The role of census data in mortality estimation

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Importance of mortality statistics for planning purposes

- Mortality indicators are key indicators for tracking progress in the well-being of populations
- Sustainable Development Goals (SDG’s) include the following mortality-related indicators:
  - Maternal Mortality Ratio
  - Under-five Mortality Rate
  - Neonatal mortality rates (<28 days)
  - Cause-specific mortality, with reference to specific diseases:
    - AIDS, tuberculosis, malaria, neglected tropical diseases, hepatitis, water-borne diseases and other communicable diseases, non-communicable diseases, road-traffic accidents, etc.
- Other important mortality indicators: life expectancy at birth, adult mortality (45q15), etc.
Importance of mortality statistics for planning purposes

• Tracking progress with respect to these indicators require reliable data

• Gold-standard: age-specific mortality rates by sex and ICD-certified causes of death

• Census data plays a major role in the production of mortality statistics

• Objective of presentation:
  • discuss the different ways (direct and indirect) censuses can play in the production of mortality statistics, and implications in terms of dissemination
Census counts as denominator of mortality rates

- Mortality rates are calculated as deaths/population
- When death counts are available in the vital registration system, population counts are necessary for the calculation of mortality rates (denominator)
- Censuses also important as basis for providing annual population estimates, which also provide denominator of rates
- Importance of age, sex and regional breakdowns
- Also: resident vs. de facto population; nationals vs. non-nationals
- Census counts play a critical role as denominator of rates even when VR information is not complete
Example: Jordan
Age-specific mortality rates by detailed age between 0 and 5

Deaths: Vital registration 2014-16
Population: Census 2015
Comparison of mortality estimates
Census information on household deaths

• Census can provide information on both the numerator (deaths) and denominator (population) of mortality rates in the absence of vital registration information

• Question on household deaths in the last 12 months:
  • Has any member of this household died in the last 12 months? If yes, record the following information about each deceased person

• Sometimes combined with question on causes of death:
  • whether the death was due to accident, violence, homicide, or suicide; and, if the deceased was a woman aged 15 to 49, whether the woman was pregnant, in childbirth, or within six weeks of the end of pregnancy when she died

• Particularly useful for estimation of maternal mortality (United Nations 2007)
## Table 4: Comparison of census-based estimates of PRMR with MMEIG and GBD estimates of MMR for 2005

<table>
<thead>
<tr>
<th>Country</th>
<th>Census estimate of PRMR</th>
<th>MMEIG estimate of MMR</th>
<th>GBD estimate of MMR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time period</td>
<td>Unadjusted</td>
<td>Adjusted</td>
</tr>
<tr>
<td>Burkina</td>
<td>1996–2006</td>
<td>278</td>
<td>478</td>
</tr>
<tr>
<td>Cambodia</td>
<td>1998–2008</td>
<td>961</td>
<td>1075</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1994–2007</td>
<td>1,739</td>
<td>2,485</td>
</tr>
<tr>
<td>Ghana</td>
<td>2000–2010</td>
<td>79</td>
<td>113</td>
</tr>
<tr>
<td>Liberia¹</td>
<td>2007–2008</td>
<td>1,929</td>
<td>572</td>
</tr>
<tr>
<td>Malawi</td>
<td>1998–2008</td>
<td>808</td>
<td>1,338</td>
</tr>
<tr>
<td>Mozambique</td>
<td>1997–2007</td>
<td>703</td>
<td>950</td>
</tr>
<tr>
<td>Nepal</td>
<td>2001–2011</td>
<td>625</td>
<td>494</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1999–2009</td>
<td>41</td>
<td>71</td>
</tr>
<tr>
<td>Zambia</td>
<td>2000–2010</td>
<td>823</td>
<td>826</td>
</tr>
</tbody>
</table>

*Note:* ¹2008 census only.
Census information on child mortality

• “Brass” questions on children ever born and children surviving, asked to women of reproductive ages (typically 15-50), also called “summary birth histories”:
  • How many live-born children have you given birth to in your whole life? How many are still alive? How many have died?

• Information can be converted in classic child mortality indicators (infant, under-five mortality)

• Most often used in surveys, but can also be included in censuses
Under-five mortality rate, Morocco
Using census data to evaluate coverage of death registration

• Death distribution methods ("DDM") examine consistency between age distributions of deaths (from VR or census household deaths) and age distribution of the population (from census counts)

• One-census method:
  • Brass growth balance method (BGB)
  • Preston-Coale method

• Two-census methods:
  • Generalized growth balance method (GGB)
  • Synthetic extinct generations (SEG)

• Produce estimates of the coverage of death registration
• Adjusted deaths can then be used for estimating mortality
• International migration can be an issue in these methods
Using census data for estimating mortality (intercensal methods)

- When no death information is available
- Need two successive censuses
- Produce “intercensal” mortality estimates
- Several methods exist (survival ratio method; Preston and Bennett 1983)
- Here also international migration can be an issue
Implication for dissemination of census results

- Population distribution by age and sex:
  - Importance of disseminating distributions by age and sex
  - Document if de facto or de jure, and how de jure was defined
  - Document if raw or adjusted counts, and how adjustments were made
  - By region and urban/rural residence
  - Nationals vs. non-nationals

- Tabulation of household deaths by age and sex (if available)

- Tabulation of children ever born and children surviving by age of the mother in five-year age groups (if available)
Summary

• Census data are critical for producing reliable mortality estimates, either directly or indirectly

• Importance of including mortality-related questions in census questionnaires

• Importance of disseminating census results in a format that can be used for mortality estimation