15, 16,..., 54, 55+, unknown	1-11+, unknown	8, 16
2014-2016	Annual number of live births by age of mother and birth order (Lexis squares)	≤13, 14, 15,..., 54, 55+, unknown	1-11+, unknown	17, 20
1964-1990 1997-2016	Annual number of live births by month	total	total	9, 10, 11, 18, 19, 20

¹ Original data were provided in a broader age group ≤19. The method for splitting original data into narrower age groups ≤15 and 16-19 is described in Appendix 2.

FEMALE POPULATION: Distribution by age and parity

Period	Type of data	Age range	Year of birth, range	Parity	RefCode(s)	Notes
12.01.1989 ²	Number of women by age and parity	15, 16,...,54, 55-59, 60-64, 65-69, 70+, unknown	-	0, 1,...,9, 10+, unknown	12	"Golden census"
16.01.1999	Number of women by age and parity	15,...,69, 70+, unknown	-	0, 1,...,9, 10+, unknown	13	
14.10.2009	Number of women by age and parity	15,...,59, 60+, unknown	-	0, 1,...,28, 29, unknown	15	

² The question about the number of children ever born was posed to only a 25% sample of households in the census. The obtained distribution of women by age and parity was applied to the entire female population of Belarus.

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>.

APPENDIX 2 ADJUSTMENTS OF AGE CATEGORY ≤19

For the period 1991-1996, as well as for the year 1986, data by age and birth order are provided by five-year age groups of the mother, with birth counts for the youngest age group aggregated in a broader age group “below 20”. As such a broad age group cannot be satisfactorily recalculated into single age groups using the current HFD methodology (see the HFD Methods Protocol), the data are split into the narrower age intervals 12-15 and 16-19⁴ using a simple method described below.

First, for the period 1991-1996 and the year 1986, the ratio of births in the age interval 12-15 to births in the age interval 12-19 is estimated for each birth order i by linear interpolation between the known values for the years 1990 and 1997⁵ and for the years 1985 and 1987, respectively:

$$r_i(12 \leq x \leq 15) = \frac{B_i(x \leq 15)}{B_i(x \leq 19)}, \text{ for } i = 1, 2, \text{ UNK} \quad (1)$$

$$r_i(12 \leq x \leq 15) = 0, \text{ for } i = 3, 4, 5+ \quad (2)$$

Then the number of live births in the age interval 12-15 for each year and each birth order is estimated as follows:

$$B_i(12 \leq x \leq 15, t) = r_i(12 \leq x \leq 15) \cdot B_i(x \leq 19, t) \quad (3)$$

The remaining births from the age interval ≤19 belong to the age interval 16-19.

⁴ The age intervals 12-15 and 16-19 were selected to ensure consistency with the age categorization of the data in the periods before and after the periods with less detailed data.

⁵ In the estimation of the ratio of births in the age interval 12-15 to births in the age interval 12-19 we experimented with calculating averages for short periods of 2-5 years before and after the period with missing data. However, due to extremely dynamic fertility development in this period, using data for the years 1990 and 1997 produced the most plausible results.