ABOUT MORTALITY DATA FOR UKRAINE

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GENERAL

Since 1997, the State Committee of Statistics of the Ukraine has been in charge the collection and primary processing of population statistics. It was founded on 29 July 1997 by decree №734/97 of the President of Ukraine. The State Committee of Statistics has 25 regional and 495 district subdivisions that collect census and micro-census data at the regional level as well as conducting various statistical surveys. The information about individual life events (births, marriages, divorces and deaths) is collected by the bureaus of civil status registration. They do not belong to the structure of the statistical organization and are included in the structure of the Ministry of Justice of Ukraine.

Population statistics in the Ukraine has a long history and stable tradition. The first surveys/micro-censuses were conducted in some regions of the Ukraine in the mid-19th century. However, they were spontaneous and didn't have a strong statistical basis. The first official population census in the Ukraine was conducted in 1897 as part of the first general population census of the Russian Empire.

The demographic development of the Ukraine in the 20th and beginning of the 21st century was affected by long and short-term factors. The first one was global changes in overall population trends. The short term factors include crisis events: World War I and the subsequent civil war and epidemics (1914-1919), famine in 1923 and 1932-1933, mass repressions in 1930s, World War II (1939-45), population deportation since the 1940s, and famine in 1947.

Mesle et al. (2003) estimated mortality during 1920-40 in the Ukraine using acts of civil status, censuses of 1926,1937, 1939, and 1959, population figures of forcibly displaced persons, and statistics of "GULAG". This study demonstrates population losses and shows an increase of mortality during this time.

During 1914-1920, the population losses in the Ukraine were between 3 and 4 million (in total). For 1929-1939, it was 4.6 million. Total population losses of the Ukraine in 1929-1959 were 13.8 million as result of social catastrophes and huge migration during new lands reclamation in Kazakhstan.

Demographic catastrophes in the first half of 20th century had a great influence on population structure and reproduction indices as well as on the social and economic development of the Ukraine.

The materials from the 1897, 1920 and 1926 censuses can be found in the State archives of Russia. M.V. Ptoukha (1960) and Y.A. Kortchak-Chepurkovskiy (1928) republished some of these data. The results from the "repressed" census of 1937 were published and became publicly available only in 1989 (Thaplin, 1989). Since the 1920s, Ukrainian population statistics can be considered the best in the USSR.

Nevertheless, its quality is not reliable before 1959. Moreover, the construction of a continuous series through war is not possible for the Ukraine. Data for 1959-1969 has a better quality but should be used with caution (see “Data Quality Issues” section for details).

The first census after the Second World War was conducted in the Ukraine on 15 January 1959 as part of the USSR population census. Subsequent censuses were conducted every 10 years: 15 January 1970, 17 January 1979, and 12 January 1989. Only the 1959 and 1970 censuses were published and became widely available. The materials from the 1979 and 1989 censuses were published as special statistical collections with the restriction “for service use only.” After the collapse of the Soviet Union, the first Ukrainian population census was carried out on 5 December 2001. The results of this census were published in entirety and are available as a special statistical collection in the electronic and printed form.

The inter-censal population estimates were published first in 1988 and since 1991 have been published annually as the collections of the State Statistics Committee of Ukraine.

Currently, vital statistics are compiled by State Committee of Statistics based on data from the bureaus of civil status registration. Before 1988, only crude birth and death rates were freely available to the society. Other information was spread across various institutions in the form of special collections for service use only. Since 1993, vital statistics data have been published annually in “Population of Ukraine.” Under the same title, the State Statistics Committee of Ukraine - in collaboration with the Institute of Demography and Social Studies - publishes the annual analytic reports since 2003.

Source of data

The mortality data that can be included in the HMD are available since 1959. The main part (for the period from 1959 until 1989) is kept by the State archives of Ukraine. Data for the last 15 years (from 1990 to 2005) are available in the form of manuscripts by the State statistics committee of Ukraine and in the annual statistical reports “Population of Ukraine.” In addition, a detailed mortality database (including causes of deaths) for the Ukraine during 1924-2000 was compiled by Mesle et al. (2003).

TERRITORIAL COVERAGE

The territory of the Ukraine during the last century changed many times. In 1920, the Ukrainian People’s Republic gave up their western lands to Poland. In 1939 according to the secret protocol between the Germany and USSR the West Ukraine was incorporated back into the territory of Ukraine. In 1945, Czechoslovakia signed a treaty with the USSR according to which the Transcarpatian Ukraine was included in the Soviet Ukraine. In 1954, the Crimea was ceded from the Russian Soviet Federal Republic to the Ukrainian Soviet Republic. All these changes occurred before 1959 and do not affect population estimates in the HMD. After the collapse of the USSR in 1991, the Ukraine became independent without any territorial changes.

DEATH COUNT DATA

Coverage and Completeness

By law, the registration of death must be done no later than three days after the death or disclosure of a dead body. In cases where it is impossible to obtain the certificate from a medical institution or judicial-medical expert, the registration must be completed within five days. Death is confirmed by the medical certificate of death issued by the medical institution, court decision about the fact of death, or by announcement of the person being dead.

The individual mortality data registered in bureaus of the civil status registration are summed up in the regional statistical subdivisions as a complex of special tables that reflects in detail the mortality structure by sex, age, type of residence (urban or rural area) and cause of death.

A substantial proportion of births with a higher risk of infant death are excluded from live births according to a restricted definition of live birth that is not comparable with countries using the WHO definition of live birth (see section "Birth Count Data" for more details).

Specific details

Until 1990, the death registration in the Ukraine was reliable. However, the mortality data in certain age groups, in particular at age under 1 and those from some causes of death (the 13 most dangerous infections including typhoid, plague, cholera, anthrax, and also deaths that occurred at the workplace) were distorted or carefully kept secret. According to N.M. Levchuk (2002), because of the restricted definition of live birth the number of unregistered deaths of newborn babies is estimated at 23%. These deaths were registered as spontaneous abortions.

Since 1990, because of the total liberalization in all spheres of life in Ukraine, the controls on gathering primary death information weakened and the quality of death statistics decreased. The share of deaths with unknown age increased. A serious problem, which distorts the mortality statistics, was the difficulties in registration of deaths in the rural areas in time. Such unregistered deaths were not included in the official statistics at all.

POPULATION COUNT DATA

Coverage and completeness

Population figures by age and sex are based on the materials of 1959, 1970, 1979, 1989, 2001 censuses. After summing up of the primary census results, the age- and sex-specific numbers of all population groups without exception (including the population that lives temporarily in the Ukraine) are adjusted to nearest 1st January using a special recounting procedure. In the period after censuses, the population estimates were calculated based on the age-sex population structure at the beginning of the year and vital statistics at the end of the same year. These post-censal estimates were recalculated once data from next census became

available. These intercensal estimates were done using special methods. All censuses covered the *de facto* population.

In the periods between censuses, the population dynamic was more or less smoothed. It promoted high accuracy of population estimates during the Soviet period of well-organized population movement registration. The period before the first Ukrainian census of 2001 coincided with the socio-economic transformation that radically changed the demographic processes themselves and the means and possibilities of their registration. It resulted in serious discrepancies between the results of the 2001 census and estimated population.

At the conceptual level, the difference between the 2001 census counts and the population estimates (census population 463,200 smaller than the estimates produced prior to the census) resulted from undercounting migrants (mostly emigrants) (for details see Gladun, 2002). The influence of other components (undercounting of births and deaths) on these discrepancies are unknown. The difference among all types residence is estimated at -0,95% of the total population (-2.25% in urban areas and +1,8% in rural areas).

The difference between deviations in urban und rural areas can be explained by undercounting of emigrants from urban areas and immigrants to rural areas. The undercounting of the population withdrawal in the urban areas resulted from under-registration of migration abroad, especially to the Commonwealth of Independent States. That is, some people went abroad for the earnings, but maintained a dwelling and citizenship in the Ukraine in the hope of returning home.

Specific Details

An additional source of data about the age-specific death numbers and population structure up to 2000 is presented in F. Mesle et al. (2003) Nevertheless, taking into account the significant differences between the estimated population and 2001 census, the data from Mesle et al. for 1989-2000 need to be corrected.

BIRTH COUNT DATA

Coverage and completeness

The registration of live births in Ukraine (like in many post-Soviet and former communist countries) differs from conventional western practices and the WHO recommendations. According to the Soviet definition of live birth (launched before the Second World War), a live birth is officially registered by the statistical system if the gestation period is 28 weeks or longer, the body mass at birth is 1000 g or higher, the body length is 35 cm or longer, and the newborn breaths. Such a restrictive rule leads to underestimation of births and population at age 0 and also to underestimation of neonatal mortality by about 50% and infant mortality by about 25% (Anderson and Silver, 1986, Blum and Monnier, 1989, Velkoff and Miller, 1995).

The current birth statistics are complied by the state statistical agency on the basis of the bureaus of the civil status registration data. By law, the registration of each birth must be done no later than one month after the

birth. In Soviet times, when there was a system of obligatory pregnancy registration at the medical institution, the expected birth was recorded long before the birth actually occurred. The cases of delayed birth registration were very rare; they were usually registered within 1.5 to 2 months after the birth because a woman had to present the birth certificate within two months after giving birth in order to obtain the payment for maternity leave and to legalize the leave for taking care of a child. The statistical system accounted for the so-called "thirteenth month" by a delay in compiling the final reports in order to allow for tardy information about the number of births occurring in the given year.

In the period of socio-economic transformation the amount of payment for maternity leave became paltry, female unemployment (obvious and latent) has increased, and the quality of the gratuitous medical assistance for the pregnant and delivering women sharply declined. Consequently, there was less incentive for pregnancy registration in the medical institutions. Reductions in the pre-school education system induced by the fertility decline limited the opportunity to use this service for many families. As a result, many parents, especially in the rural areas, do not register a birth until an official certificate of birth is needed. It happens sometimes when the child reaches school age, and sometimes it doesn't happen at all. As a result, in the beginning of 1990s the statistical bodies of Ukraine changed to a system of recording births by date of registration rather than by date of birth.

DATA QUALITY ISSUES

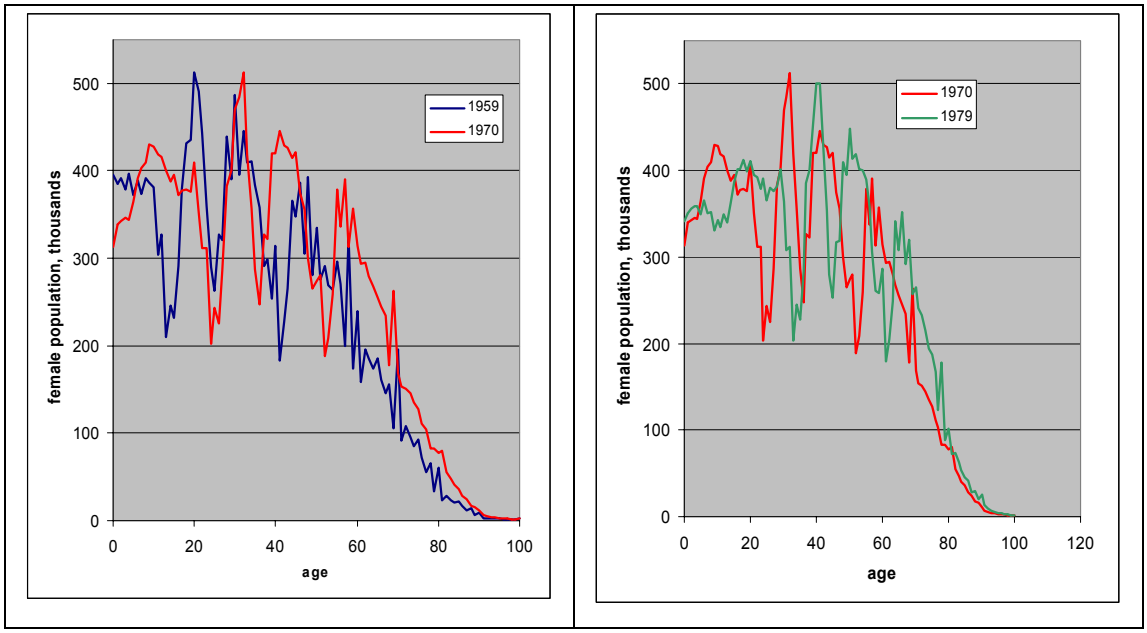
The data prior to 1970 should be used with extra caution due to problems of data quality.

Ukrainian data on death and population counts cover the period 1959-2005. However, for the estimation of mortality surfaces in HMD, the official population estimates were used only for the period 1970-2005.

Problems regarding the population census of 1959 and official population estimates for the 1960s, 1970s and 1980s

Ukrainian data prior 1990 have the same problems as data for other ex-soviet republics (see also *Background and Documentation* files for Russia, Lithuania, and Latvia). Our first concern is with the population census data for 1959. Figure 1 shows that substantial and inconsistent fluctuations in population numbers by age are much less pronounced in the census of 1970 (this is also true for the subsequent censuses of 1979, 1989 and 2001). Thus, we can argue that reliability of the registration of age is questionable in the case of the 1959 census.

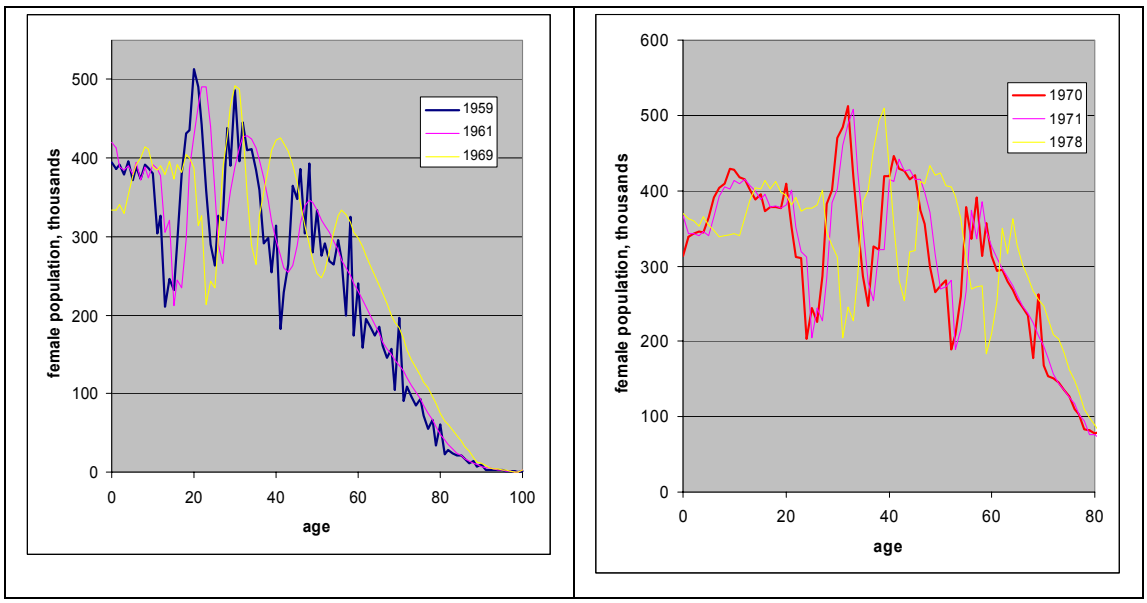
Figure 1. Fluctuations in the numbers of the Ukrainian female population by age: differences between the censuses in 1959, 1970, and 1979.



<u>Comment.</u> Substantial peaks in the number of females (for example, at ages 60 and 70) identified in the census 1959 data are missing at the corresponding ages (71 and 81) in the subsequent census of 1970. In contrast, all peaks in the 1970 census counts are also present (for the corresponding cohort) in 1979.

Significant inconsistency has also been revealed between the census data (1959 and 1970) and the official population estimates for the 1960s. It is clear that smoothing procedures have been applied after age of 20 in order to produce the population estimates (Figure 2). Therefore, we calculated our own inter-censal population estimates for the period 1960-1969 using HMD methods (see Methods Protocol for details). However, even these new population estimates for the 1960s should be treated with caution due to possible quality problems with the census of 1959.

Figure 2. Inconsistencies between the data from population censuses and official population estimates in 1959-1969

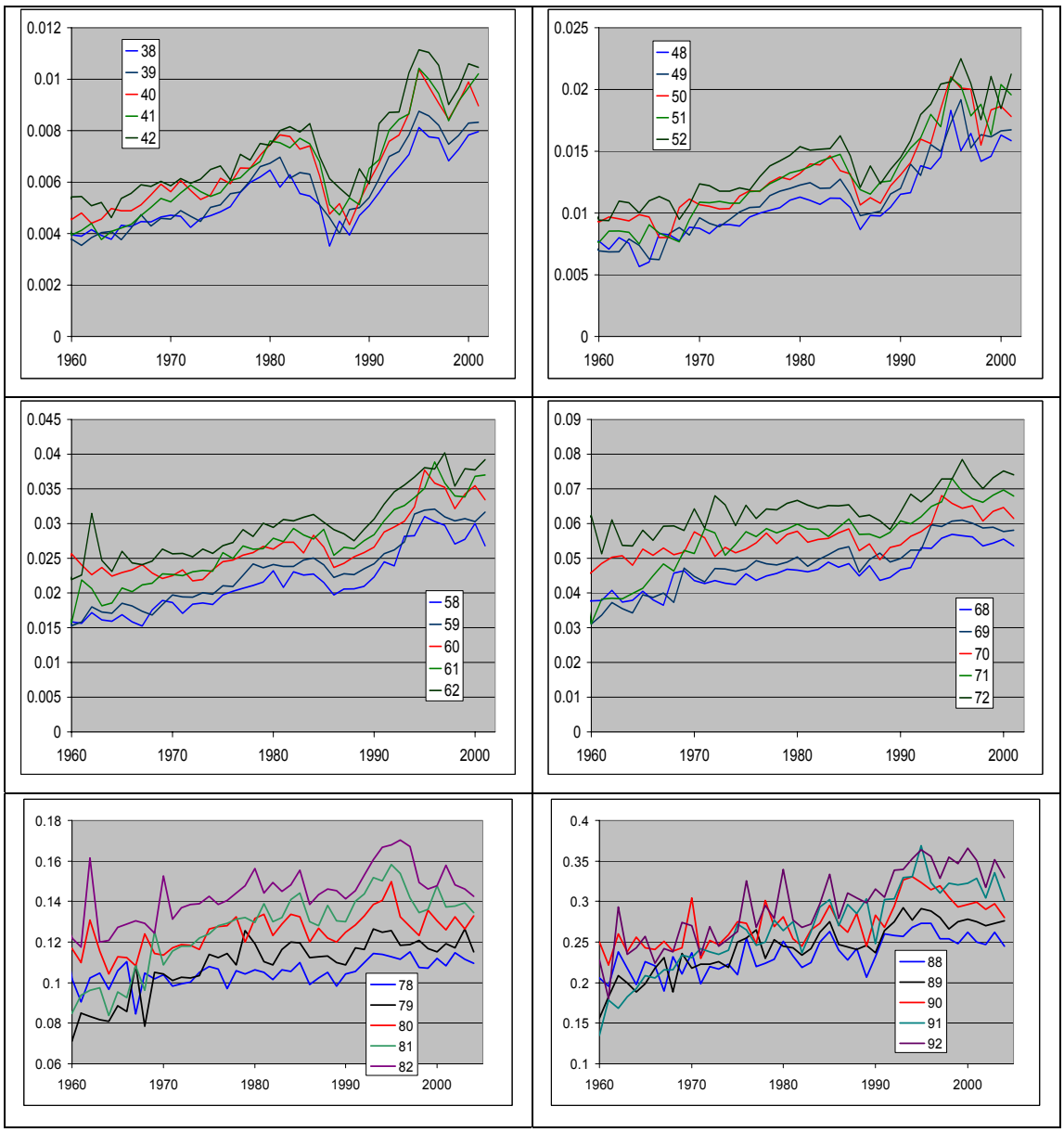


Comment. The official inter-censal population estimates for the period 1960-1969 appear to have been smoothed after age 30 as significant fluctuations in the number of females in the corresponding age interval are present at the censuses of 1959 and 1970 but not in the population estimates for 1961 and 1969 (see Figure 2, left). In 1970s, inter-censal estimates correspond to census data with one exception: age heaping for cohort born in 1900 is smoothed (Figure 2, right).

Age heaping in deaths

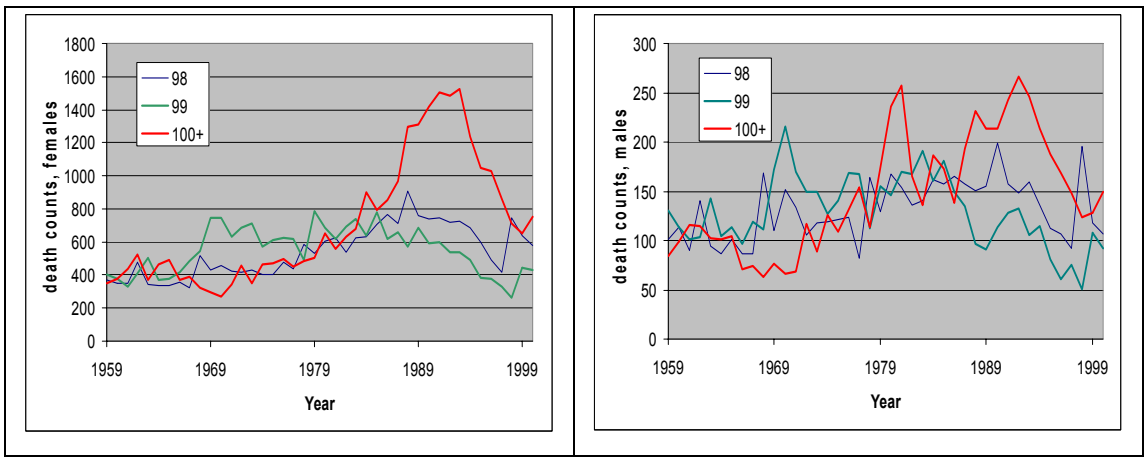
Age heaping at older ages is often considered one of the most serious problems with mortality statistics in the former USSR (Anderson, Silver, 1997). For example, Zakharov has shown that age heaping is very pronounced at ages 70, 80 and 90 in the Russian data for the period before 1970 (see the HMD *Background and Documentation* for Russia). Using the same procedures, we performed a similar analysis for Ukraine. Our results suggest that there may be some age heaping prior to the mid-1960s. Figure 3 shows that mortality at ages 40, 50, 60, 70, 80, and 90 seems to be higher than at most ages in between.

Figure 3. Mortality rates for selected ages, Ukraine, males, 1960-2001



As in the case of Russia, we have also found a substantial peak in number of deaths at age 99 in the beginning of the 1960s and in 1970s. At the same time, fewer deaths were registered at age 100+ (Figure 4). In the mid-1990s the situation was exactly the opposite: very few deaths were recorded at age 99, but considerably greater numbers were found for neighboring ages 98 and 100+. It seems that in the both cases these inconsistencies could be related to some specifics of the death registration procedures (several hypotheses on the issue are presented in the *Background and Documentation* for Russia). To avoid possible fallacies, we decided to use 99+ as the open-ended age interval in 1959-1989 for further calculations.

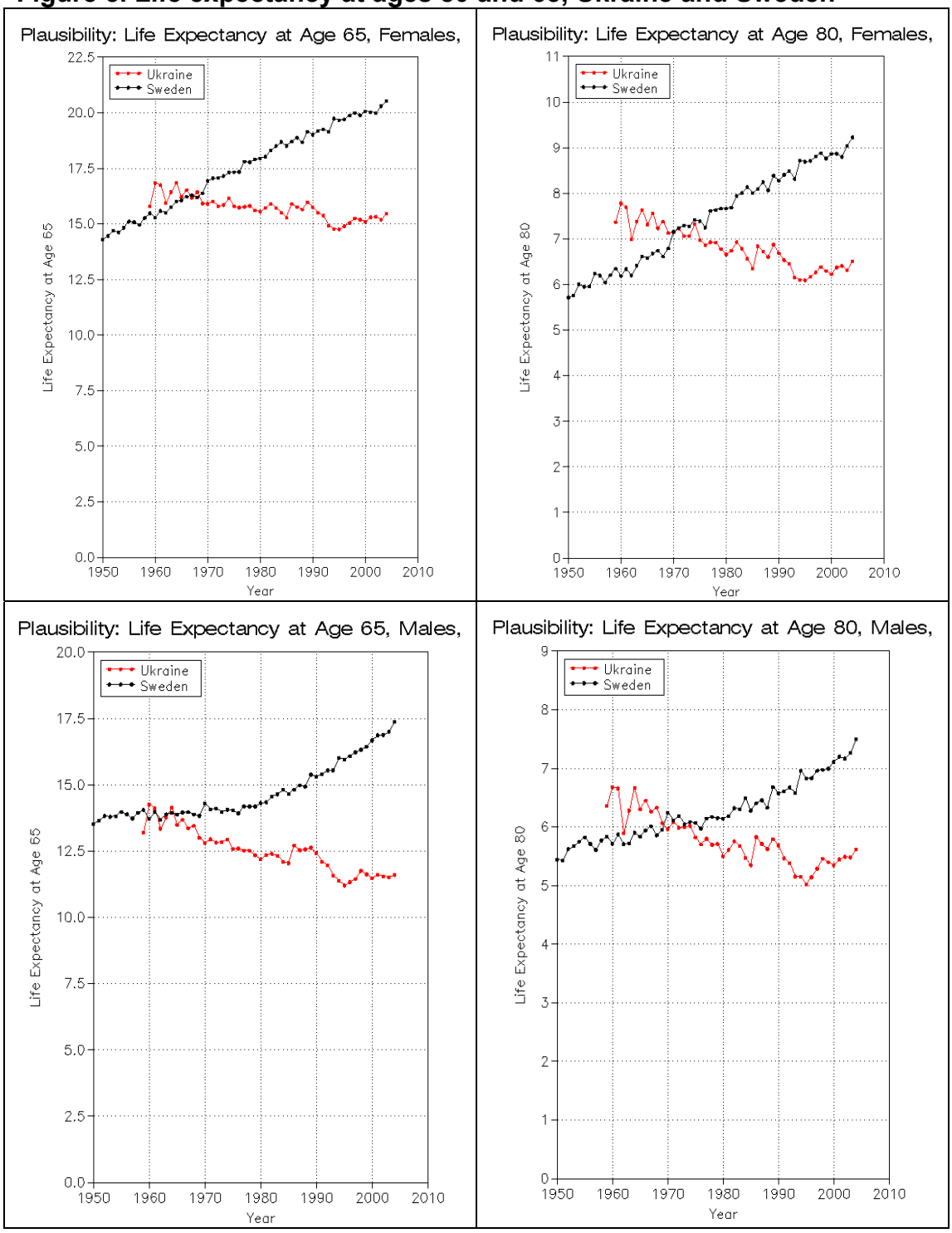
Figure 4. Number of deaths at ages 98, 99 and 100+, Ukraine, 1959-2000



Old ages

There are serious fallacies in the official estimation of the population of elderly men and women reported by the GOSKOMSTAT (Central Statistical Office of the USSR), especially for persons over 80. As a result, changes in the size of the elderly population and, correspondingly, old-age mortality rates, become highly irregular and unjustified. The official data appear to be increasingly problematic as age increases. These fallacies could be of methodological nature and, most probably, have to do with the use of the wrong model to approximate migration among very old people. These problems are partly solved by using the extinct (or almost extinct) cohort method to derive HMD population estimates. Nevertheless, our results suggest that during the 1960s life expectancy at age 80 was notably higher in the Ukraine than in Sweden, which seems extremely implausible (Figure 5). Thus, we expect that prior to 1970, the population at older ages is overestimated and thus, death rates are underestimated.

Figure 5. Life expectancy at ages 80 and 65, Ukraine and Sweden



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APPENDIX 1:

DESCRIPTION OF DATA USED FOR LEXIS DATBASE

DEATHS

Type of data: Annual officially registered number of deaths by age and sex compiled from the death certificates.

Age grouping: See table below.

Period covered: 1959 – 2005

RefCodes: 10, 11, 43, 44

Comments: No adjustments have been made to the raw mortality data.

Period	Type of Data	Age Grouping	Comments	RefCodes
1959-2001	Annual number of deaths by sex and age (1x1 rectangle)	0, 1, …, 99, 100+, unknown age		10,11
2002-2004	Annual number of deaths by sex, age and birth cohort (Lexis triangle)	0, 1, …, 100+		43
2005	Annual number of deaths by sex and age (1x1 rectangle)	0, 1, …, 99, 100+		44

POPULATION

Type of data: *De facto* population at the moment of census for 1959; *De jure* population adjusted to the 1st of January for the census years 1970, 1979, 1989 and 2001; estimated *de jure* population on the 1st of January for the periods between the censuses

Age grouping: For the *de facto* population at the moment of census – single age groups (0, 1, …, maximum age attained); for the estimated *de jure* population on the 1st of January – single age groups (0, 1, …, 99, 100+)

Period covered: 1959 – 2006

RefCodes: 19, 20, 21, 22

Period	Type of Data	Age Grouping	Comments	RefCodes
1959	Census counts of population as of 15 January 1959, by sex and single year of age	0, 1, …, maximum age attained		19
1970, 1979, 1989	Census counts of population adjusted to the 1st of January of the corresponding year, by sex and single year of age	0, 1, …, 99, 100+		20
1960-1969, 1971-1978, 1980-1988, 1990-1991	Annual population estimates as of the 1st of January, by sex and single year of age	0, 1, …, 99, 100+		21

Period	Type of Data	Age Grouping	Comments	RefCodes
1992-2005	Annual population estimates as of the 1st of January, by sex and single year of age	0, 1, …, 99, 100+		22
2002	Census counts of population adjusted to the 1st of January of the corresponding year, by sex and single year of age	0, 1, …, 99, 100+	As the moment of the census 2001 fell on the 5th of December, adjustment has been made to the 1st of January 2002	23
2005	Annual population estimates as of the 1st of January, by sex and single year of age	0, 1, …, 99, 100+		24
2006	Annual population estimates as of the 1st of January, by sex and single year of age	0, 1, …, 99, 100+		25

BIRTHS

Type of data: Annual live birth count by sex.

Period covered: 1955 – 2005.

RefCode: 30