ABOUT MORTALITY DATA FOR BELARUS

by Pavel Grigoriev Last Updated: March 25, 2020

GENERAL

Currently, the National Statistical Committee of Belarus (Belstat) is responsible for collecting, processing and disseminating population data for Belarus. Belarusian statistics passed through several historical stages before the establishment of this Committee. Initially, it was incorporated into the statistical system of the Russian Empire. At the beginning of the 20th century, each of the four governor's districts ("gubernias") included a statistical division: Minsk, Vitebsk, Mogilev and Grodno. These statistical divisions were primarily responsible for conducting the population censuses. The official establishment of a Belarusian statistics office occurred in August 1920 when the Central Statistical Bureau began operating (Minstat, 2007).

Until the demise of the Soviet Union, the Central Statistical Bureau of Belarus functioned as a regional subdivision of the Cental Statistical Office of the USSR (the *Tsentralnoe Statisticheskoe Upravlenie*, or TsSU). After Belarus obtained independence in 1991, the main responsibility for population statistics in Belarus was assigned to the State Committee of Statistics and Analysis (Goskomstat). In 1994, this was reorganized into the Ministry of Statistics and Analysis of the Republic of Belarus (Minstat). In 2008, the Minstat was reorganized into the National Statistical Committee of Belarus. The socio-economic transformation in Belarus required significant changes and the reconstruction of the entire statistical system. In 1992, the Belarusian authorities adopted the State Program of transition to a new statistical system in accordance with international standards. Within this program's framework, two significant methodological changes were implemented in the area of population statistics: the transition towards the World Health Organization (WHO) definition of live births in 1994 and the adoption of the 10th revision of the International Classification of Diseases in 2002.

The main sources of population data in Belarus have been the population census and vital and migration statistics. The first official population census in Belarus was conducted in 1897 as part of the first population census of the Russian Empire. During the period of Soviet rule, six population censuses took place (1926, 1939, 1959, 1970, 1979 and 1989). In February 1999, the first census in the history of independence was conducted in Belarus. It was followed by two other census: one in October 2009 and the other in October 2019, though data for this most recent census are not yet available at the time of this writing.

The system of vital statistics in Belarus is highly centralized and relies upon principles established under Soviet rule. The local and district civil registration offices, the district statistical bureaus, the regional statistical offices and the National Statistical Committee are integrated into the system of vital statistics. The registration of all vital events in Belarus takes place in the civil registration offices. Official statistics exclude vital events occurring to Belarusian citizens while living abroad as well as in-country events that are not registered.

According to current rules and regulations on vital statistics in Belarus (see Appendix I), at the end of each month and no later than the second day of the following month, the local civil registration offices compile and forward duplicate copies of individual vital event records to the district civil registration office (ZAGS). In addition, death records must be accompanied by medical certificates of death. By the seventh day of the month, the district ZAGS assembles and transmits all individual records (for the previous month) along with the medical certificates of death to a district statistical bureau. District statistical bureaus forward all collected and systematically arranged documents to a regional statistical office. Then, the regional statistical offices assemble individual records and compile them on the regional level. Finally, verified data are aggregated at the national level by Belstat.

The international migration statistics in Belarus are based on data collected by the Ministry of Internal Affairs, the Committee of Migration of the Ministry of Labor, and the Ministry of Foreign Affairs (Minstat, 2001). Data on migration between Belarus and the Commonwealth of Independent States (CIS)[1] and the Baltic States (Latvia, Lithuania and Estonia) are obtained by tabulation of registered arrivals and departures, which are compiled by the local "militia" (police). Data on migration between Belarus and other countries are obtained from the permanent system of registration of arrivals and departures.

As in the majority of other former Soviet republics, detailed data on deaths and population size by single year of age have never been published in Belarus. Early statistical yearbooks on population were rarely published and included demographic indicators that were so highly aggregated that use for analytical purposes was limited. More detailed information became publicly available in the mid-1980s, an era of significant political changes declared by the Soviet government. These data included deaths and population by sex and by five-year age groups. Since that time, Belarus has made mortality data by broad age groups publicly available.

Sources of data

The HMD series for Belarus start from 1959. This year corresponds to the first post-war census conducted in Belarus. We did not consider collecting the raw data prior 1959 because of their poor quality. Data from the 1959, 1970, 1979 and 1989 population censuses as well as death counts and population estimates for the period 1959-1989 were collected at the State Archive of the Ministry of Economy of the Russian Federation and the Interstate Statistical Committee of the Commonwealth of Independent States. Belstat provided computerized data files for the period since 1990 including the 1999 and 2009 census counts. The number of live births was extracted from the annual reports on "Recent Demographic Developments in Europe" published by the European Population Committee of the Council of Europe and the statistical yearbooks published by Belstat.

[1] CIS does not include the Baltic States. There is separate registration of international migration for the countries of the former USSR (12 republics of CIS plus the Baltic States) and for the rest of the world.

TERRITORIAL COVERAGE

There has been no territorial change in Belarus during the period since 1959.

DEATH COUNT DATA

Coverage and Completeness

According to Belarusian law, a death must be registered within seven days of occurrence (disclosure of a body) on the basis of the medical death certificate and the statement of death made by the relatives or other people related to the deceased. Deaths can be registered at the place of permanent residence of the deceased, the place of death, or the place of burial. Upon registration, two duplicates of the death certificate are issued by the local (district) civil registration office: one for relatives, and the other for the district statistical bureau. Afterwards, the death is recorded in accordance with the standard procedure described above.

There is reason to assume that for the period since 1959 the territory of Belarus has been covered adequately and the registration of deaths has been satisfactorily completed. Most experts dealing with mortality data for Russia, the Baltic States, Ukraine and Belarus believe that registration of deaths in these countries is complete (Murray & Bobadilla, 1997). Anderson and Silver (1997) note that recent mortality data for Belarus (as for the other former Soviet republics mentioned above) “are generally trustworthy, especially at the working ages.”

On the basis of death registration data (1981-2001), Mathers and colleagues regard the quality of Belarusian mortality data to be of a *medium level*. They assessed the completeness of death registration (the proportion of all deaths that are registered among the population covered by the vital registration system of the country) to be 100 percent. The coverage of death registration (the total number of deaths recorded by the vital registration system for a given year divided by the total number of expected deaths for that year) has been estimated at 98 percent (Mathers et.al., 2005).

Specific Details

The problems related to the quality of mortality statistics in Belarus during the period of Soviet rule have been well documented. It is widely recognized that mortality data in the former Soviet Union suffered from various kinds of measurement errors such as the under-registration of infant mortality, age heaping, and age exaggeration at old ages (Anderson & Silver, 1997; Kingkade & Arriaga, 1997). Perhaps the most notable inconsistencies in terms of the distortion of overall mortality statistics were those related to the reporting of infant deaths. One source of inconsistency originated from the more restricted Soviet definition of a live birth and an infant death that was used in Belarus until 1994. Under this definition, infants born before 28 weeks of gestation, weighing less than 1000 grams or measuring less than 35 centimeters in length were not counted as either live births or infant deaths if they died before completing the first seven days of life. As a result, a considerable share of infant deaths was unreported. According to the widely

cited estimates made by Anderson and Silver (1986), the infant mortality rate would increase by between 22 and 25 percent if the Soviet definition of live birth conformed to the WHO criteria. A second source of inconsistency resulted from a change in the registration system starting in 1974 in the former USSR, which caused an increase in the number of registered infant deaths (Anderson and Silver, 1986).

Although evidence on the validity and reliability of mortality data for Belarus in recent years is scarce and no scientific studies regarding this matter have been conducted, it is unrealistic to assume that since the dissolution of the USSR the quality of mortality statistics has improved. In fact, the quality may even have deteriorated because of the socio-economic constraints of the transitional period, which affected all spheres of life including the statistical system of Belarus. On the other hand, Belarus has taken some steps towards the improvement of mortality statistics such as shifting towards the WHO definition of a live birth since January 1994.

The adoption of the international standards in the definition of live- and stillbirths was expected to lead to a considerable increase in early neonatal mortality, and consequently, in infant mortality (Grigoriev, Meslé, Vallin 2012). However, no such increase was reflected in the official infant mortality rates in Belarus. In 1993, the infant mortality rate reported in the *Statistical Yearbook* was 12.5 deaths per one thousand live births compared with 13.2 in 1994 and 13.3 in 1995. In 1996, the infant mortality rate declined to the 1993 level and continued a dramatic decline reaching 9.3 per thousand in 2000. By 2007, it had reached 5.2 deaths per one thousand live births (Minstat, 2008). These trends differ from those observed in the Baltic States after the switch to the WHO definition of live births. According to some estimates, the shift in the registration procedures in these countries resulted in an average 23% increase of the infant mortality rate (Anderson & Silver, 1997).

These contradictory trends in infant mortality in recent years might be explained by the fact that the WHO definition of live births was not fully implemented in the statistical practice in Belarus. According to the WHO definition, a newborn who breathes or shows any sign of life is counted as a live birth, regardless of the length of gestation. Yet, the “new” definition of live births in Belarus imposes as an additional requirement that the birthweight be greater than 500 grams and the length 25 centimeters or more, or that the duration of gestation is at least 22 weeks. Thus, even the “new” definition does **not** conform to the WHO criteria. Moreover, after the shift towards the WHO definition has been implemented, Belstat developed a system that calculated infant mortality according to the “old” and “new” criteria of viability. The infant mortality figures noted in the previous paragraph appear to have been actually based on the “old” definition (which required more than 28 weeks of gestation, a birthweight greater than 1000 grams, and a body length of at least 35 centimeters). The infant mortality rate according to the “new” definition was 14.8 per thousand in 1994, 14.5 in 1995, and 10.5 in 2000; on average, during the period 1994-2000, the infant mortality rate based on the new definition was 8.8-12.9% higher than that calculated based on the old criteria (Shakhotko, 2003). Furthermore, the rates would likely be even higher if Belarus conformed fully to the WHO definition (i.e., if they did not impose further restrictions based on gestation, birthweight, and length).

Population count data

Coverage and Completeness

Data on population cover all permanent residents of the territory of Belarus including those who are temporarily living abroad. As in most countries, the census-based component method has been used in Belarus to obtain population estimates (as of January 1st) by age, sex, and geographical sub-divisions.

Official estimates of population size for the inter-censal periods between 1959 and 1989 were produced by the Central Statistical Office of the USSR. They were based on the Soviet censuses conducted on the 15th of January in 1959 and 1970, on the 17th of January in 1979, and on the 12th of January in 1989. The population estimates since 1990 onwards have been produced by Belstat. The last census has been used as the starting point for these estimations. First, the results of the census have been adjusted to represent the population as of January 1st of the census year. Then, on the basis of population, deaths, births and migration data, post-censal population estimates have been produced incrementally for the following years. After obtaining the results of the next census, previously calculated post-censal population estimates have been adjusted retrospectively. Thus, the population counts for the period 1990-2009 represent official inter-censal population estimates adjusted in accordance with the results of the last three censuses (1989, 1999, and 2009). Population counts since 2010 are post-censal population estimates based on the 2009 Census. They will be adjusted after the results of the 2019 Census become available.

Specific Details

The reliability of population data has been affected by two major problems: age heaping and age exaggeration at advanced ages (especially pronounced in the mid-1960s), and the quality of migration statistics in the most recent period. Some discussion regarding the age heaping effect is provided in the “Data Quality Issues" section.

Although there is only weak evidence for this, there are some reasons to assume that the registration of migration in Belarus is incomplete and that the overall quality of migration statistics has deteriorated compared to the period of Soviet rule. The demise of the USSR intensified migration flows between Belarus and other neighboring countries and increased opportunities for moving abroad. High population mobility, especially in the 1990s, was accompanied by a lack of suitable technical equipment for the collection of statistical information and for dealing with other organizational and methodological problems. All of these factors made the registration of migratory movements more complicated and eventually affected the reliability of migration statistics, and consequently, the quality of population estimates. The fact that there are virtually no controls on the border between Belarus and Russia complicates the situation, especially with regard to the registration of emigration.

A comparison of the official post-censal population estimates based on the 1989 census with the adjusted inter-censal estimates based on the 1989

and 1999 censuses points to an overestimation of total population size during 1990-1998, ranging from 0.2% in 1990 to 1.1% in 1998. Almost the same pattern remained for the next inter-censal period, namely 2000-2008. During this period, the overestimation of total population ranged from 0.2% in 2000 to 1.5% in 2008. The overestimation of the total population is consistent with the above-mentioned problem of under-registration of out-migration in Belarus.

BIRTH COUNT DATA

Coverage and Completeness

The national law requires that birth be registered within three months of occurrence. 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. The registration of a stillbirth or a newborn who died during the first seven days of life is based on the information provided within three days of occurrence by a medical institution. 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. Afterwards, the birth count is recorded in accordance with established procedure.

The completeness of birth registration in Belarus has depended predominantly on the parents' willingness to register the birth of their child, which is strongly motivated by the possible financial and legal consequences of non-registration. Thus, it can be assumed that the registration of birth during the entire period has been satisfactorily complete. Nonetheless, because the definition of a live birth differs from the one used by the World Health Organisation (WHO), the number of live births is probably under-estimated (see below for details).

Specific Details

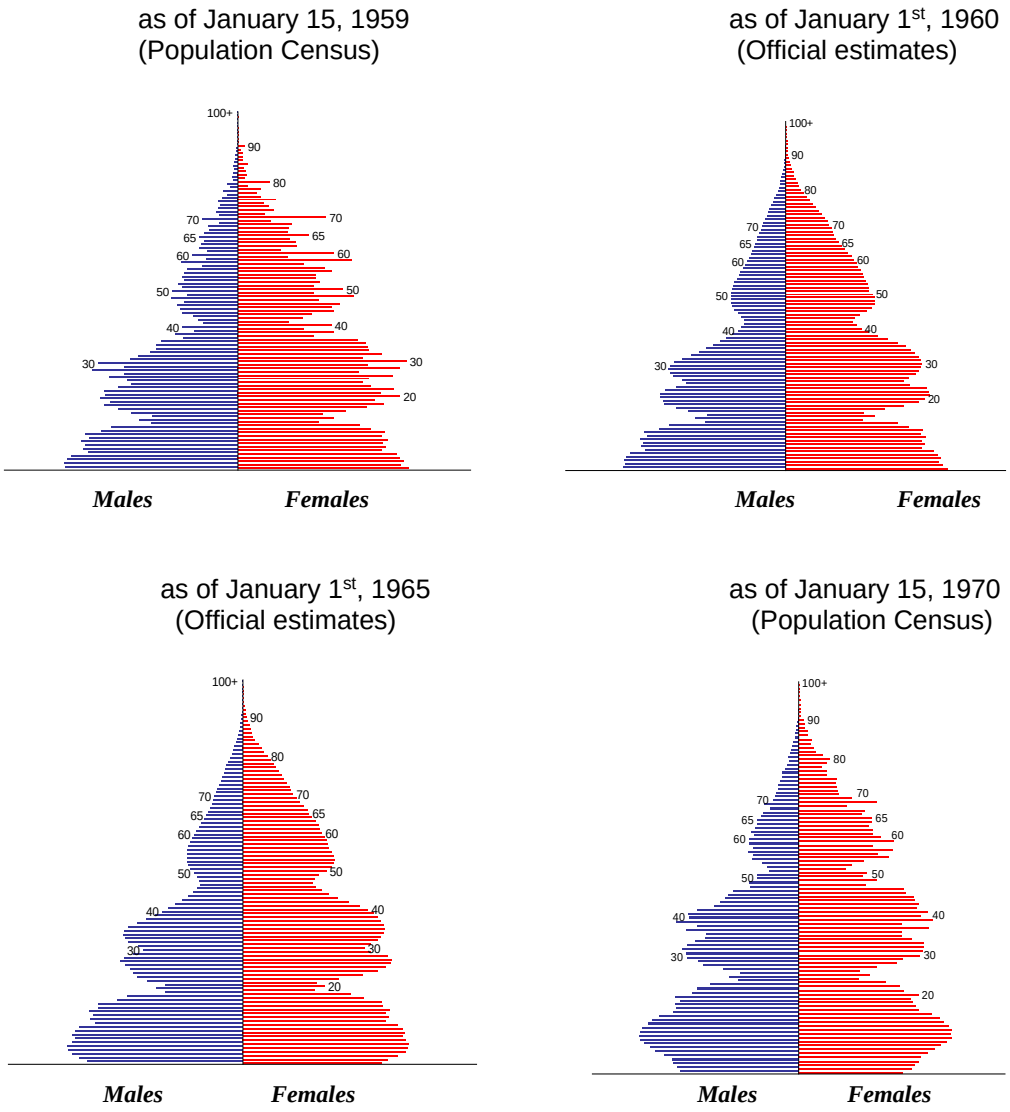
Until 1993, Belarus used the Soviet definition of a live birth. As stated by this definition, infants born before 28 weeks of gestation, weighing less than 1000 grams or measuring less than 35 centimeters were not counted as live births if they died before completing the first seven days of life. Consequently, live births were undercounted. In 1994, Belarus started using a new definition that is closer to the WHO definition of live births. According to this new definition, live births are defined as products of conception when: i) the birthweight is greater than 500 grams, the length is 25 centimeters or more, or the duration of gestation is at least 22 weeks, and ii) the newborn breathes or shows any other evidence of life. Notably, even this definition excludes some live births as defined by WHO (i.e., those newborns who exhibited signs of life, but weighed less than 500 grams, measured less than 25 centimeters, and whom period of gestation was less than 22 weeks).

DATA QUALITY ISSUES

The data prior to 1970 should be used with extreme caution due to data quality issues

Analysis of the official data for Belarus revealed some systematic inconsistencies, especially for the 1960s. Figure 1 depicts the most obvious of these, namely age heaping:

Figure 1. Age-sex structure of the Population of Belarus

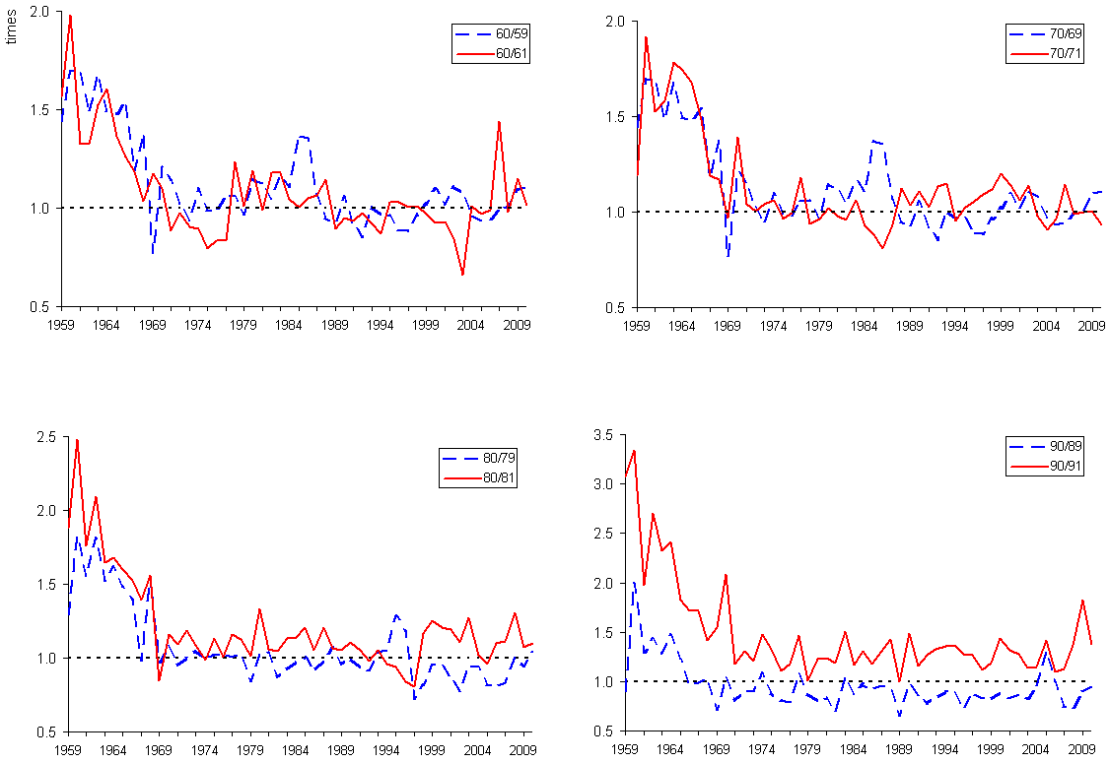


Clearly, the data from the 1959 census suffered from age heaping, especially among females. The same is true (but to a lesser extent) for the 1970 census. In an effort to eliminate this problem, a smoothing procedure was used by TsSU to produce the official post-censal population estimates for 1960-1969. However, this practice resulted in severe inconsistencies between the data obtained from the two successive censuses and the inter-censal population estimates. For these reasons, the official population estimates for

1960-1969 were not used for the present calculations; new inter-censal population estimates were computed using the Human Mortality Database methodology (see the *Methods Protocol*) instead. For similar reasons, new inter-censal population estimates for 1970-1979 were produced as well.

Age heaping of deaths at old ages is a widespread problem among mortality statistics in the former Soviet Union (Anderson & Silver, 1997). This problem has also been found in mortality data for Russia, The Ukraine, and the Baltic States (see the HMD *Background and Documentation* files for these countries). A similar analysis was conducted on the Belarusian data. Heaping in the age at death may be detected visually by plotting the ratios of the number of deaths at selected old ages (60, 70, 80, and 90) to the number of deaths in the adjacent ages (Figure 2).

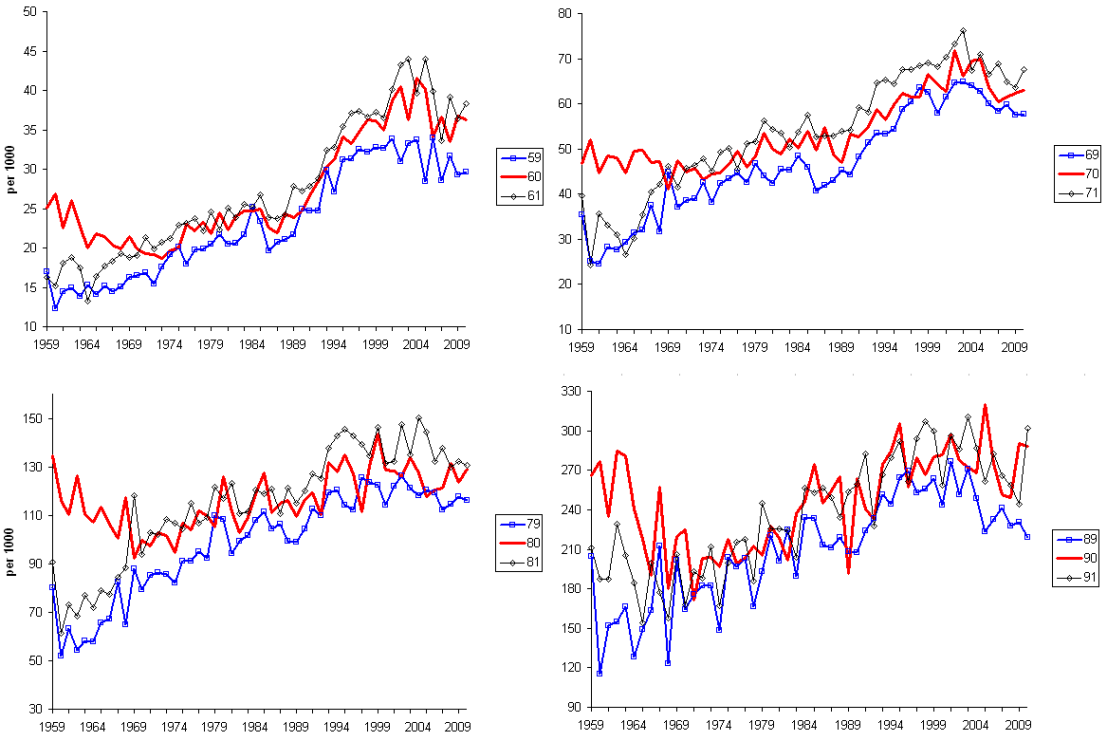
Figure 2. Ratios of the number of deaths at selected ages, Belarus, Males, 1959-2010



The graphs above show evidence of age heaping prior to 1970. The unusually high ratios observed during the 1960s are very likely the result of age attraction. As would be expected, the magnitude of the problem is greater for ages 80 and 90 than for ages 60 and 70. The same is true for the female population (results of this similar analysis not presented here).

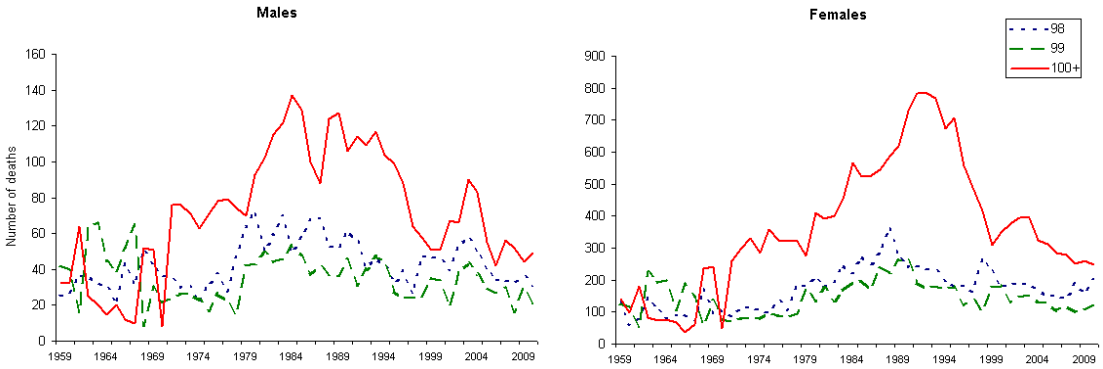
Such heaping in the age at death may also result in the overestimation of the age-specific death rates for ages 60, 70, 80, and 90. The implausibly high death rates for these ages in 1959-1970 points to a problem of age heaping at that time (Figure 3):

Figure 3. Age-specific mortality rates for selected ages, Belarus, Males, 1959-2010



The analysis of mortality data for Russia and Ukraine revealed several problems regarding the consistency of data on the number of deaths at ages 98, 99, and 100+. A similar analysis was performed to determine whether the Belarusian data exhibit the same problems. Figure 4 shows trends in the number of deaths at these ages during the period 1959-2010. Between 1959 and 1970, for both males and females, the number of deaths at age 99 is higher than would be expected given the counts at ages 98 and 100+. Given the very small number of recorded deaths at these ages (typical for small populations), it is possible that such trends are the result of random variations. Alternatively, there may be problems of age misreporting. Several hypotheses explaining the possible reasons for such errors are described in the HMD *Background and Documentation* file for Russia. In order to avoid possible inconsistencies, it was decided to aggregate deaths for ages 99+ prior to making further calculations.

Figure 4. The number of deaths at ages 98, 99, and 100+ by sex; Belarus, 1959-2010



REVISION HISTORY

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 will not be further updated in the future.

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APPENDIX I
LEGAL ACTS ON POPULATION STATISTICS IN BELARUS

in chronological order

Ministry of Health of Belarus and State Committee for Statistics and Analysis of Belarus (09.11.93). Decree № 254/75 “On shifting to the WHO criteria of live birth and still birth”. *[Постановление Министерства Здравоохранения Республики Беларусь и Государственного Комитета по Статистике и Анализу Республики Беларусь от 9 ноября 1993 г. №254/75 "О переходе на рекомендованные Всемирной Организацией Здравоохранения критерии живорождения и мертворождения"].*

The Code of the Republic of Belarus on Marriage and Family (1999). Chapter V “Civil Acts”. *[Кодекс Республики Беларусь о браке и семье (1999). Раздел 5 “Акты гражданского состояния”]*
Available in Russian at http://arc.pravoby.info/documentd/part5/aktd5834.htm

Ministry of Justice of Belarus (31.07.2000). Decree №16 “On the approval of the Instruction about the order of the fulfillment of civil acts registration”. *[Постановление Министерства Юстиции Республики Беларусь от 31 июля 2000 г. №16 “Об утверждении Инструкции о порядке совершения записей актов гражданского состояния”].*
Available in Russian at http://www.levonevski.net/pravo/razdel8/num3/8d3873.html

Ministry of Statistics and Analysis of Belarus and Ministry of Justice of Belarus (03.09.2001). Decree №75/18 “On the approval of the rules of the transfer by the civil registration offices of the second duplicates of the vital events records to the bodies of State statistics, and the order of their transfer by the bodies of State statistics to the archives of ZAGS”. *[Постановление Министерства Статистики и Анализа Республики Беларусь и Министерства Юстиции Республики Беларусь от 3 сентября 2001 г. №75/18 “ Об утверждении правил передачи органами ЗАГСа вторых экземпляров записей актов гражданского состояния в органы государственной статистики и порядка их направления органами государственной статистики в архивы органов ЗАГСа”].*
Available in Russian at http://arc.pravoby.info/documentc/part5/aktc5381.htm

The Law of the Republic of Belarus “On State Statistics” (29.10.2004).
Available at http://belstat.gov.by/homep/en/about/lawtext.php

APPENDIX II

DESCRIPTION OF THE ORIGINAL DATA USED FOR HMD CALCULATIONS

DEATHS

Period	Type of Data	Age grouping	Comments	RefCode(s)
1959-2018	Annual number of deaths by sex and single year of age (1x1)	0, 1, …., 99, 100+, unknown	For the purpose of our calculations, the age groups 99 and 100+ have been aggregated into ages 99+ (see "Data Quality Issues" section for details).	03–05 11 13 17 20 22 25 29

POPULATION

Period	Type of Data	Age grouping	Comments	RefCode(s)
1959, 1970	Census counts (as of January 15th) by sex and single year of age. Actually present (*de facto*) population.	0, 1, …., 99, 100+, unknown		06
1979	Census counts (as of January 17th) by sex and single year of age. Permanent resident (*de jure*) population.	0, 1, …., 99, 100+, unknown		06
1989	Census counts (as of January 12th) by sex and single year of age. Permanent resident (*de jure*) population.	0, 1, …., 99, 100+, unknown		06
1980-1988, 1990-2019	Annual population estimates (as of January 1st) by sex and single year of age, Permanent resident (*de jure*) population.	0, 1, …., 99, 100+		08 09 10 16 19 23 26 30

APPENDIX II (CONT.)

BIRTHS

Period	Type of Data	Comments	RefCode(s)
1959-2018	Annual number of live births by sex		01 02 12 15 18 21 24 28

BIRTHS BY MONTH

Type of data: Annual live birth counts by month

Period covered: 1964–1990, 1997–2016

RefCodes: 27