

ABOUT MORTALITY DATA FOR LITHUANIA

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GENERAL

The earliest reliable historical data on the population of Lithuania are available from the first population census of the Grand Duchy of Lithuania, which took place in 1790 (Jasas & Truska, 1979; Stankuniene, 1989). By the time of the census, so called "Handling commissions" were established, which could be considered the first official institutions responsible for collecting of statistical data in Lithuania (Jasas & Truska, 1979). Registration of vital events was very fragmentary at the time, as the parish registration system has never been established at the state level.

After the third partition of the Polish-Lithuanian Commonwealth (in 1795), Lithuania became a part of the Russian Empire and was divided into three governor's districts ("gubernias"). Following the Order on Statistics passed in 1863, statistical committees were established at the *gubernia* level in the second half of the XIX century (Gozulov, 1972). The Statistical Committee of the Russian Empire started publishing data on the population and vital events at the *gubernia* level (including the three Lithuanian governor's districts). The quality of registration of vital events was relatively poor at the time as it was usually based only on the Church records (Gozulov, 1972). Lithuania took part in the first population census of the Russian Empire in 1897. Data on population by age and sex, ethnicity, religion, occupation and other characteristics were published at the *gubernia* level following the census (Isupov, 1994; Gozulov, 1972).

Lithuania regained its independence from Russia in 1918. Several important territorial changes took place during the inter-war period (1918-1940). First, as a consequence of the war with Poland (1919-1920), a significant part of the territory where the historical capital, Vilnius, is located was lost for the period 1920-1939. It was a significant loss in terms of population: according to the data for 1931, about 18% of the total Lithuanian population resided in that region (Gaucas, 1978). Second, the Klaipeda region was regained by Lithuania in 1925, adding 145 thousand people to the total national population of 2.03 million (not including the Vilnius region) (Central Statistical Bureau, 1926, 1937). However, after Hitler's ultimatum this region was lost again when Germany took control of it in 1939. Part of the Vilnius region including the capital city was returned to Lithuania in 1939 (shortly before the country lost its independence in 1940).

During the inter-war period there were many attempts to create and maintain a fully functioning registration system of vital events in Lithuania and to systemize the statistical data according to international standards. The General Department of Statistics was established in 1919, which was reorganized into the Central Statistical Bureau in 1921. In 1923, the Population Census took place in Lithuania (except in the Vilnius region, which was under the control of Poland, and the Klaipeda region, where the enumeration of population took place in 1925). The first issue of the Lithuanian Statistical Yearbook was published in 1922 and has been published at least semi-annually since 1928. The published data on vital events were relatively detailed, including classification by age, sex, and often by other social characteristics (ethnicity, education, religion, urban/rural residence, county, etc.). However, the data on population are not reliable since the population estimates were based only on

vital events (migration was not considered at all). Thus, except for the census 1923 (it was the only census in Lithuania during the period of its independence, 1918-1940), reliable data on population are missing for the period.

Lithuania was incorporated into the Soviet Union as the Lithuanian Soviet Socialist Republic in 1940, and the Central Statistical Bureau became part of the Central Statistical Office of the USSR. The first data on vital events covering the entire territory of Lithuania became available in 1953. However, the completeness of the data is unclear because a guerilla war against the Soviet army lasted until the mid-1950s in some rural areas (Kiaupa et al., 2000). By the end of the 1950s, the Statistical Office of the Lithuanian SSR took several steps to improve the registration system following several orders from the central and local authorities, especially concerning registration of deaths (Stukonis, 1958). The statistical data on vital events were kept in the special "secret" files ("Report on the Natural Increase and Migration in the Lithuanian SSR"), which were compiled on an annual basis. Although the Statistical Office of the Lithuanian SSR has published population yearbooks since 1966, the data were available only at the aggregate level and were restricted to "internal use". Four population censuses (1959, 1970, 1979 and 1989) took place in Lithuania during the period of the Soviet rule (1940-1989). Continuous population data series based on the census data and inter-censal estimates became available on Lithuania in 1959. However, the detailed data on population (e.g., by single years of age) were never been published for the soviet period (except for the census years). They were available only from unpublished manuscripts or tables.

After the restoration of independence in 1990, the main body responsible for the population statistics in Lithuania was the Department of Statistics to the Government of the Republic of Lithuania (Statistics Lithuania). Among the first steps to improve the quality and comparability of the demographic data was harmonization of the statistics according to the international standards, which were often ignored during the Soviet period. For example, the WHO definition of live birth was adopted in 1991 and the International Classification of Diseases replaced the Soviet classification in 1992. More detailed data on vital events have become available to scientists and the public from publications such as the Demographic Yearbooks of Lithuania or other more specialized statistical abstracts published annually by Statistics Lithuania. The data on population by single years of age and by urban/rural residence have been published in the special statistical abstracts ("Lithuanian population by age groups").

Taking into account that there is no continuous and reliable data series on population and vital events before 1959, the data for the period 1959-2003 are included in the Human Mortality Database (HMD).

Source of data

Data on deaths for the period of the Soviet rule (1959-1989) have been collected at the State Archive. Statistics Lithuania has provided unpublished manuscripts with the population estimates for the 1960s, 1970s and 1980s. Newly recalculated population estimates for the period from 1989 to 2004 have also been obtained from Statistics Lithuania (in computerized datafiles). Data from the 1970, 1979 and 1989 censuses come from the published materials by the Statistical Office of the Lithuanian SSR or the Central Statistical Office of the USSR. Relevant data on

deaths and population for the 1990s come from the publications, unpublished manuscripts or computer files provided by Statistics Lithuania. Birth data have been published in the statistical abstracts on the "Natural increase and migration of the population of the Lithuanian SSR" and the "Demographic Yearbook of Lithuania 2003".

All the data for HMD were collected and prepared by V.Stankuniene and D.Jasilionis.

TERRITORIAL COVERAGE

There were no territorial changes in Lithuania during the period 1959-2003.

DEATH COUNT DATA

Coverage and completeness

It can be assumed that death registration has covered the entire territory of Lithuania since the end of the 1950s. The registration system improved by the end of the 1950s following the special orders by the central and local Soviet statistical and health authorities (Stukonis, 1958).

In general, the registration system of vital events has been very centralized in the case of Lithuania. Since the beginning of the 1990s, several new laws and orders have been passed regarding the registration of death, yet the main principles remained more or less similar to those used during the period of the Soviet rule.

The following procedure for the registration of deaths has been in force in Lithuania. First, a medical death certificate is issued by a medical or judicial institution. Afterwards the certificate has to be forwarded (usually by relatives) to the local Civil Registry office. The latter institution issues a death certificate (on the basis of the medical death certificate) and sends copies of both documents to the local branches of Statistics Lithuania. Later, copies of the medical and death certificates are forwarded to the central office of Statistics Lithuania in Vilnius, where they are checked and computerized (Statistics Lithuania, 2000).

Specific details

Two major concerns are related to the reliability of the Lithuanian death statistics during the period of the Soviet rule. The first one is related to a more restrictive definition of infant death. Until the end of 1990, the definition of infant death differed from the one by the WHO. Early neonatal deaths (i.e., within the first 7 days of life) were not registered if: the birth weight was less than 1000 g, the period of gestation was shorter than 28 weeks or the body length was shorter than 35 cm. Due to this restricted definition, a relatively significant part of early neonatal (and total infant) deaths were underreported. Since 1991, the WHO definition of infant death has been used to register infant deaths. According to some estimates, based on the experience of the three Baltic States (Lithuania, Latvia and Estonia), the shift in the registration procedures has resulted in a 23% increase, on average, in infant mortality statistics (Anderson & Silver, 1997).

A second concern is related to the quality of mortality statistics at older ages, especially before the end of the 1960s. Problems of age heaping in the former USSR have been revealed and discussed in the case of the Russia and other countries of the former USSR (Anderson & Silver, 1997; Shkolnikov, Meslé & Vallin, 1997; see also Zakharov's notes in the *Background and Documentation* for Russia). To our knowledge, no scientific study has been conducted to check the quality of the Lithuanian old-age mortality data. Our preliminary results show that there may be some age heaping at ages "60", "70", "80", "90" and "99" during the first half of the 1960s. For more details, see the section "DATA QUALITY ISSUES".

POPULATION COUNT DATA

Coverage and completeness

Four population censuses (1959, 1970, 1979 and 1989) took place in Lithuania during the period of the Soviet rule (1940-1989). One census (2001) has been conducted since the restoration of Lithuania's independence in 1990. Official population estimates as of January 1st, based on the census data and data on current deaths, births and migration were produced by the Statistical Office of the Lithuanian SSR and the Central Statistical Office of the USSR for the periods 1960-1969, 1971-1979, and 1980-1988. Newly recalculated population estimates for the period from 1989 to 2004 have been provided in the format of Excel files by Statistics Lithuania.

The official January 1st estimates for the census years 1959 and 1970 are not available to us.

All the data on population for the years 1970-2004 represent the "permanently resident" population.

Specific details

Population estimates for the 1960s are based on the census of 1959 data and births, deaths, and migration for the years 1959-1969. Both the census and population estimates correspond to the "actually present population" (Nalichnoe naselenye"). The estimates have never been published except by 5 year age groups for the period 1959-1965. However, we found that the Statistical Office used smoothing procedures in order "to improve" data after the age of 20. Furthermore, similar problems have been revealed in the cases of the official population estimates for the 1970s and 1980s. Unfortunately, we don't know what procedures have been applied by the Statistical Office of the Lithuanian SSR in performing such calculations (for more details see the chapter "DATA QUALITY ISSUES"). Therefore, for further calculations of the mortality surface we decided not to use the official estimates for the period 1960-1988.

Thus, the official population estimates have been used for the period since 1989, while for earlier years (1960-1988) we calculated new inter-censal estimates according to the HMD methodology.

New population estimates for the period 1989-2004 supercede old post-censal population estimates (1990-2001) calculated on the basis of the 1989 census. The

latter population estimates do not account for the unregistered emigration, which was substantial during the 1990s. For example, earlier published figures for the total population for the January 1, 2001 (based on the 1989 census), are about 6% higher as compared to the new ones based on the 2001 census (3692645 vs. 3486998, respectively).

Official population estimates for 2003 and 2004 are provided by single year age only to age 84. Above age 84, data are given by five-year age groups (85-89; 90-94) with an open-ended age interval for ages 95+. Normally, we use the official population estimates for cohorts that are younger than age 90 at the end of the observation period. Therefore, we had to apply a non-standard method in order to distribute population into 1x1 data for ages 85-89. Our standard method for deriving population estimates for almost-extinct cohorts who are age 90+ at the end of observation is the survivor ratio method. Thus, we apply this same method for all those above the age 84 in 2003 and 2004.

BIRTH COUNT DATA

Coverage and completeness

The registration of births has also been very centralized (as in the case of deaths). The following procedure has been in force recently. First, for each newborn a birth document is issued by a medical institution. Within 3 months this document has to be forwarded to the local Civil Registry office, where the birth is registered and the birth certificate is issued for the child (Statistics Lithuania, 2000). Afterwards, copies of the documents are to be sent to the local branch of the Statistics Lithuania. The latter institution sends the copies of the documents to the central office of the Statistics Lithuania in Vilnius, where this information is computerized and added to the special database (Statistics Lithuania, 2000).

Specific details

During the period 1940-1991, the Soviet definition of live birth was in force in Lithuania. Live birth was defined based on the following criteria: evidence of life (respiration after separation from mother's body); birth weight at least 1000 g; period of gestation 28 weeks or longer; and body length 35 cm or longer. Infants who did not meet the above-mentioned criteria and died within their first week of life were not counted as live births or as infant deaths but rather as stillbirths. Only if these newborns survived more than seven days were they registered as live births. This definition differed from that of the WHO, thus leading to underestimation of births.

The WHO definition of live birth has been used since 1991. Live birth is defined as any delivered child showing evidence of life (respiration and heartbeat) (Statistics Lithuania, 2000).

DATA QUALITY ISSUES

Lithuanian data on death and population counts cover the period of 1959-2001. However, for the estimation of mortality surfaces in HMD, the official population estimates were used only for the period 1989-2001.

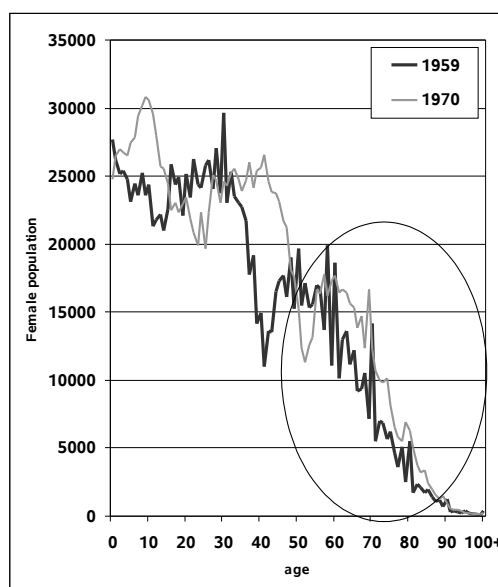
Problems around the population census of 1959 and official population estimates for the 1960s, 1970s and 1980s

Our first concern was with the population census data for 1959. Figure 1 shows that significant 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 first post-war census of Lithuania.

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 (Appendix 2, Figure 2A). Therefore, new inter-censal population estimates for the period 1960-1969 were calculated using HMD methods (see Methods Protocol for details). However, even new population estimates for the 1960s have to be treated with caution due to possible quality problems with the census of 1959.

Similar problems of apparent smoothing have been revealed in the process of checking consistency of the official population estimates for the 1970s and 1980s. Several peaks in population numbers, which are present in the censuses 1959, 1970, 1979 and 1989 are missing in the inter-censal estimates (Appendix 2, Figures 2B and 2C). Thus, we decided to also calculate new inter-censal estimates for the periods of 1971-1978 and 1980-1988.

Figure 1. Fluctuations in the numbers of the Lithuanian female population by age: differences between the census 1959 and the subsequent census of 1970.



Comment. Significant peaks in 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.

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 Lithuania. Our results suggest that there may be some age heaping prior to the mid-1960s. Figure 3 in Appendix 3 shows that mortality at ages 90, 80, and 70 seems to be higher than at most ages in between. However, due to small numbers of deaths in Lithuania, it is difficult to distinguish age heaping problems from random fluctuations in age-specific mortality rates.

As in the case of Russia, we have also found a significant peak in number of deaths at age 99 in the beginning of the 1960s and in 1979. At the same time, few, if any, deaths were registered at age 100+ (Table 1). 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 neighbouring 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* File on Russia).

These findings should be treated with caution as the number of death in the respective age groups are relatively small in the case of Lithuania. However, to avoid

possible fallacies we decided to use 99+ as the open ended age interval in further analysis of the mortality surface.

Table 1. Number of deaths at ages 98, 99 and 100+ . Lithuanian males and females, selected years.

Age	1960	1961	1962	1965	1979	1993	1994	1995	1996
98	38	35	60	38	76	110	121	97	91
99	115	137	163	111	175	15	16	11	10
100+	3	0	0	0	0	368	341	305	283

REFERENCES

Anderson, B.A., Silver, B.D. (1997). "Issues of Data Quality in Assessing Mortality Trends and Levels in the New Independent States." Pp.120-154 in: *Premature Death in the New Independent States*. Washington, DC, USA: National Academy Press.

Central Statistical Bureau. (1926). *Lietuvos gyventojai. Pirmojo 1923 m. rugsejo 17d. Visuotino gyventoju surasymo duomenys* [Population of Lithuania. Data of the first population census of September 17, 1923]. Kaunas: Central Statistical Bureau. 312 pp. [in Lithuanian and French]

Central Statistical Bureau. (1938). *Lietuvos statistikos metraštis 1937* [Yearbook of Lithuanian statistics for 1937]. Kaunas: Central Statistical Bureau. 45 pp. [in Lithuanian and French]

Gaucas, P. (1978). "Gyventoju skaičius Lietuvoje 1923-1939 metais [Population of Lithuania, 1923-1939]." Pp. 61-70 in: *Works of universities of the Lithuanian SSR. Geography and Geology*, XIV. Vilnius: Mokslas. [in Lithuanian]

Gozulov, A.I. (1972). "The state statistics in Russia during the age of capitalism." Pp.100-142 in: *Essays on the History of Statistics of the Motherland*. Moscow, Russia: Statistika. [in Russian]

Isupov, A.A. (1994). Population Census. Pp.305-314 in: *Narodonaselenye*: Moscow, Russia: Bolshaya Rossiskaya Entsiklopedya [in Russian].

Jasas, R., Truska, L. (1979). *The population census of the Grand Duchy of Lithuania in 1790*. Vilnius, Lithuania: Mokslas. 96 p. [in Lithuanian]

Kiaupa, Z., Mäesalu, A., Pajur, A., Straube, G. (2000). *Baltijos saliu istorija* [History of the Baltic States]. Vilnius: Kronta, 239 pp. [in Lithuanian]

Shkolnikov, V., Meslé, F., Vallin, J. (1997). "Recent trends in life expectancy and causes of death in Russia 1970-1993." Pp.34-65 in: *Premature Death in the New Independent States*. Washington, DC, USA: National Academy Press.

Stankuniene, V. (1989). "Demographic processes in Lithuania." Pp.22-59 in: *Demographic development of Lithuania: retrospective, recent problems, comparative analysis*. Vilnius, Lithuania: Institute of Economics of the Academy of Sciences of Lithuania. [in Russian]

Statistics Lithuania (2000). *Demographic Yearbook 1999*. Vilnius, Lithuania: Statistics Lithuania, pp.144-145.

Statistics Lithuania (2004). *Demographic Yearbook 2003*. Vilnius, Lithuania: Statistics Lithuania.

Stukonis, M. (1958). *On the registration of causes of death in the Lithuanian SSR*. Vilnius, Lithuania: Scientific-methodical bureau of sanitary statistics of the Lithuanian SSR, 12p.

APPENDIX 1:

DESCRIPTION OF DATA USED FOR LEXIS DATABASE

DEATHS

Period	Type of Data	Age grouping	Comments	RefCode(s)
1959-2003	Annual number of death to <i>de facto</i> population by sex and single year of age(1x1 rectangle).	0, 1, ..., 99, 100+, unknown	No adjustment for age heaping and underestimation has been made	LTUR04; LTUR05 LTUR18

POPULATION

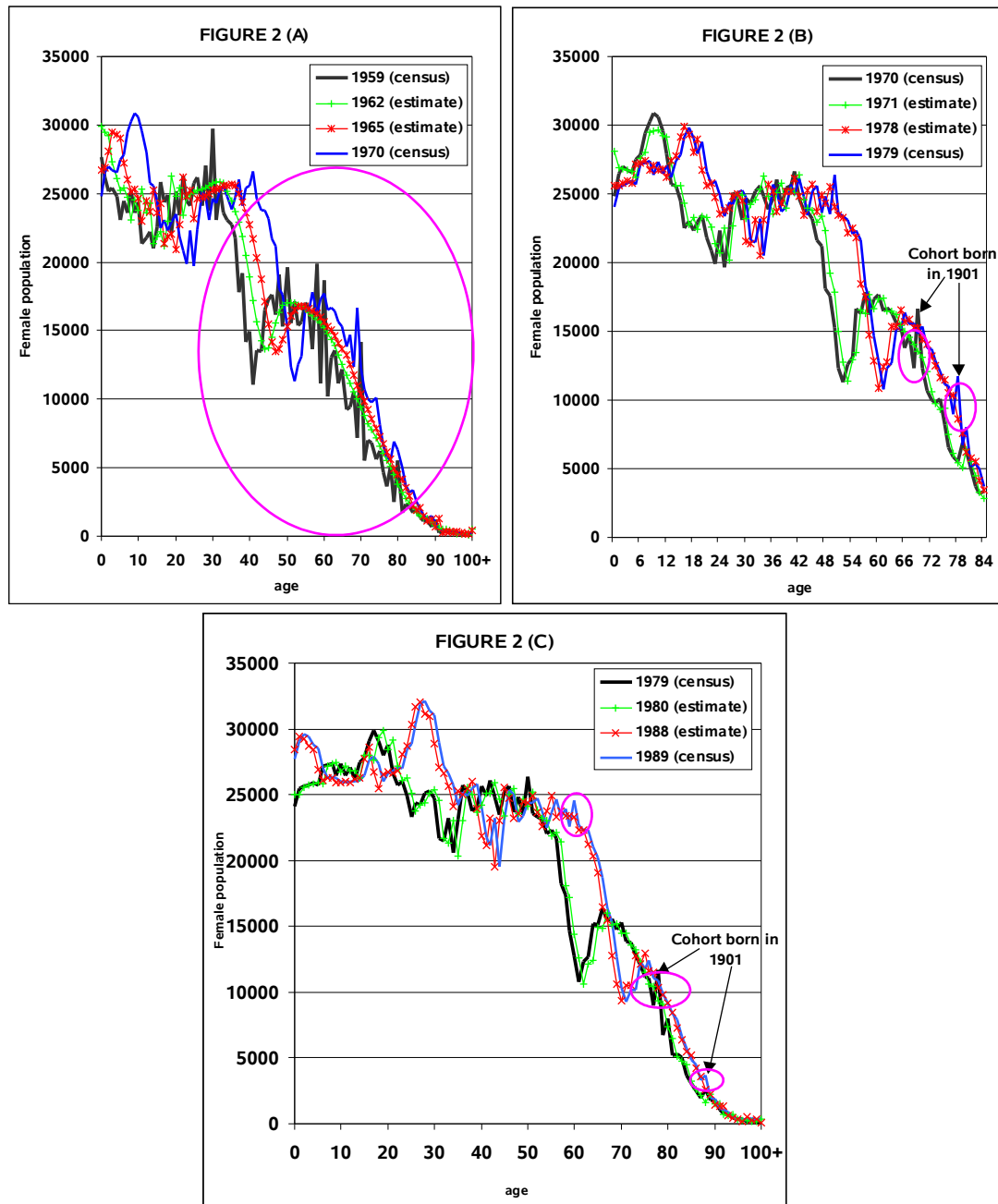
Period	Type of Data	Age grouping	Comments	RefCode(s)
1959	Census counts of population by sex and single year of age as of January 15. Actually present (<i>de facto</i>) population.	0, 1, ..., 99, 100+, unknown		LTUR06
1970, 1979	Census counts of population by sex and single year of age as of January 15. Permanently resident (<i>de jure</i>) population.	0, 1, ..., 99, 100+, unknown		LTUR09 LTUR11
1989-2002	Annual population estimates by sex and single year of age. Permanently resident (<i>de jure</i>) population.	0, 1, ..., 99, 100+		LTUR14
2003-2004	Annual population estimates by sex and single year of age. Permanently resident (<i>de jure</i>) population.	0, 1, ..., 84, 85-89, 90-94, 95+		LTUR16 LTUR17

BIRTHS

Period	Type of Data	Comments	RefCode(s)
1959-2003	Annual counts of births by sex. Actually present (<i>de facto</i>) population.	No adjustment for underestimation has been made	LTUR01 LTUR02 LTUR03 LTUR19

APPENDIX 2:

Figure 2 (A,B,C). Inconsistencies between the data from population censuses and official population estimates



Comment. The official inter-censal population estimates for the period 1960-1969 appear to have been smoothed after age 30 as significant fluctuations in numbers of females in the corresponding age interval are present at the censuses of 1959 and 1970 but not in the population estimates for 1962 and 1965 (see Figure 2A). In a similar manner, peaks due to a larger number of females in the 1901 birth cohort have been smoothed in the cases of official inter-censal estimates for the 1970s and 1980s (Figures 2B and 2C).

APPENDIX 3:

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

