Improving benchmarks for completeness of death registration

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Background
Benchmarks for completeness

- Comparing registered deaths to estimated/expected total number of deaths is an important strategy to assess completeness of registration system.
- In LLMICs, estimated total deaths often derived from modeled, cross-country estimates (e.g. GBD, WPP).
- Primary data inputs for GBD (and WPP) in many LLMICs are census and survey data on mortality.
Benchmarks for completeness

- Census and survey datasets have (some) information on some disparities:
  - Mortality by gender and age in surveys and censuses
  - Censuses also allow calculating death rates by wealth quintile and geographic area
  - Surveys collect mortality data from reports of relatives’ survival
Limitations of benchmarks and reference estimates

- Censuses occur every 10 years at best
- Surveys are more frequent, every 3-5 years, however:
  - We do not know SES characteristics or residence of relatives, only respondent
  - More data/longer series on child mortality estimates
- Current practices in LLMICs:
  - derive adult estimates from 5q0 + life table
  - use respondents’ data as proxy in benchmarking disparities in mortality
Data and Methods
Our study

- Part of **multi-country study on the measurement of adult mortality in LLMICs**
  - funded by US National Institutes of Health
  - sites in Senegal, Malawi, Bangladesh, Guinea-Bissau and Uganda
  - Collaboration with LSHTM, IRD, icddrb, RHSP, MEIRU, University of south Denmark.
Our study

- Primary goal was to conduct validation studies of DHS-like data on mortality at ages 15-59 years old.
- A secondary goal was to test whether we could collect additional survey data on mortality disparities among adolescents/adults.
  - improve estimates of disparities in 45q15
  - allow finer measurement disparities in completeness of death registration among adults
- We focused on:
  - Residence (subnational estimates)
  - Educational level (simple marker of SES, strongly associated with mortality)
Data collection: Malawi

- More than 3,000 respondents recruited from Karonga HDSS
- Tested addition of survey questions re: residence, education and HIV status of relatives of a participants
- Verified reported residence by calling relatives listed by respondents during the survey
  - > 95% agreement at the district level (live siblings)
  - > 90% concordance at the district level (deceased siblings)
Data collection: Bangladesh

- More than 2,000 respondents recruited from Matlab HDSS
- Tested addition of survey questions re: residence, education in questionnaires re: survival of relatives
- Record linkages with Matlab HDSS
- Added direct questions re: death registration
Results
Reporting of educational level

- Two questions:
  - What is the highest level of schooling that [NAME] attended?
  - How many years of schooling did [NAME] complete at that level?
- This matches questions asked re: respondents
Reporting of educational level

- Very limited amounts of missing data (<2% of siblings), both in Malawi and in Bangladesh
  - 0.9 among live siblings aged 15 and older
  - 1.8 among siblings deceased at ages 15 and older
  - Missing data increases with time since the death
- Requires very limited time collect
  - $\approx$ 1 min per relative for basic data
  - questions re: education add 15-20 seconds of data collection time per relative
Reporting of educational level

- Level of concordance in educational levels of siblings is more limited than expected
- Hypothesis that respondents’ education is a good proxy of siblings’ education will lead to attenuation bias
### Disparities in adult mortality

#### Results from Bangladesh

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Respondent’s own education</th>
<th>Siblings’ education</th>
</tr>
</thead>
<tbody>
<tr>
<td>No schooling</td>
<td>1 (ref)</td>
<td>1 (ref)</td>
</tr>
<tr>
<td>Primary</td>
<td>1.01</td>
<td>0.86*</td>
</tr>
<tr>
<td>Secondary</td>
<td>1.10</td>
<td>0.76***</td>
</tr>
<tr>
<td>Univ/Higer</td>
<td>1.11</td>
<td>0.59***</td>
</tr>
</tbody>
</table>

- Cox regressions with controls for age and gender
  - Focus on past 15 years
  - Observations clustered within families
  - Control for gender and age
  - N = 8,807 siblings

- Similar results in Malawi
Conclusions

- Surveys are an important benchmark for assessing completeness of death registration
  - More frequent than censuses
  - Potential for even more frequent turnaround via cellphones
  - Allow assessing some disparities in mortality
- In combination with direct questions re: death registration, surveys might allow better understanding/quantifying disparities in death registration and their social determinants.
Limitations

- Key concern: sample size
  - adult mortality is a rare event, so measuring disparities is demanding
  - potential opportunity: need for large surveys to assess excess mortality linked to COVID-19