Using phone surveys to assess mortality

Evidence from Bihar, India

Aashish Gupta, Harvard University

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Introduction

- Multiple (complementary) sources of mortality information in India
- Uncertainty about pandemic mortality impact
  - Especially at the state level
- Promise of phone surveys
  - Lower costs
  - Surge in interest during pandemic
  - Increases in mobile phone coverage
  - Easier implementation for continuous surveillance
- Limited use in mortality surveillance
  - Mortality is a rare event
  - Given lower response rates, large sample sizes can still cost quite a bit
Pilot survey: Description

- Implemented in June 2021 in Bihar
  - Bihar is one of India's poorest and largest states (pop. ~120 million)
  - Mortality surge due to second wave in June 2021
- Question: deaths of any members in household since April 1, 2021
  - 505 households, 17 deaths
  - We calculate person-years of exposure (denominators) based on household size
  - Assuming dead members died in the middle of the exposure period
- Mobile phone numbers were scraped from an administrative dataset
  - Beneficiaries of the Public Distribution System (PDS) in Bihar
    - 80% of rural households are covered under the PDS
    - Approx 60% have phone numbers in our dataset
    - Our contact rate was 41%
  - We did not weight our estimates in the pilot
Pilot survey:
Results

Observed annualized Crude Death Rate of 24.3 deaths per 1,000 [95% CI 13.0-37.4] during the second surge of the pandemic in Bihar; more than four times baseline mortality (5.8 deaths per 1,000 per year).

Comparison of crude death rate observed in the phone survey with:

- Baseline rates observed in the Sample Registration System
- Adjusted rates observed in the Civil Registration System, used in current estimates of excess deaths

Figure 1: Large increase in death rates in Bihar in April-June 2021

Note: Sample Registration System (SRS) covers a sample of 374,000 people in Bihar. Civil Registration System (CRS) covers all of Bihar, but 51.6% of deaths were estimated to be registered in 2019. Adjusted April-May 2021 estimates from the Civil Registration System (CRS) are annualized Crude Death Rates. They are adjusted by the inverse of the rate of completion of death registration in 2019 in the CRS. This estimate assumes that the increase in unregistered deaths was the same as the increase in registered deaths. Survey estimate are from a survey of beneficiaries in the Public Distribution System.
Pilot survey: Results

Despite a small sample size . . .

Figure 2: High probability that mortality during second surge in Bihar was at least 3 times baseline mortality

Note: Graph shows probabilities of annualized crude death rate in 1 Apr - 17 Jun 2021 being 2-5 times baseline mortality (5.8 deaths per 1,000 in 2018). Calculations are based on 1,000 bootstrap samples.
B-MAPS approach

- Bihar Mortality Assessment Phone Survey (B-MAPS), funded by University of Pennsylvania Institute for the Advanced Study of India (UPIASI)
- Sample size > 17,000 households; estimated cost ~ USD 45,000
- Sampling frame: administrative dataset of Public Distribution System beneficiaries
  - Interviews in all districts
- Question on deaths in the household in the last four years (>3,200 deaths)
  - Whether death was registered
- Question on last death in the household if no death in the last four years
B-MAPS approach

- Piloted multiple ways to measure exposures
  - Summary household size
  - Number of household members by sex and age group
  - Detailed enumeration of household members by age and sex
- Also ask respondents to report births and still-births in last four years
- Additional questions of interest (gender, education, healthcare, governance) implemented in sub-samples
- Survey conducted Feb-Aug 2022
Preliminary summary statistics (unweighted)

- Religion: 84.1% Hindu, 15.7% Muslim
  - Census 2011: 83.1 Hindu, 16.5% Muslim
- Social group: 16.6% Scheduled Caste, 1.8% Scheduled Tribe
  - Census 2011: 16.6% Scheduled Caste, 1.4% Scheduled Tribe
- Assets: 76.2% Chair, 85.4% Fan, 4.7% Fridge
  - NFHS-5 (2019): 75.5% Chair, 85.3% Fan, 5.6% Fridge
- Survey duration: Mean: 12.5 minutes, Median: 11.2 minutes
Preliminary summary statistics: Unweighted
Next steps

- Estimate:
  - Person years and death rates
  - Extent to which baseline death rates (2019) match existing estimates (SRS/NFHS)
  - Overall excess mortality in 2020 and 2021
    - By age group
    - By social group
  - Extent to which deaths were registered
- Weights, representativeness in our sample, and other implementation lessons
  - Measure mortality in a representative sample in Bihar and compare our results
  - Compare weighted estimates with unweighted ones
- Other approaches to doing phone surveys:
  - Can we do RDD samples with new screening and interviewing strategies