Integrating CRVS, census and survey data on adult mortality

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UN EXPERT GROUP MEETING ON INNOVATIVE METHODS FOR ESTIMATING COVID-19 MORTALITY FROM CENSUSES AND SURVEYS

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UN World Population Prospects

- UN official estimates and projections of population, published since 1951
- 27th edition released on 11 July 2022
- Covers 237 countries and areas
- Estimates of demographic components from 1950 to 2022 and projections to 2100
- Selected innovations in 2022 Revision:
  - Transition from 5x5 data framework to 1x1 (i.e., annual time series and single age inputs/outputs)
  - Comprehensive metadata on data sources and estimation methods
  - Harmonized methods and tools
WPP workflow process with vital rates

• Compute direct and indirect estimates from as many empirical data sources as possible for each country since 1950
• Review and assess the various series
• Generate an initial robust time trend for summary indicators (e.g., TFR, 5q0, 45q15) and age-specific rates (e.g., ASFR, life tables, net migration)
• Use this initial set of estimates to create a full cohort-component population reconstruction by age and sex since 1950
• Compare the reconstructed population cohorts with those enumerated across the various censuses
• Revise and adjust the WPP estimates to reconcile demographic components to satisfy demographic balancing relationships over time, age and cohorts
WPP estimation process for each country/area

1. Estimate fertility, mortality, (migration) for period \((t_{0-1})\)
2. Run cohort-component projection for period \((t_{0-1})\)
3. Compare projection result with census population by age and sex in \((t_1)\)
4. Re-estimate fertility, mortality, (migration) for period \((t_{0-1})\)
   - Match
   - No match

Proceed to next period \((t_{1-2})\)

Estimate net-migration for period \((t_{0-1})\)

Census population by age and sex \((t_0)\)

Census population by age and sex \((t_1)\)

Adjust census population if necessary

Start

Censuses, surveys vital registers

Census population by age and sex \((t_0)\)
Estimation of adult mortality for countries with sparse or deficient mortality data: Integrating CRVS, census and survey estimates
Estimation steps for countries with sparse or deficient data

1. Evaluate data from incomplete registration, questions on household deaths, survival of siblings or parents, etc.

2. Compute summary index (e.g., 45q15) from each source using an adaptive relational standard to extrapolate ages if necessary

3.

4.

5.
Peru – sources of data for 45q15

Population Division

MINSA adjusted GGB

SEG
Validate empirical estimates

Child and Adult mortality: Bangladesh (Log-scales)

DataProcessType/DataType:
- Census/Household deaths
- Census/Intercensal survival (adjusted)
- Estimate/Life table
- SRS/Intercensal survival (adjusted)
- SRS/Life table
- Survey/Household deaths
- Survey/Sibling survival

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Data Sources

A description of the empirical data used and the methods applied in revising past estimates of population and components of demographic change (fertility, child, adult and overall mortality, international migration) is available here for each country or area for the period 1950 to 2021. For the countries with less than 1,000 inhabitants in 2021, only the data sources for total population are made available.

Select below a country or area to see the respective information, or download the whole set of metadata in PDF format for all countries or areas or a tabular version for each demographic component under Documentation.

Mali

Adult and Old Age Mortality: Estimates derived from: (a) recent household deaths adjusted at adult ages for underregistration using death distribution methods; (b) siblings deaths from the 1995-1996, 2001, 2006, 2018 DHS and 2012-2013 DHS; (c) maternal orphanhood from the 1987, 1998 censuses and 1995-1996, 2001 DHS; (d) paternal orphanhood from the 1987, 1998 censuses and 1995-1996, 2001 DHS; (e) estimates of under-five, adult and old age mortality. In addition, the (a) recent household deaths data by age and sex from the 1976, 1987, 1998, 2009 censuses; (b) maternal orphanhood from the 2006 DHS and 2009 Census; (c) paternal orphanhood from the 2006 DHS and 2009 Census have been considered.
Estimation steps for countries with sparse or deficient data

1. Evaluate data from incomplete registration, questions on household deaths, survival of siblings or parents, etc.

2. Compute summary index (e.g., 45q15) from each source using an adaptive relational standard to extrapolate ages if necessary

3. Compute robust time trend in 45q15 by sex using a Bayesian B-spline Bias reduction model to account for various data biases and non-sampling errors

4. Generate full life table for each year using model life table system (Coale-Demeny, United Nations or log-quadratic) with 1-3 age-specific inputs (5q0, 1q0, 45q15)

5. Separate modelling process for countries highly affected by HIV and AIDS
Mortality shocks from conflicts, famines, natural disasters, epidemics, etc

• 2022 Revision used new estimates of total crisis deaths (country x year)
  o Consolidation of reference datasets for wars, genocides, battle deaths, conflicts, major types of natural disasters
  o Modelled pattern of deaths by age/sex for each crisis type
  o Crisis years excluded from B3 modelling

• Impact of COVID-19
  o Sex- and age-specific excess mortality rates during 2020 and 2021 computed from the WHO estimates of excess deaths by sex and age.
  o Rates added to the baseline mortality rates estimated for 2020 and 2021 in the absence of a pandemic
Peru – final 45q15 estimates (male)
Conclusions

• Do use opportunities to collect mortality data from census and survey, especially when added cost not too high
• Extreme care required when evaluating mortality estimates from censuses and survey
• Cross-checking with other population components can provide a check on validity, but data quality of other components also an issue
• Please share tabulated data with UNPD
Resources

• Home page for WPP2022 data and reports: https://population.un.org/wpp/