

ABOUT MORTALITY DATA FOR LATVIA

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GENERAL

For some parts of Latvia (for example, for the capital city of Riga), the earliest historical data on the population is based on the parish registry and dates back to the end of the 17th century (Katus, 1999). For a long time the country was divided between the different powers (e.g. The Teutonic Order, Sweden, Polish-Lithuanian Commonwealth, Russia). Thus only very fragmentary data are available for the Latvian territory until the end of the 19th century. During the 18th century, Latvian territories were progressively incorporated into the Russian Empire (Kiaupa et al., 2000). During the period of Russian rule (until 1918), the two northern parts of Latvia (Livonia and Courlandia) together with the country's northern neighbour, Estonia, were unified into the special territorial unit called the Baltic *gubernia* (Kiaupa et al., 2000). An important development in population statistics at the time was the first publications on population at the level of province, which were produced on a regular basis throughout the second half of the 19th century (Gozulov, 1972). More reliable data on the population of Latvia (Livonia and Courlandia) originate from the first population census of the Baltic *gubernia* in 1881. Data on all three "Latvian" *gubernias* (Livonia, Courlandia and Latgalia) became available with the first Census of the Russian Empire in 1897 (Gozulov, 1972; Kiaupa et al., 2000).

The Republic of Latvia first declared independence in 1918, after which the State Statistical Office (Central Statistical Bureau of Latvia, or CSB) was established in 1919 (CSB of Latvia, 2004). The latter date also marks the beginning of a continuous demographic data series for the Latvian territory comparable to the boundaries of the present state. During the period between the First and Second World Wars, three population censuses took place (1925, 1930 and 1935). In the 1920s, the Central Statistical Bureau of Latvia began publishing statistical data on vital events and population on a regular basis. The published data were classified following international standards (e.g. the International Classification of Disease for the purpose of coding cause-of-death statistics) (Katus, 1999).

Like its neighbours, Estonia and Lithuania, Latvia was incorporated into the USSR as the Latvian Soviet Socialist Republic in 1940. Immediately after the Second World War, the Statistical Office of the Latvian SSR was established as a part of the Central Statistical Office of the USSR (GOSKOMSTAT). During the period of Soviet rule (1940-1989), few detailed data on population and vital events were published. Furthermore, following the instructions from GOSKOMSTAT, all the data that were regularly published in population yearbooks by the Statistical Office of Latvia were restricted "for internal use" only. Four population censuses (1959, 1970, 1979 and 1989) took place in Latvia during the period from 1940 to 1989. Data on population at the aggregate level are available from the special publications published during the years subsequent to the censuses.

More detailed data (e.g. by single year of age) on population and vital events were available in the format of manuscripts or unpublished tables, which were usually kept in the special "secret" reports on the population of Latvia.

After the restoration of independence in 1990, the Central Statistical Bureau (CSB) of Latvia was re-established and became the main body responsible for population statistics in Latvia (CSB of Latvia, 2004). Beginning in the 1990s, the CSB of Latvia took several steps to meet international standards for classifying demographic data. First of all, the World Health Organization (WHO) definition of live births and infant deaths was introduced in 1991. Among other major steps for improving the comparability of the demographic data was the replacement of the old Soviet classification of causes of death by the International Classification of Diseases (ICD) in 1993. The first population census after the restoration of independence took place in 2000. Following the census, new inter-censal population estimates (for the period 1990-2000) were calculated by the CSB of Latvia. They replaced the previously used post-censal population estimates, which were affected by under-estimation of unregistered emigration during the 1990s. The most recent population census was conducted in 2011. The revised inter-censal population estimates for 2001-2011 taking into account large unregistered emigration during the 2000s have been published in the online Statistics Database (<http://www.csb.gov.lv>).

From the beginning of the 1990s, data on population and vital events have become freely available to researchers and the public. Together with annual population yearbooks, the CSB of Latvia publishes special reports or statistical abstracts devoted to the specific demographic processes (e.g. mortality by cause of death, detailed data from the population census, etc.) (CSB of Latvia, 2004).

Source of Data

Official data on births, deaths, and population were provided by the Central Statistical Bureau of Latvia (as electronic data files) or downloaded from the online Statistics Database (<http://www.csb.gov.lv>). The provided data include electronic data containing unpublished demographic data for the period of Soviet rule (1959-1989). All the original data for the Human Mortality Database (HMD) were collected and prepared by the Central Statistical Bureau of Latvia under the supervision of Mr. Uldis Usackis.

TERRITORIAL COVERAGE

There were no territorial changes in Latvia during the period covered by available data (1959-2019).

DEATH COUNT DATA

Coverage and Completeness

Registration of deaths has been complete and has covered the whole territory of Latvia since the end of the 1950s. There is some evidence that Latvian data on deaths are more reliable compared to the death statistics of neighbouring Lithuania for the 1950s (Stukonis, 1958).

As in the case of other former Soviet states, the registration system of deaths as well as other vital events has been very centralised. Although several new laws on the registration of death have been passed since the restoration of Latvian independence (in 1990), the basic principles remained more or less the same as during the Soviet period. First, a medical death certificate is issued for the deceased by a medical or judicial institution. Second, on the basis of the medical certificate, a death record is compiled by the Registry Offices under the Ministry of Justice. Every month, the Registry Offices send copies of these records to the Central Statistical Bureau of Latvia in Riga (Aspinall et al., 2003).

During the years 1994-2019, the CSB of Latvia published death counts by the age reached during the year (vertical parallelograms) (with the exception of data for the year 2007, which were provided by Lexis squares). In addition, the Statistics office published official death counts for age 0 for the lower Lexis triangle. By subtracting this death count from the death counts below age one in the Lexis square, it was possible to determine the number of infant deaths in the upper Lexis triangle. Similarly, the number of deaths for the lower triangle of age 1 were estimated by subtracting the number of deaths at age 0 in the upper Lexis triangle from the number of deaths in the vertical parallelogram for age 1 (age reached during the year). Recently, the CSB Latvia has replaced earlier published official death counts classified by age reached during the year (vertical parallelograms) for 2000-2014 by deaths by single year of age (Lexis squares). This age classification has also been applied in more recent publications, for the years starting in 2015. However, deaths for 1994-1999 remain classified according to the age reached during the year (vertical parallelogram).

Specific Details

Most concerns about the reliability of the Latvian data on deaths relate to the period of Soviet rule (from the Second World War to 1989). Problems related to the under-estimation of infant mortality due to a more restrictive definition of live births (which was in force until 1990) have been widely discussed (see Anderson & Silver, 1997). According to the "Soviet" definition, early neonatal deaths (i.e., those within the first seven days of life) were not registered if the body weight was less than 1,000 grams, the period of gestation was shorter than 28 weeks or the body length was shorter than 35 centimeters. This definition was different from that proposed by the WHO and led to a substantial under-estimation of infant deaths in Latvia as well as in other post-Soviet

countries (Anderson & Silver, 1997). Since 1991, the WHO definition of live births has been used in Latvia.

Evidence from the post-Soviet countries shows that estimations of mortality at older ages (especially for the 1960s) should be treated with caution due to age heaping problems (Anderson & Silver, 1997). Nonetheless, Kannisto suggested that although the Latvian mortality data are likely to be affected by age exaggeration, they are of "conditionally acceptable quality" (Kannisto, 1994). Stukonis (1958) also pointed out that at the end of the 1950s, registration of deaths was significantly better in Latvia than in Lithuania (Stukonis, 1958). The present results support these statements: age heaping problems appear less evident in the case of Latvia than in Russia and Lithuania. For more details, see the section "Data Quality Issues". All the data on deaths were provided by the Central Statistical Bureau of Latvia as Excel files.

POPULATION COUNT DATA

Coverage and completeness

Four population censuses (1959, 1970, 1979 and 1989) were conducted in Latvia during the period of the Soviet rule (1940-1989). The first population census after the restoration of Latvia's independence took place on March 31st, 2000 and the most recent census was conducted on March 1st, 2011.

The Statistical Office of the Latvian SSR and the Central Statistical Office of the USSR (GOSKOMSTAT) produced official population estimates (as of January 1st) for the inter-census years 1971-1979 and 1980-1989. The official January 1st estimates for the period 1960-1969 are not available. The newest inter-censal population estimates for the period 1990-2011 were produced by the Central Statistical Bureau of Latvia. These official population estimates replaced the previously published post-censal estimates for 1990-2000 and 2001-2011. The new series of inter-censal population estimates take into account large unregistered emigration in the 1990s and 2000s which was not accounted for in the previously published post-censal population estimates. For example, earlier published figures for the total population on January 1st, 2011 (based on the 2000 census) are about 7% higher than the new estimates based on the 2011 census (2,229,000 vs. 2,074,000, respectively).

All the population data were provided (in the format of Excel files) by the Central Statistical Bureau of Latvia or downloaded from its online Statistics Database (<http://www.csb.gov.lv>).

Specific Details

Several problems should be considered when using the Latvian data on population. First, there was a change in population coverage from a definition using the "actually present population" to one using the "permanently resident population". The census

counts for 1959 and 1970 represent the "actually present population", whereas since 1971 the official population estimates have corresponded to the "permanently resident population". This change in definition may have been partly responsible for the apparently slight increase in mortality between 1970 and 1971.

The second problem relates to the smoothing procedures used by the Statistical Office during the period of Soviet rule. As in the case of Lithuania, some peaks in population numbers at certain ages found in the population censuses (1959, 1970 and 1979) are absent from the population estimates. We do not know what procedures were applied by the Statistical Office of the Latvian SSR in performing such calculations. Because the smoothing of population numbers at certain ages for the years 1971-1989 is less evident for Latvia than for Lithuania (see the *Background and Documentation file* for Lithuania), for those years the official population estimates are used for subsequent calculations of the mortality surface for the HMD. For the period 1960-1969, new intercensal population estimates were calculated using the HMD methods protocol (see Methods Protocol for details).

The third issue to be considered relates to official population estimates for the period 1990-2011. A significant peak in population numbers among adults born in 1972 shows in the data for 1990-1999, but not for the subsequent years 2000-2011 (including in the 2000 population census). It is difficult to determine whether this is due to a very strange but real migration pattern (affecting only one cohort) or whether it is due to an error in calculations. For more details see the section on "Data Quality Issues".

Starting from the January 1st, 2017 the Central Statistical Bureau of Latvia discontinued the practice of including into the official population counts persons who were not in fact residing within the country but who declared their workplace (enterprise registered in Latvia) as their place of residence (Statistics Latvia, 2018). This change affected a very small number of people and had no effects (disruptions or discontinuities) on the total and age-specific population counts.

BIRTH COUNT DATA

Coverage and Completeness

The registration of births is considered complete and covers the entire territory of Latvia. As for deaths, the birth registration system has always been very centralised. First, a birth document is issued for each newborn by a medical institution. Second, on the basis of this document a birth certificate is issued by the Registry Offices under the Ministry of Justice. Every month, the Registry Offices send copies of these documents to the Central Statistical Bureau of Latvia in Riga (Aspinall et al., 2003).

Specific Details

The Soviet definition of live births (which differed from that of the WHO) was used in Latvia from 1940 until 1991. Live births were defined on the following criteria: evidence of life (respiration after separation from the mother's body); birth weight of at least 1,000 grams; gestational period of 28 weeks or longer; and body length of 35 centimeters or longer. Newborns who did not meet all of these criteria and died within the first week of life were not registered as live births nor as infant deaths but as stillbirths. These newborns were registered as live births only if they survived for more than seven days. This restricted definition of live births has led to an underestimation of births (and infant deaths). As in the other two Baltic States (Lithuania and Estonia), Latvia started using the WHO definition of live births in 1991.

Since 2000, the number of live births also includes those occurring abroad to women who have been residing outside of Latvia for less than a year.

For the years 1948-1950, 1952, and 1956-1959, the total number of live births stated in the birth-of-month statistics does not correspond to the total number of live births by year published by CSB Latvia. Since only the proportional distribution of births by month is used, rather than the absolute number of births (which is taken from the birth-by-sex file), this discrepancy has not been corrected.

DATA QUALITY ISSUES

Although population counts for 1959 and 1970-2014 were available, it is unclear whether population estimates have ever been calculated for the 1960s. In the case of neighbouring Lithuania, such population estimates exist, but they are greatly distorted by smoothing procedures (all peaks after age 20 have been smoothed) (see the *Background and Documentation* file for Lithuania). Given that local Statistical Offices were very centralised (they were local branches of the Central Statistical Office of the USSR), similar data (with similar inconsistencies) might be expected to exist for Latvia. Nonetheless, as noted earlier, new population estimates were calculated following the HMD Methods Protocol for the period 1960-1969.

Although some small inconsistencies were found (as described below) between the data from the 1970 and 1979 censuses as well as in the corresponding population estimates, official population estimates were used for the period from 1970 until 2015.

Problems related to the quality of data on population

Population counts from the first post-war population census of 1959 exhibit severe age heaping problems with significant peaks at ages ending with "0". These peaks are much less apparent in the subsequent census of 1970 (Figure 1). Therefore, taking into account the data quality problems of the 1959 census, the newly calculated population

estimates for the period 1960-1969 should be used with caution. Comparisons with Swedish data have showed that old age mortality seems to be underestimated for this period in Latvia.

Checking the consistency of population estimates for the 1970s and 1980s, it was found that whereas the 1970, 1979 and 1989 censuses show some evidence of age heaping, the inter-censal estimates do not (Appendix 2, Figures 2A and 2B). In addition, when comparing the official estimates for 1974 and 1975, we find an unexplainable drop in the number of males in the 1956 birth cohort (data not shown). It is possible that in these particular years, recruitment into the Soviet Army was counted as migration. Alternatively, this strange drop in the number of males in this cohort may have resulted from a computing error.

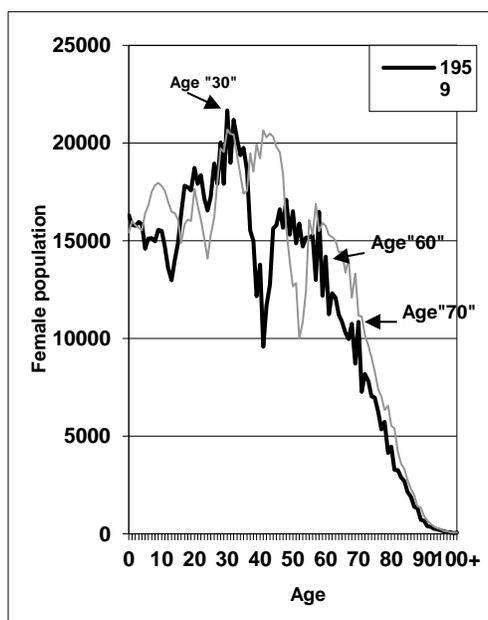
Another inconsistency between population estimates is evident in the data for the 1990s: there is a peak in the number of males and females born in 1972 in the data for 1990-1999, but not in the population estimates for the subsequent years 2000, 2001 and 2002 (including the 2000 population census) (Appendix 2, Figure 2C and 2D).

Checking the quality of data on deaths

Age heaping at older ages (and age overstatement) is a concern in dealing with mortality statistics in the former USSR (Anderson & Silver, 1997). In the case of Russia and Lithuania, there is evidence of age heaping in deaths at ages 70, 80 and 90 in the data for the period before 1970 (see the HMD *Background and Documentation* file for Russia and Lithuania). Furthermore, significant peaks in deaths at age 99 were found in both of these countries in the early 1960s.

Taking into account that similar death registration procedures were in force, one might also expect similar data reliability problems for Latvia. Therefore, data checks were performed for Latvia using the same procedures as for Russia and Lithuania. The findings, however, do not support the initial hypothesis: there is no clear evidence of age heaping for deaths at ages 70, 80 and 90 in the 1960s (Appendix 3, Figure 3) nor is any peak found in deaths at age 99.

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



Comment on Figure 1. There are significant peaks in female population counts at ages 30, 60 and 70 in the 1959 census data. In contrast, there is much less evidence of such peaks at the corresponding ages 41, 71 and 81 in the subsequent population census of 1970.

REVISION HISTORY

Changes with the September 2018 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 a_0 , 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/Methods Protocol.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 they have not been, and will not be, updated.
- **Death counts for 2000-2014:** newly published recalculated official deaths by single year age groups (Lexis squares) replaced previously published official deaths classified by parallelograms with vertical left and right sides.

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APPENDIX 1:

Description of the original data used for HMD calculations

DEATHS

Period	Type of Data	Age grouping	Comments	RefCode(s)
1959	Number of deaths to <i>de facto</i> population by sex and 5-year age groups (5x1 rectangle) except first and last age intervals.	0, 1-4, ..., 65-69, 70+, unknown	No adjustment has been made for the underestimation of infant deaths for the period 1959-1990	2
1960-1961	Number of deaths to <i>de facto</i> population by sex and 5-year age groups (5x1 rectangle) except first and last age intervals	0, 1-4, ..., 80-84, 85+, unknown	No adjustment has been made for the underestimation of infant deaths for the period 1959-1990	2
1962-1993	Annual number of deaths to <i>de facto</i> population by sex and single year of age (1x1 rectangle).	0, 1, ..., 99, 100+, unknown	No adjustment has been made for the underestimation of infant deaths for the period 1959-1990	2
1994-1999	Annual number of deaths to <i>de facto</i> population by sex and 1-year birth cohort (age reached during the year - vertical parallelogram).	TL, TU: Age 0 TL: Age 1 VV (age reached during the year): 2, 3, ..., 99+, unknown	For vertical parallelograms, exact age was recalculated (by decreasing by one year) to follow the HMD definition of vertical parallelogram (age at the beginning of the year).	5, 7, 8, 10
2000-2014	Annual number of deaths to <i>de facto</i> population by sex and single year of age (1x1 rectangle).	0, 1, ..., 99, 100+, unknown	Newly published recalculated official deaths by Lexis squares replaced previously published official deaths classified by parallelograms with vertical left and right sides.	30
2015-2019	Annual number of deaths to <i>de facto</i> population by sex and single year of age (1x1 rectangle).	0, 1, ..., 99, 100+, unknown		31, 32

POPULATION

Period	Type of Data	Age grouping	Comments	RefCode(s)
1959, 1970	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		3
1971-1989	Annual population estimates by sex and single year of age. Permanently resident (<i>de jure</i>) population.	0, 1, ..., 84, 85+		4
1990-2011	Annual inter-censal population estimates by sex and single year of age. Permanently resident (<i>de jure</i>) population.	0, 1, ..., 99, 100+, unknown		4, 6
2012-2016	Annual post-censal population estimates by sex and single year of age. Permanently resident (<i>de jure</i>) population.	0, 1, ..., 99, 100+, unknown		9, 19, 20, 28
2017-2020	Annual post-censal population estimates by sex and single year of age. Permanently resident (<i>de jure</i>) population.	0, 1, ..., 99, 100+, unknown	Population estimates were derived using a revised concept excluding previously counted persons having declared their place of residence at their workplace (enterprise registered in Latvia) but not residing in Latvia.	29, 35

BIRTHS

Period	Type of Data	Comments	RefCode(s)
1959-1999	Annual counts of births by sex. Actually present (<i>de facto</i>) population.	No adjustment has been made for the underestimation of the number of live births during the period 1959-1990	1
2000-2019	Annual counts of births by sex. Permanently resident (<i>de jure</i>) population.	The number of live births includes those occurring abroad to women officially residing in Latvia.	14, 15, 21, 26, 33

BIRTHS BY MONTH

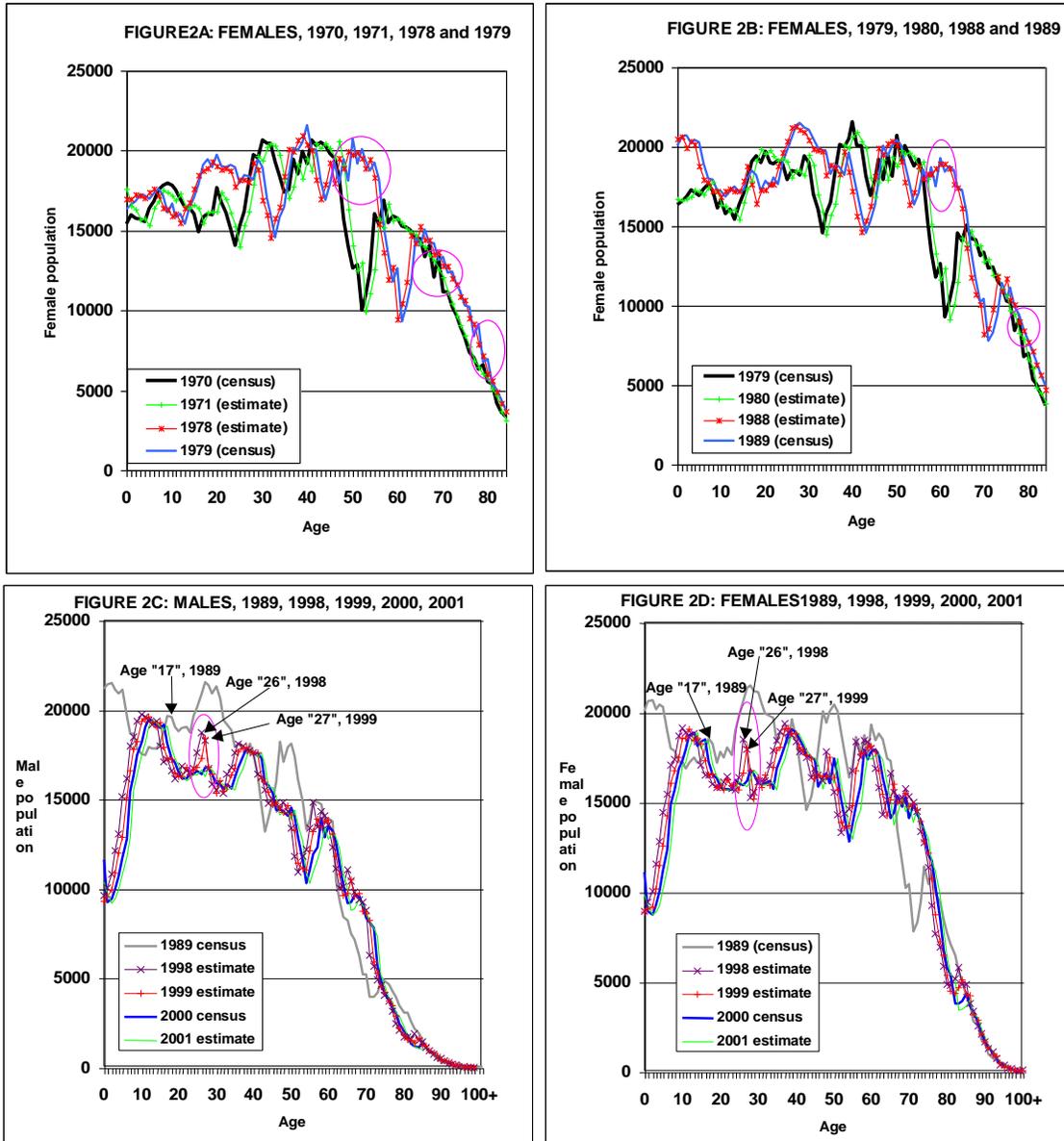
Type of data: Annual live birth counts by month.

Period covered: 1959-2019.

RefCode(s): 16, 17, 18, 25, 27, 34.

APPENDIX 2: DATA QUALITY ISSUES (1)

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



Comment on Figure 2. There are peaks at ages 67 and 69 in the 1970 census, but not at the corresponding ages of 68 and 70 in the population estimates for 1971. Similar inconsistencies can be identified between the census of 1979 and the official inter-censal estimates for 1978 and 1980 as well as between the census of 1989 and the estimate for 1988 (Figures 2A and 2B). Peaks in the number of males and females in the 1972 birth cohort are present in the census of 1989 and in the population estimates for the period 1990-1999, but not in the 2000 and 2001 population estimate and the census of 2000 (Figures 2C and 2D).

APPENDIX 3: DATA QUALITY ISSUES (2)

Figure 3. Mortality rates for selected ages. Latvia, both sexes, 1962-2001.

