Domantas Jasilionis

Mortality data and methodological approaches in estimating mortality in developing countries

INTRODUCTION
QUO VADIS, HMD?

- HMD covers almost all developed countries with fully functioning vital registries.

- Further expansion of the main HMD is limited due to strict requirements for coverage and quality of statistics.

- A growing demand for more reliable and real data-based mortality estimates for developing countries.

The objective of the meeting: to discuss possibilities to extend the HMD approach to China, India, and other middle- & low-income developing countries.
Momentum of a global health transition

- Health transition framework (Vallin & Meslé 2004, 2005)
  - a wider concept, not just epidemiological change.
  - a process of subsequent divergence-convergence cycles, a divergence following each major health progress.
  - changing vanguards and laggards.
  - complex processes: new cycle can start without completion of the previous cycle.

Developing countries:
- Shift from child to adult / old-age mortality.
- Ongoing transition from infectious to non-communicable diseases.
- Huge shifts in cohort composition:
  - early life conditions, education, and modern health risks – smoking, alcohol, obesity,...
- Uneven progress and scenarios across/within countries.
Decline in child (0-5 yrs) mortality in selected developing countries: UN estimates, 1950-2015.

Life expectancy still mainly driven by child mortality, much slower progress at adult ages.

→ limited scope for future improvements:

Recent threats:
- Smoking epidemics
- Unfavorable patterns in other risk factors.
- Huge social and regional disparity

Source: Registrar General of India; Saikia, Jasilionis, Shkolnikov, Ram, 2012.
IMPLICATIONS FOR MONITORING MORTALITY IN DEVELOPING COUNTRIES

- A need for more comprehensive national data sources beyond standard surveys primarily focusing on child and maternal mortality.

- A need for a change in modeling strategies:
  - More emphasis on adult and (even) old-age mortality based on real (observed) data.
  - From heavy modeling and “global” approaches to more precise approach taking into account variations & country specifics.

- Proved solutions for obtaining reliable evidence base on mortality profiles
  - Sample registration systems (e.g. India)
  - Surveillance points systems (INDEPTH)

- New initiatives
  - Bill Gates Foundation: *Countrywide Mortality Surveillance for Action (COMSA)* & *Child Health & Mortality Prevention Surveillance Network (CHAMPS).*

Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017

Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017
Scientists agree they need better estimates for the death toll from the world’s major killers. But they fiercely disagree on how to go about it

How Do You Count the Dead?
Gretchen Vogel

A Controversial Close-Up Of Humanity’s Health
Kudos and criticism greet a landmark new report, filling the largest ever issue of The Lancet, on the global burden of disease

The Imperfect World of Global Health Estimates
Peter Byass

OPEN ACCESS Freely available online
Potential contribution of the HMD

→ Focus on quality instead of “quantity” [global coverage]

→ Implementing fundamental HMD principles:
  - transparent and well documented methodology;
  - exploiting local expertise;
  - systematic and extensive data quality checks;
  - careful documentation of data and their problems;
  - more data, less model;
  - open data principles (input data, scripts, ...).

→ A country-specific approach:
  - general approach + country-specific methods;
  - maximal usage of real data;
  - employing alternative data sources.
Principal data sources on mortality in China

CENSUSES OR SURVEYS BY NATIONAL BUREAU OF STATISTICS (NBS)

  - enumeration of people who died in a household one year or 18 months before the census or survey. Inter-censal 1% sample surveys: 1987, 1995, and 2005

- Annual Population Change Surveys. Smaller surveys for inter-censal years.

HOUSEHOLD REGISTRY ("HUKOU") BY MINISTRY OF PUBLIC SECURITY

- each resident is legally required to register in the household registration system, registration to be cancelled within a month after death. Serves as basis for census.

VITAL REGISTRATION / SURVEILLANCE SYSTEMS BY HEALTH MINISTRY

- Nationwide Vital Registration System: 8 % of the national population, ca. 110 million people (2005 est.), mostly urban, Eastern China (Rao et al. 2005).

- Disease Surveillance Points (DSP): 161 surveillance points, ~10 mill. people.

- National Child and Maternal Mortality Surveillance Points:
  336 counties / urban districts covering 140 mill. people, child and maternal mortality.
Principal data sources on mortality in India:
SAMPLE REGISTRATION SYSTEM AND NFHS&DLHS SURVEYS

Sample Registration System (SRS)
- a nationwide system by Office of the Registrar General.
- a dual record vital registration system for a sample of urban blocks and villages to produce continuous demographic data.
- representative, covers all major states, sample size ~10 mill. pop.

- Includes deaths occurring 3 years prior the survey reported by household head.

- DLHS 2-4: deaths occurring 1-4 years prior the survey rep. by household head.
→ NFHS and DLHS: different waves not consistent in terms of coverage and methods.

The million death study: biannual survey covering 14 mil. people and 1 mill. deaths by cause of death (verbal autopsy). Register General, India & Centre for Global Health Research, University of Toronto, Canada).
India: a variety of data quality problems

Coverage
- Indirect evidence about completeness of death registration:
  1971-1991: 95% for men, 88-91% for women
  1970s-80s.
- Variation in quality of registration across major states
- Unequal coverage of population under risk across ages: substantial undercount at older ages, especially among females →possibly due to sampling and other errors.

Age misreporting:
a) Age overstatement: more pronounced among men and more observed in deaths than in population at risk (Saikia et al. 2012).
b) Age understatement among older females (Bhat 1987, 1995).
c) Very pronounced age heaping: most of evidence from census data, SRS releases only abridged 5-year group data →does such grouping helps avoiding distortions?
Different countries → different problems? Age-specific population counts from the latest pop. censuses (2011 & 2010)

INDIA

CHINA

Source: RG India, 2019; Statistics Bureau of China, 2019.
Age-specific mortality derived from the Chinese censuses and HMD age-specific mortality estimates for Sweden

PRESENTATIONS OF THE HMD AND COLLABORATING TEAMS:

Mortality estimates for China and its regions: solving data and methodological challenges.
[MPIDR / Beijing University, China / China Population and Development Research Center, China]

Reconstructing age-specific mortality in India using data with pronounced age heaping from DLHS and NFHS surveys.
[MPIDR / International Institute for Population Sciences, India]

Issues in constructing HMD data series in middle-income countries: The case of Mexico.
[University of California at Berkeley, USA / Department of Actuarial Mathematics & Statistics Heriot-Watt University, UK]