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Summary

Introduction to the Special Collection “Human Mortality over Age, Time, Sex, and Place: The 1st HMD Symposium”

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This article is part of Demographic Research Special Collection 4, “Human Mortality over Age, Time, Sex, and Place: The 1st HMD Symposium”.
Please see Volume 13, publications 13-10 through 13-20.

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a summary

Introduction to the Special Collection "Human Mortality over Age, Time, Sex, and Place: The 1st HMD Symposium"

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Abstract

This introduction to the special collection "Human Mortality over Age, Time, Sex, and Place: The 1st HMD Symposium" describes the Human Mortality Database project and briefly summarizes the Special Collection articles.

This article is part of Demographic Research Special Collection 4, "Human Mortality over Age, Time, Sex, and Place: The 1st HMD Symposium". Please see Volume 13, Publications 13-10 through 13-20.

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1. The Human Mortality Database

It is remarkable how much can be learned using simple series of death and population numbers arranged by sex, age, and calendar year. These seemingly mundane data provide fascinating opportunities for tracing the demographic characteristics of national populations over time, for analyzing the evolution of age patterns in mortality and population age structures, for making inter-country comparisons, and for forecasting future mortality and population changes. The data are useful to researchers in a variety of academic fields (population studies and other social sciences, epidemiology, public health, medicine, biology, and actuarial science) and also to broader groups of students, journalists, policy analysts, and others interested in population and longevity trends.

The idea of compiling detailed series of mortality and population data over the entire age range for various national populations, and of making those data widely available via the Internet, was first materialized by researchers at the University of California at Berkeley (UCB). The Berkeley Mortality Database (BMD; http://www.demog.berkeley.edu/~bmd) was launched in 1997 and provided historical mortality and population series for four countries: France, Japan, Sweden, and the United States. Another database, the Kannisto-Thatcher Database on Old-Age Mortality (KTD; http://www.demogr.mpg.de/databases/ktdb), also documents temporal changes in mortality for national populations, but only for ages 80 and above. The KTD originated in 1993 at the Odense University Medical School in Denmark; since 1996, it has been maintained and developed further at the Max Planck Institute for Demographic Research (MPIDR).

The development of the Human Mortality Database (HMD; http://www.mortality.org) began in 2000 as a collaborative project between UC Berkeley's Center on the Economics and Demography of Aging (CEDA) and the MPIDR. Building on the methods and organizational structure first developed for the BMD and the KTD, the HMD was launched in May 2002 and currently includes data for 24 national populations. For each country in the collection, the database provides access to uniform series of death counts and population estimates arranged by sex, age, and calendar year. It also includes estimated mortality rates and life tables in various formats, organized both by year of death (period) and by year of birth (cohort), as well as the underlying raw data from which all such estimates were derived.

The HMD provides the most detailed and well-documented source of information currently available on mortality for countries in the more developed world. At present, the database has more than 7,500 registered users. As of October 2003, the HMD (or its predecessor, the BMD) had already been cited in more than 85 scientific publications and at least 40 conference presentations and working papers.

2. The HMD Symposium

In order to facilitate further research based on the HMD and to provide a forum for discussing further development of the database, MPIDR and UCB/CEDA jointly organized the 1st HMD Symposium on the topic of "Human Mortality over Age, Time, Sex, and Place." It was held in Rostock (Germany) on June 18-19, 2004, and included an introductory session, eight regular sessions, and a roundtable discussion:

0. Introduction and overview of HMD.
1. Mortality comparisons over time and place.
2. Mortality patterns over age and time.
3. The impact of major historical events on mortality.
4. Alternative data sources and quality assessment.
5. Sex differences in mortality.
6. Estimating old age population and mortality.
7. Civilian versus total mortality in wartime.
8. Beyond HMD.
9. Roundtable discussion.

A more detailed seminar agenda is available at the MPIDR website at http://www.demogr.mpg.de/cgi-bin/calendar/workshops.plx .

After the symposium, participants were invited to submit their papers for possible publication in this Special Collection. An initial selection of papers was performed by an editorial committee consisting of K. Andreev, D. Glei, V. Shkolnikov, and J. Wilmoth. Selected papers were then submitted to the journal and underwent the usual process of peer review.

3. Summary of the articles

This Special Collection includes ten articles:

- Wilmoth J.R. On the relationship between period and cohort mortality. *Demographic Research.* Volume 13, Article 11, pages 231-280.
- Hill K., Choi Y., Timæus I.M. Unconventional approaches to mortality estimation. *Demographic Research.* Volume 13, Article 12, pages 281-300.

- Pison G. Population observatories as sources of information on mortality in developing countries. *Demographic Research*. Volume 13, Article 13, pages 301-334.
- Jdanov D., Scholz R., Shkolnikov V.M. Official population statistics and the Human Mortality Database estimates of populations aged 80+ in Germany and nine other European countries. *Demographic Research*. Volume 13, Article 14, pages 335-362.
- Glei D.A., Buzzone S., Caselli G. Effects of war losses on mortality estimates for Italy: a first attempt. *Demographic Research*. Volume 13, Article 15, pages 363-388.
- Jdanov D., Andreev E., Jasilionis D., Shkolnikov V. Estimates of mortality and population changes in England and Wales over the two World Wars. *Demographic Research*. Volume 13, Article 163, pages 389-414.
- Waldron I., McClockey C., Earle I. Trends in gender differences in accidents mortality: relationships to changing gender roles and other societal trends. *Demographic Research*. Volume 13, Article 17, pages 415-454.
- Pampel F. Forecasting sex differences in mortality in high income nations: The contribution of smoking. *Demographic Research*. Volume 13, Article 18, pages 455-484.
- Elo I.T. Cause-specific contributions to sex differences in adult mortality among Whites and African Americans between 1960 and 1995. *Demographic Research*. Volume 13, Article 19, pages 485-520.
- Gómez-Redondo R., Boe C. Decomposition analysis of Spanish life expectancy at birth: evolution and changes in the components by sex and age. *Demographic Research*. Volume 13, Article 20, pages 521-546.

The first six articles are devoted to methodology and data-related issues, while the last four focus on substantive features of historical mortality patterns.

The collection begins with John Wilmoth’s theoretical study examining the relationship between the conventional period life expectancy and some proposed alternative measures of mean lifespan based on cohort survival (Bongaarts and Feeney 2002, 2003; Guillot 2003). These various measures are described in the article using a comparable mathematical notation, and their properties are explored using a model in which mortality trends are expressed as a function of cohort “percentile slopes” (which measure the speed of change over time in the percentiles of cohort distributions of age at death) rather than traditional mortality rates. The author distinguishes between measures of longevity based on the concept of a synthetic cohort (e.g., life expectancy at birth) and other measures based on models of population dynamics. He concludes that the level of period life expectancy at birth is not "distorted" or "biased" as claimed by Bongaarts and Feeney, and that the proposed alternative indicators differ from life expectancy simply because they measure different things.

Currently, the HMD includes only developed countries with (nearly) complete registration of vital events and reliable census- or register-based population estimates. Developing countries, which comprise the majority of the world's population and suffer the highest mortality, are not represented. The next two papers discuss approaches for estimating mortality in countries where demographic statistics are incomplete. Kenneth Hill, Yoonjoung Choi, and Ian Timæus review four categories of unconventional estimation techniques. In order to expand the HMD to include a broader set of countries, the authors conclude that child mortality could be estimated using birth history data, while adult mortality could be estimated based on partial death registration, deaths by age recorded in censuses or large surveys, and information on deaths of siblings. Yet, all of these sources must be evaluated and may require further adjustment. Moreover, none of these techniques is perfect, particularly in the presence of migration.

The study by Gilles Pison focuses on demographic surveillance sites (DSS), also known as "population observatories," which monitor the entire population of specific geographical locations over a long time period and record information on vital events (e.g., births, deaths). DSS usually provide detailed, high-quality information on general and cause-specific mortality and morbidity. However, it remains unclear to what extent they are representative of their respective national populations. The article begins by providing general information about 22 surveillance sites from Africa and Asia, with sizes of monitored populations varying from around 8 to 215 thousand. The author then focuses on empirical findings from two rural sites located in Senegal (Bandafassi and Mlomp). He notes that a decrease in under-five mortality stagnated during the 1990s, reflecting a decline in mortality from measles (due largely to immunization) accompanied by an increase in mortality from malaria.

The next three papers are concerned with the validity of data currently included in the HMD. Dmitri Jdanov, Rembrandt Scholz, and Vladimir Shkolnikov examine differences between official and HMD estimates of populations aged 80 and above for Germany and nine other European countries. Whereas official estimates are derived using various methods and data sources, all HMD estimates within this age range are derived using a uniform method. The analysis detects substantial discrepancies for West Germany, which are then investigated in detail. Among the ten countries, Russia, Hungary, and England and Wales experience the greatest discrepancies; in contrast, differences between HMD and official estimates are very small for the Scandinavian countries. Regression analysis shows that these differences tend to decrease with time, to increase with age, and to be smaller in census years and after the introduction of a population register. In most cases where substantial differences exist, the authors conclude that the HMD estimates are superior to the official ones.

Studies by Dana Glei, Silvia Bruzzone, and Graziella Caselli and by Dmitri Jdanov, Evgeny Andreev, Domantas Jasilionis, and Vladimir Shkolnikov address the effects of war on mortality estimates for Italy and England and Wales, respectively. Following a strategy similar to that applied by Vallin (1973) to France, Glei *et al*. estimate total and civilian mortality for Italy during wartime. They derive such estimates directly, using available information about deaths in war operations and the size of the military to adjust estimates (derived using standard HMD methods) based on census counts and vital statistics. In contrast, Jdanov *et al*. develop a more elaborate model of population dynamics during war periods in order to reconstruct the demographic series for England and Wales. Their model incorporates information about military and civilian war losses, as well as the sizes of the corresponding sub-populations. This model could be applied to other countries, possibly with modifications if the available data are more limited. These two studies demonstrate that for males in countries with substantial war mortality, HMD estimates based on the civilian population alone greatly underestimate total period mortality during wartime as well as cohort mortality for those cohorts that suffered heavy war losses.

The next three papers focus on the recent narrowing of the sex difference in mortality within developed countries. Ingrid Waldron, Christopher McClockey, and Inga Earle examine sex differences in accidents mortality for the United States, Great Britain, France, Italy, and Japan during 1950-98. They conclude that decreasing sex differences in the amount of driving and in mortality due to motor vehicle and occupational accidents support the Convergence Hypothesis, which predicts that as gender roles become more similar sex differences in accidents mortality will also decrease. In contrast, for many types of accidents mortality, sex differences were stable or increasing; the authors attribute this finding to a sex differential in the impact of other societal trends.

Fred Pampel projects future trends (from 2000 to 2020) in relative sex differences in mortality based on recent trends in mortality and smoking among 21 high-income countries. The results suggest that although sex ratios in smoking-related mortality will continue to narrow, overall sex ratios in total mortality may widen yet again due to persisting sex differences in mortality from causes unrelated to smoking. He projects that countries in the later stages of the smoking epidemic (e.g., U.S., U.K.) will experience the greatest increases in sex ratios, whereas those in the early stages (e.g., Spain, Greece) will see the smallest increase, or perhaps even a short-term decline in relative sex differences.

Irma Elo and Greg Drevenstedt continue a sequence of studies on mortality differentials by race in the United States (Elo, 2001; Elo and Drevenstadt, 2004). From around 1960 until 1995, the sex difference in life expectancy at birth declined from 6.6 to 6.2 years among Whites, whereas over a similar interval it increased from 5.2 to 8.7 years among African Americans. A decomposition of these trends by cause of death reveals that the mortality disadvantage suffered by African American males relative to White males and females of both races stems in large part from two factors. First, at younger ages (15-39), higher homicide rates among African American males made a major contribution to the increased gap relative to their female counterparts. Second, at older ages (40-64), although mortality due to circulatory diseases declined much faster among White males than White females, African American males did not enjoy the same advantage relative to African American females.

Finally, Rosa Gómez-Redondo and Carl Boe analyze sex- and age-components of the impressive increase in life expectancy at birth in Spain from 1970 to 2001. The results indicate that declines in infant mortality contributed substantially to the overall increase in life expectancy during 1971-81, while decreased mortality at older ages (65-85) played an important role throughout this 30-year period. Yet, increased mortality among young adults (20-34) during 1981-91 slowed the overall gain in life expectancy.

In sum, this Special Collection includes a set of high-quality, informative studies. We hope that readers will find it interesting and useful.

4. Acknowledgements

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