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

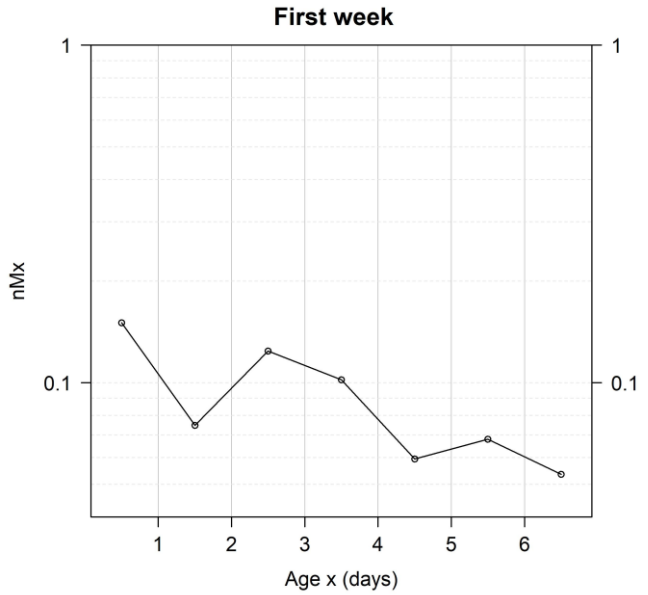
- Tracking progress with respect to these indicators require reliable data
- Gold-standard: age-specific mortality rates by sex and ICD-certified causes of death
- Census data plays a major role in the production of mortality statistics
- Objective of presentation:
  - discuss the different ways (direct and indirect) censuses can play in the production of mortality statistics, and implications in terms of dissemination

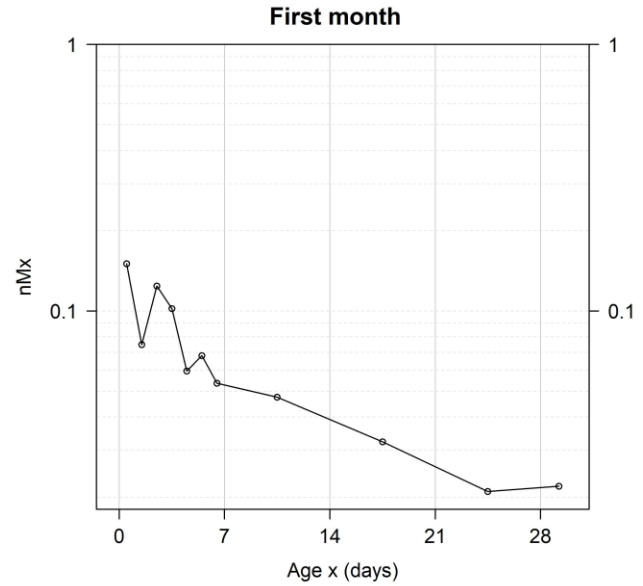
Census counts as denominator of mortality rates

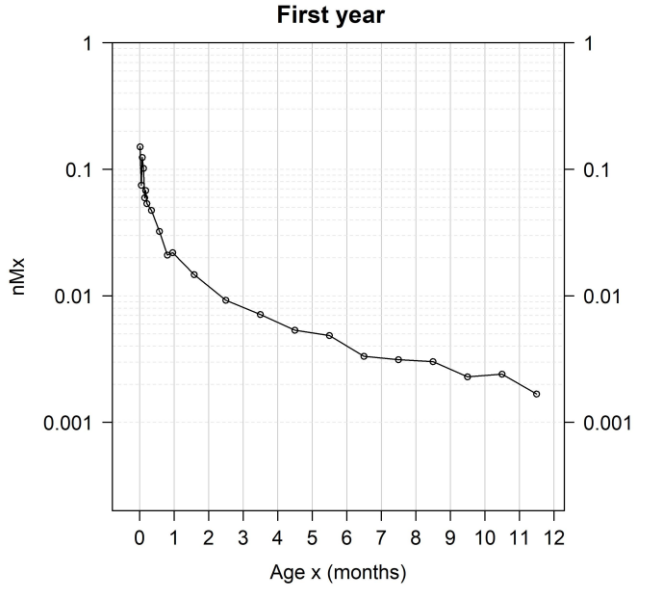
- Mortality rates are calculated as deaths/population
- When death counts are available in the vital registration system, population counts are necessary for the calculation of mortality rates (denominator)
- Censuses also important as basis for providing annual population estimates, which also provide 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

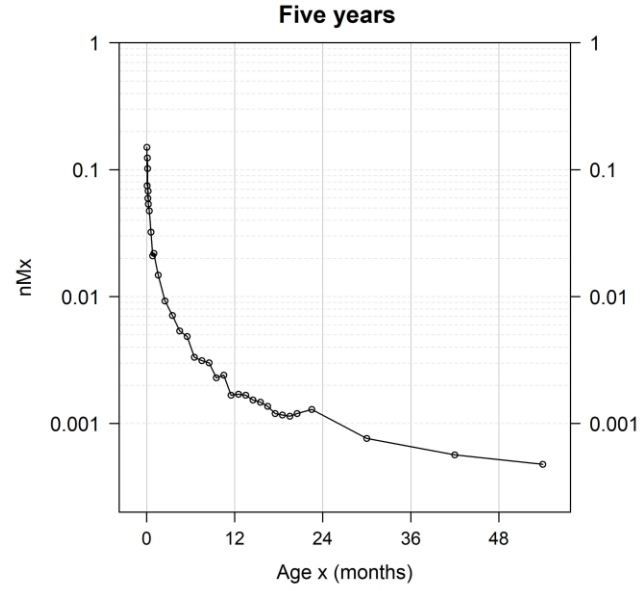
Example: Jordan
Age-specific mortality rates by detailed age between
0 and 5

Deaths: Vital registration 2014-16
Population: Census 2015

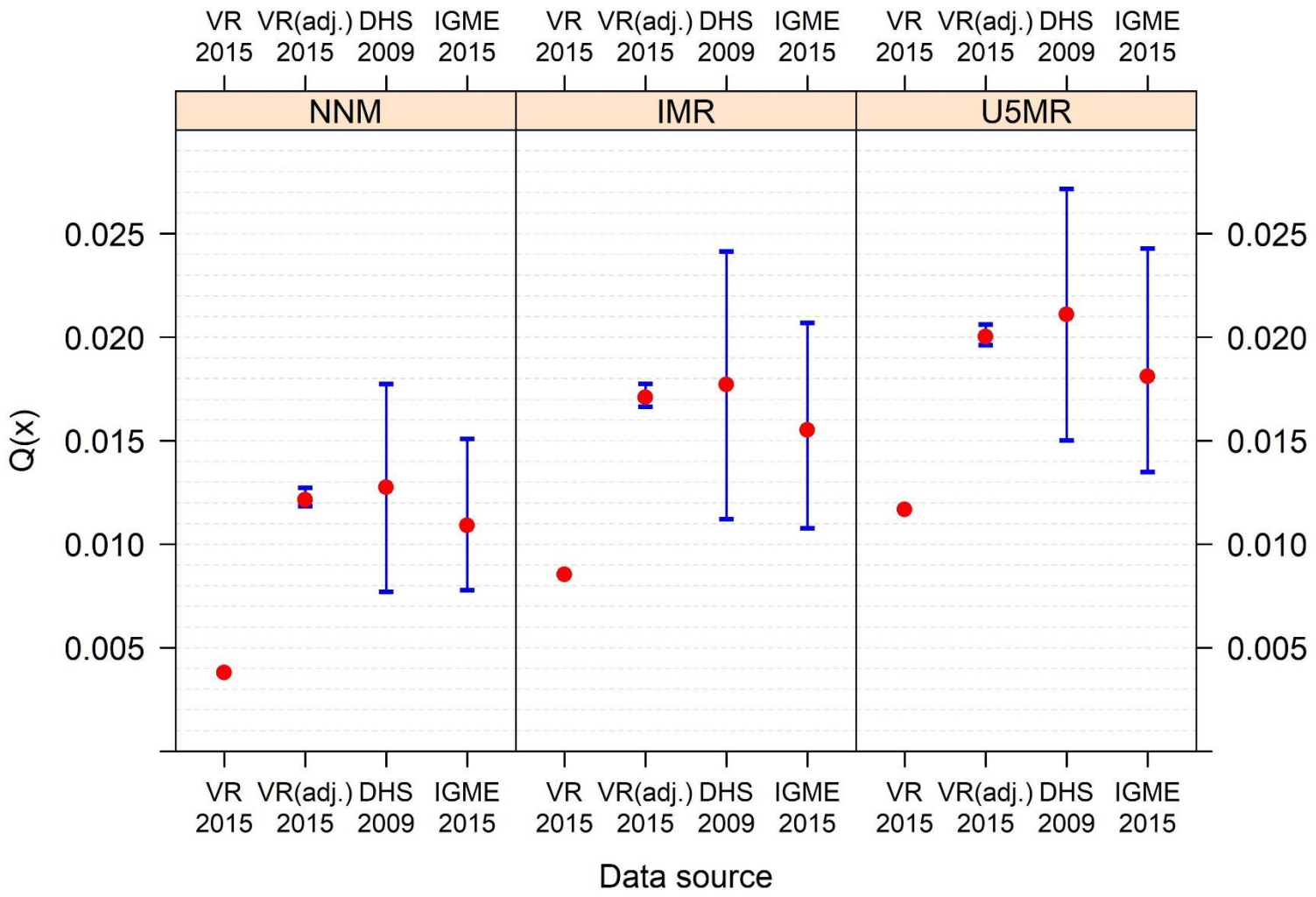








Comparison of mortality estimates



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)

Hill et al. 2018

Table 4: Comparison of census-based estimates of PRMR with MMEIG and GBD estimates of MMR for 2005

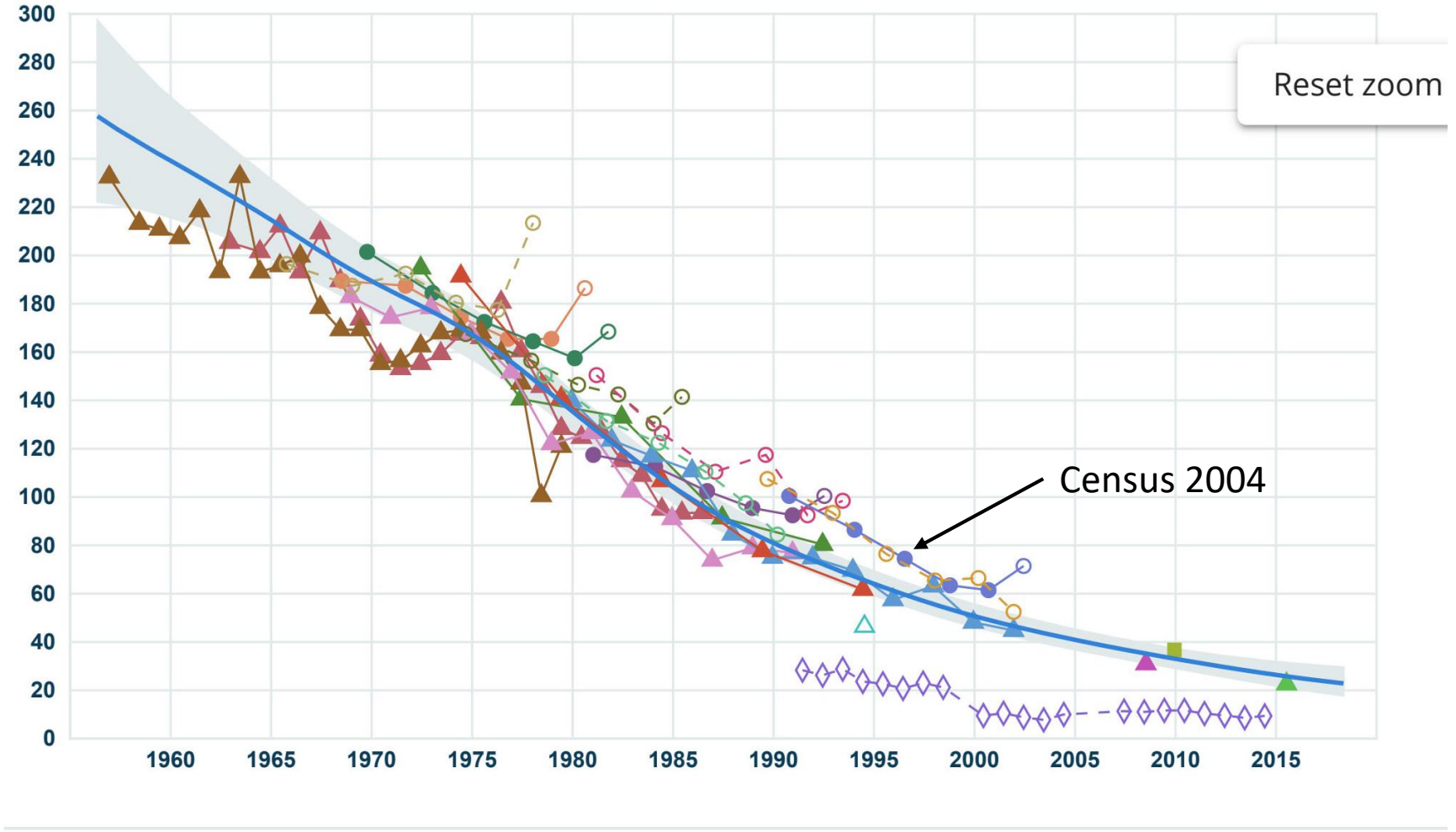
Country	Census estimate of PRMR			MMEIG estimate of MMR	GBD estimate of MMR
	Time period	Unadjusted	Adjusted		
Burkina	1996–2006	278	478	468	372
Cambodia	1998–2008	961	1075	315	286
Ethiopia	1994–2007	1,739	2,485	743	665
Ghana	2000–2010	79	113	376	225
Liberia[1]	2007–2008	1,929	572	1,020	653
Malawi	1998–2008	808	1,338	648	387
Mozambique	1997–2007	703	950	762	291
Nepal	2001–2011	625	494	444	373
Vietnam	1999–2009	41	71	61	29
Zambia	2000–2010	823	826	372	366

Note: [1]2008 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