Tracking excess mortality in countries with limited death registration: the role of mobile phone surveys

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Excess mortality: a key measure of COVID-19’s impact

- Number of deaths above number of deaths that would have occurred if the COVID-19 pandemic had not happened.
- Increasingly accepted/recommended indicator:
  - not affected by limited availability of tests for SARS-CoV-2
  - bypasses issues of classification of causes of deaths
  - includes indirect effects of the pandemic
  - Should be largely comparable across countries and over time
Excess mortality: a key measure of COVID-19’s impact

- Regular updates from national statistical offices and health agencies
- Generated a lot of media attention
- EuroMOMO project
- Addition of data series on Short-term Mortality Fluctuations in Human Mortality Database
Excess mortality: data needs

- Data from a complete vital registration system
- Timely registration, so excess can be tracked on a weekly/monthly basis
- Population counts to account for changing population size and composition from year-to-year.
Excess mortality in low-income settings: challenges

Figure 1: Availability of data required to measure excess (source: UNSD)
Excess mortality in LLMICs: potential solutions

- WHO Recommendations: increasing facility-based and community-based recording and reporting of deaths.

- Issues:
  - Relies on modeled estimates for pre-COVID baseline.
  - Hard to scale-up such systems in “normal” times
  - Safety risks with increased community-based reporting, household visits etc...
Excess mortality in LLMICs: the role of mobile phone surveys

- Rapid proliferation of mobile phone surveys in the context of the COVID-19 pandemic.
- Very few mobile phone surveys collect data on mortality.
Rationale for mobile surveys about mortality

Figure 2: Expansion of access to mobile phones in Uganda
Rationale for mobile surveys about mortality

Supplement approaches recommended by the WHO

- Estimates of pre-COVID mortality can be obtained from mobile survey, using consistent methodology
- Can be rapidly and safely conducted in current context
- May reach areas where scale-up of death records is not happening.
Mobile surveys about mortality: what are the issues?

- Some issues shared with other mobile surveys, in particular sampling frame and sample selection bias
- Some issues shared with in-person mortality surveys: sample size and statistical power
- Issues specific to mortality measurement via mobile phone:
  - Sensitivity of the topic
  - Time to collect data
  - Accuracy of reported data
Pilot study in Malawi

- Study initiated before COVID-19 pandemic, as part of a multi-country validation study of survey data on mortality (R01HD088516)
- Study based in a Health and Demographic Surveillance System (HDSS) for reference data
  - Karonga Health and Demographic Surveillance System
Pilot study in Malawi

- Multiple assessments of mortality data
  - Validation vs HDSS data
  - Multiple members of the same family interviewed either by phone or in person to assess reliability (randomly allocated)
  - In-depth interviews with respondents and interviewers to assess issues related to sensitivity of the topic.
Pilot study in Malawi

- Sampled 150 families, among which index participants in 126 families completed an in-person interview and 342 of their siblings completed a mobile interview.
- Collected parental survival histories and siblings’ survival histories from respondents.
Pilot study in Malawi: participation

- Non-participation in mobile interview primarily due to phone ownership:
  - 33% of potential mobile participants did not own a phone
  - 10% resided in a HH without a mobile phone
  - Second reason for not participating: “could not be reached”

- Very few refusals to participate in mobile interview among potential respondents (<1%)

- Refusal to answer questions about survival of siblings and parents were extremely limited, comparable to in-person interviews (<1%).
Initial results: sensitivity of the topic

- In in-depth interviews, interviewers reported that circumstances of the death can make it more difficult to collect mortality data (e.g., violent deaths), regardless of the mode of interview.

- Different issues and skills involved in conducting in-person vs. mobile interviews.

  - “I feel like these issues [sadness among respondents] happen more during face to face interviews because I think that your physical presence and facial expressions make a great impact for them to remember their deceased. And I feel like the respondents also want to let you know how much pain they are going through so that you should sympathize with them.”  
    (Interviewer PL, 05/24/2020)
Initial results: duration of interviews

Figure 3: Time to collect data on maternal survival
Initial results: accuracy

- Systematic assessment of inter-sibling reliability
- Comparison with prospective records from HDSS for validation
- Analyses under way. Additional assessments will include accuracy of year and month of death reporting, symptoms preceding deaths etc.
Initial results: accuracy

Figure 4: Differences in reporting between modes of interview

Corr = 0.68

Age at death (mobile interviews) vs. Age at death (in-person interviews)
Conclusions

- Feasible to collect data on mortality via mobile phones.
- This might supplement current recommendations from WHO for rapid mortality monitoring during COVID-19 pandemic
  - Particularly in countries with the least robust data collection systems
  - Might also help improve estimation due to consistent pre-COVID baseline
- Additional work needed to adjust for sample selection biases and representativity of mobile phone data
Additional references:

- Pre-print on rationale for mobile phone surveys: https://osf.io/preprints/socarxiv/4bu3q/
- Pre-print on Malawi study, including COVID follow-ups: https://www.medrxiv.org/content/10.1101/2020.06.16.20133322v2