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Research Synthesis: CATI in LMIC through a Total Survey Error Framework

Abigail Greenleaf, PhD MPH, *ICAP at Columbia University*

Charles Lau, PhD



Presentation Overview

Background

Methods

Results

Representation

Conclusions

Background

- **Survey modes in high income countries have evolved from face-to-face (FTF) to telephone (1980s) and web (2000s) surveys, while LMIC have continued to rely on face-to-face interviewing**
- **Over past 15 years, CATI increased dramatically in LMIC**
- **Literature is disparate: siloed across disciplines, countries, and research designs**

The objective of this Research Synthesis is to summarize findings about representation and measurement from peer-reviewed methodological research on CATI in LMIC

Method

Used Scoping Review methodology:

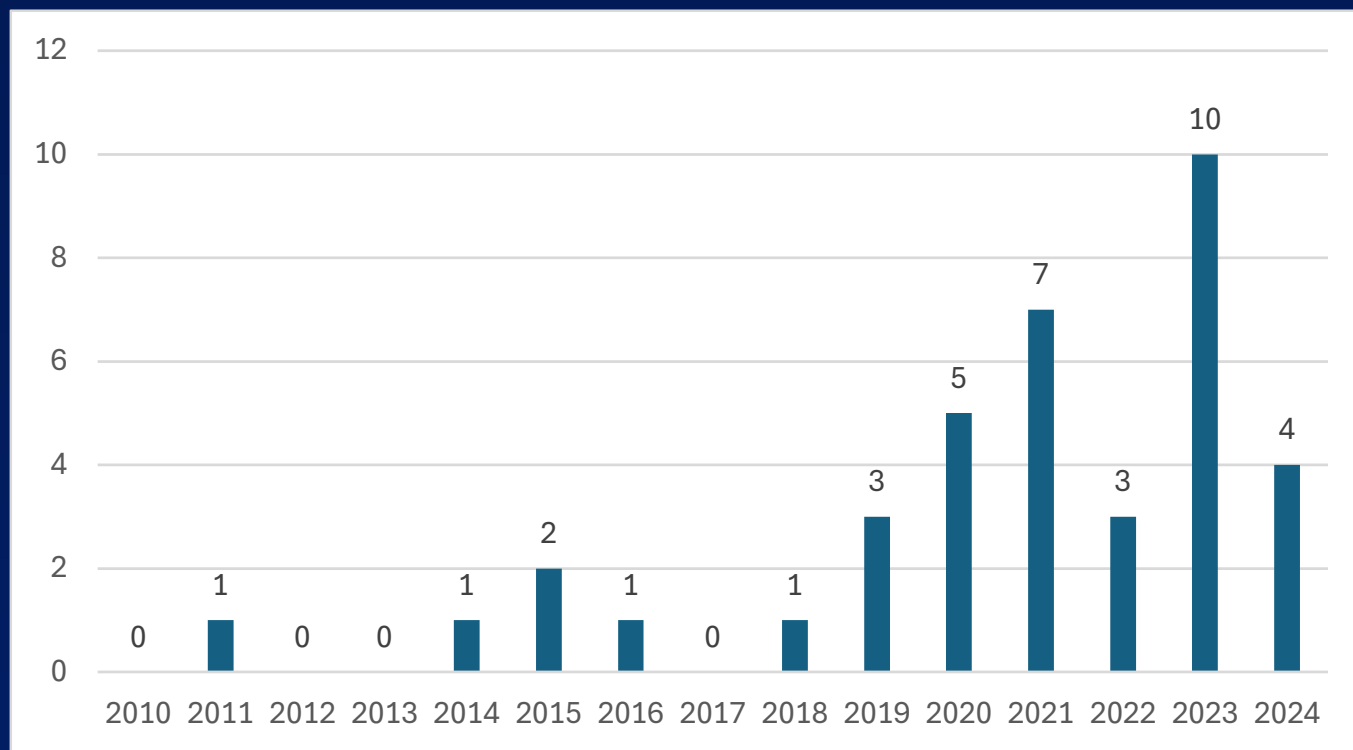
1. Drafted search terms and queried seven search engines June 4, 2024
2. Established inclusion criteria
3. Screened titles and abstracts then reviewed the full text
4. Extracted data
5. Summarized findings

Inclusion Criteria

- CATI
- Research conducted in LMIC
- Mobile phone-based
- Primary data collected for survey or surveillance (i.e. not an intervention)
- Total survey error component
- 2010 – current
- Any subject matter
- Any target population other than a rare or highly specialized group
- Sample size greater than 100

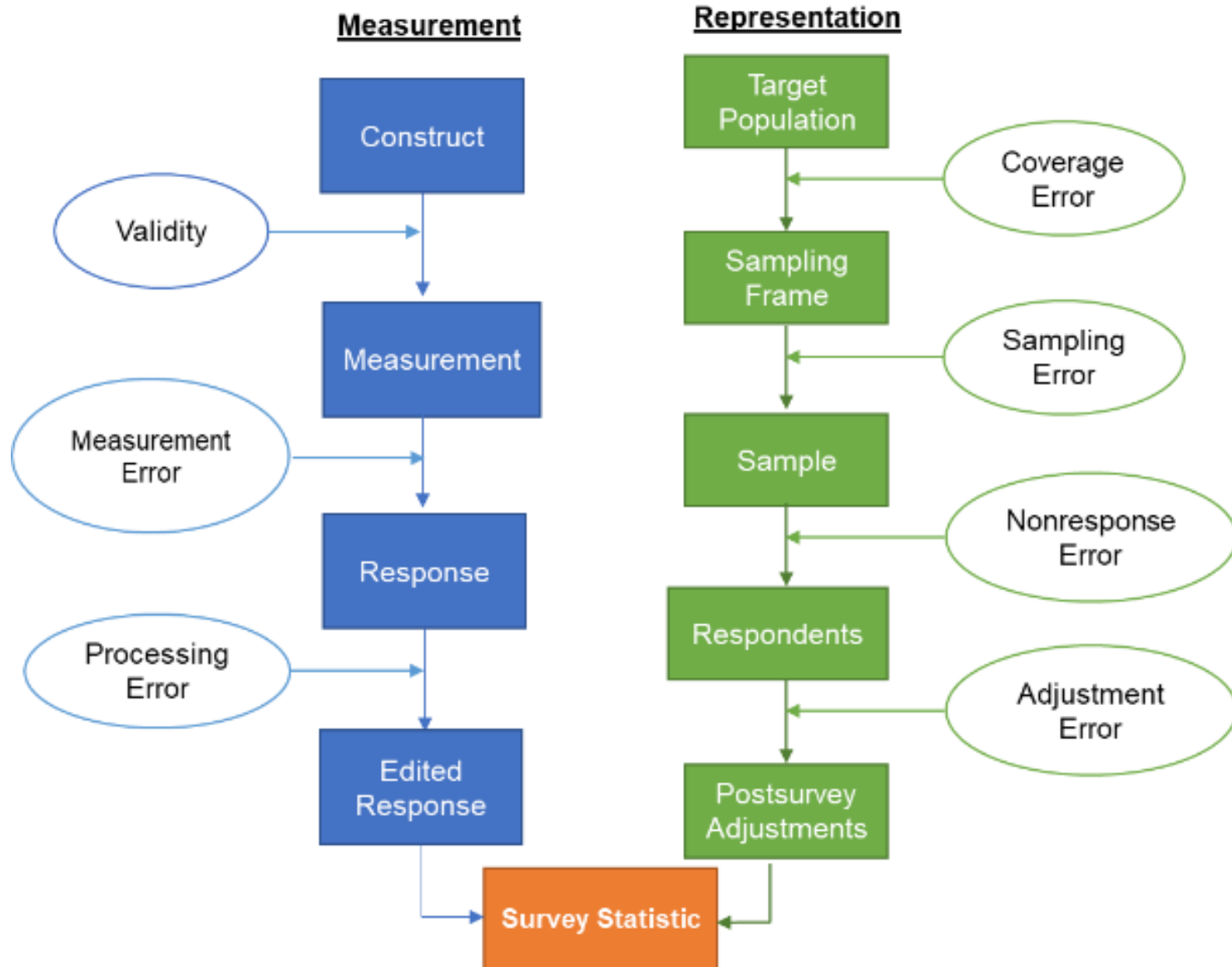
RESULTS

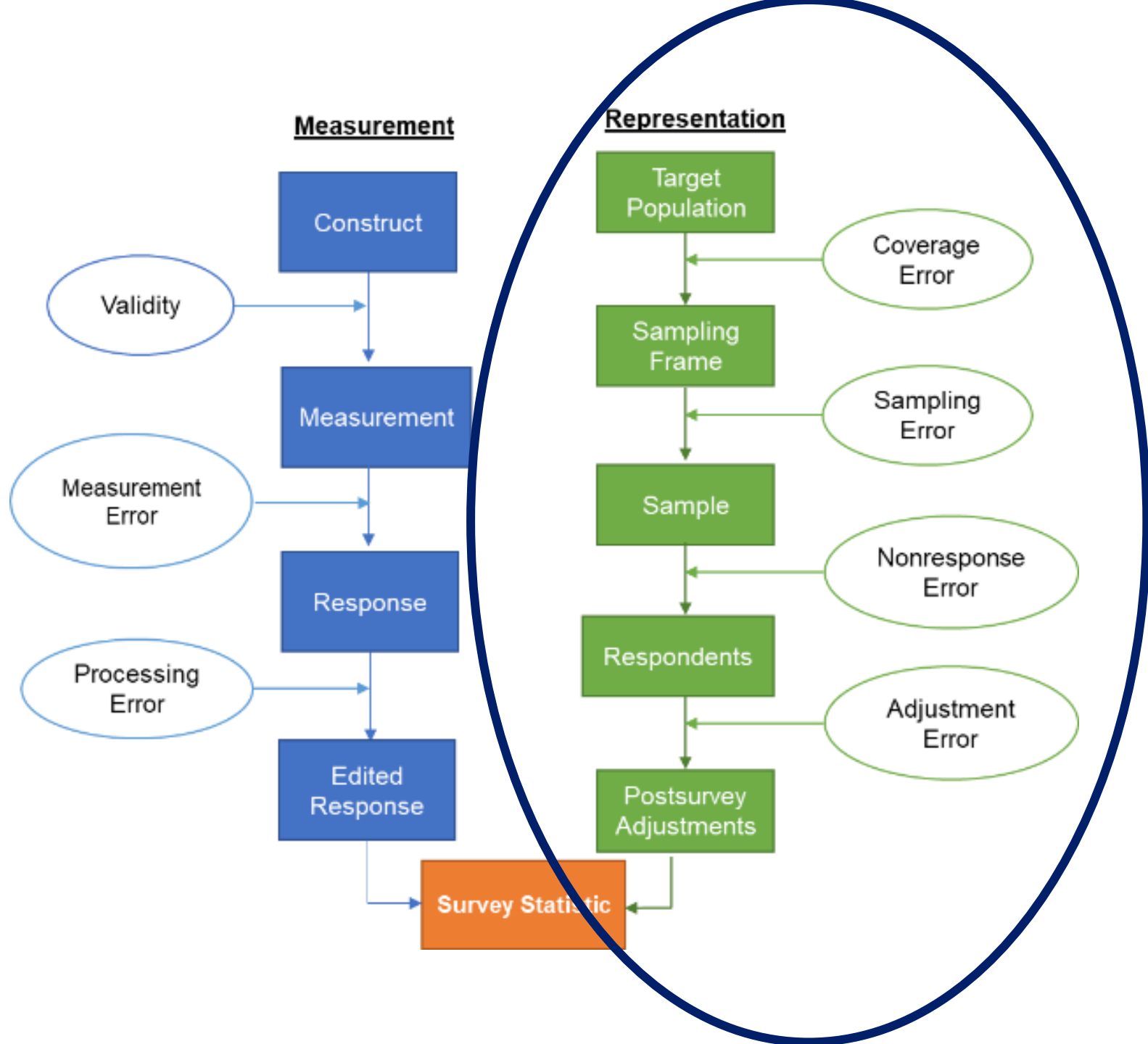
Number of LMIC CATI TSE publications by year, 2010 – 2024 (N=38)



Among the 36 unique study designs:

- 22 studies took place in Africa; 8 in India
- 27 studies' subject matter was public health
- 30 surveys, 6 surveillance manuscripts
- 31 cross-sectional, 6 longitudinal
- Number of respondents ranged from 115 to 154,494
- 14 reported interview length, ranging from 5 to 45 minutes, with a median of 21.5 minutes
- 9 studies reported incentive amount, 5 provided \$1, 1 study <\$1 and 3 studies >\$1





Target population

- **General population (N=27)**
 - **Country (N=17)**
 - **State (N=5)**
 - **City (N=3)**
 - **District (N=2)**
- **Women (N=8)**
 - **Country (N=2)**
 - **State (N=3)**
 - **District (N=2)**
 - **City (N=1)**
- **Health workers (N=1)**
 - **District**

Sampling Frame

- **16 studies RDD**
- **12 FTF follow-up**
- **8 created a sample frame another way**
 - **Collected by Healthcare workers**
 - **Vendor database**
 - **Women selected by chiefs from a master list of residents**
 - **Women who presented for childbirth at study facility**
 - **Annual census**
 - **Program participants**
 - **Previous CAPI survey**

Coverage Error

- **Under-coverage (the sampling frame omitting units from the target population) is of concern due to unequitable mobile phone ownership in LMIC**
- **As an example, mobile phone ownership in LMIC varies greatly: ownership is 40% in Ethiopia, 55% in Uganda, 67% in Nigeria, 72% in Mali, and 85% in Lesotho**
- **El Kasabi & Khan (2023) analyzed data from 36 LMIC and found those who own a phone are more likely to be “males, urban residents, literate, married, and relatively wealthy”**
- **Articles that address coverage error that didn’t meet inclusion criteria: Doyle et al., 2021; Jadhav & Weis, 2020; G. M. Al Kibria & Nayeem, 2023; Mistry et al., 2021; Olamoyegun et al., 2020**

Sampling

RDD (n= 16)

- 7 quota sampling
- 10 other sampling designs:
 - Multi-stage
 - Sampling proportional to market share of each mobile operator

FTF (N= 12)

- 7 used entire frame
- 2 called half the frame
- 2 used multi-stage design
- 1 enumerated all HH members and sample one (not necessarily the person who picked up the phone)

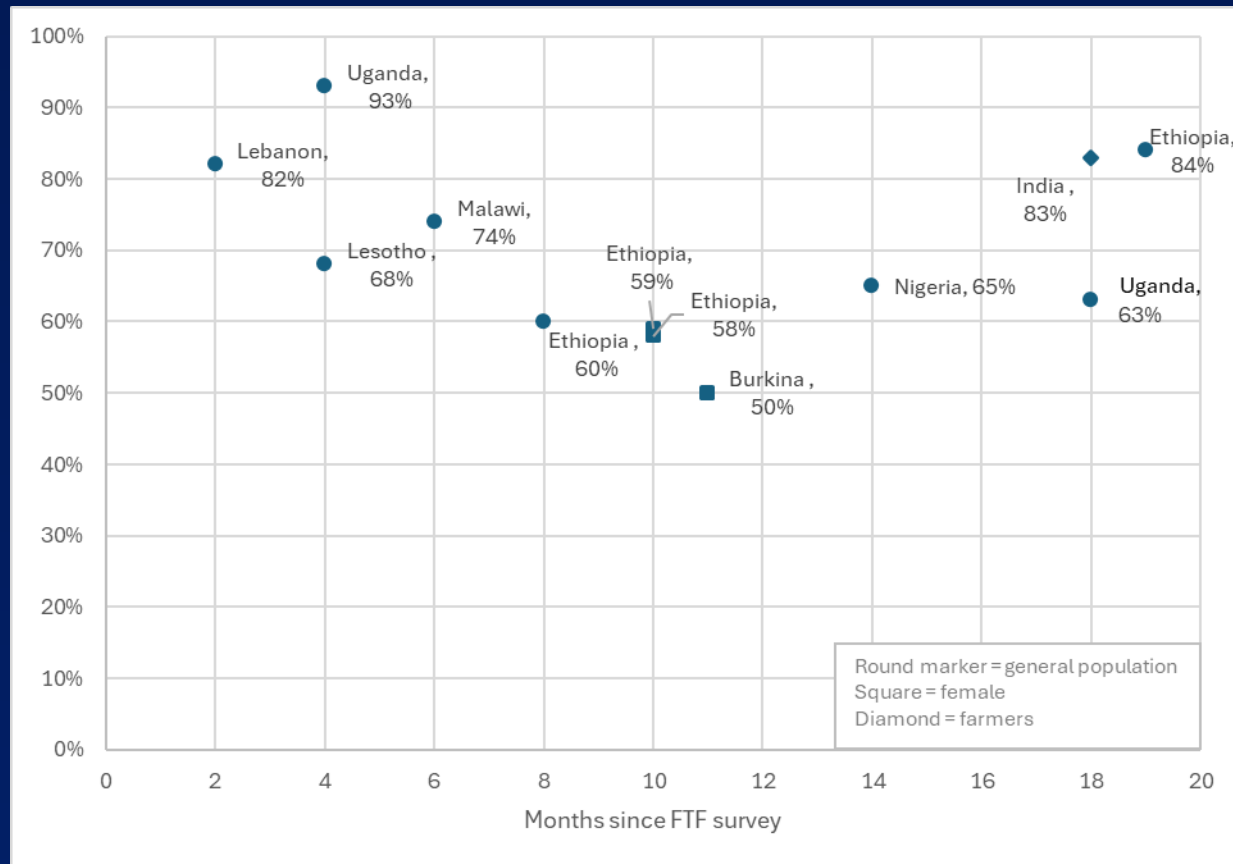
Two sampling approaches explicitly designed to reduce coverage and nonresponse error:

1. Passing the phone
2. Person who picks up survey call asked to provide a household listing, then randomly selecting a participant

Response Rates by Months since Collecting Phone Numbers (FTF)

Respondents

- Methods for calculating response rates were inconsistent
- 12 of 16 RDD studies reported a response rate. Range: 3% to 52%
- 10 of 12 FTF studies reported a response rate. Range: 50% to 93%



Non-Response

- 9 articles addressed causes of non-response
- Noncontact was largest source of non-response
 - 41% Burkina Faso
 - 83% Nigeria
 - 31% India
- Cooperation (refusal and break-off)
 - Response rate by survey topic (mixed findings)
 - Response rate by survey length (no bias found)
 - Response rate by key socio-demographics (no bias found)
 - Break-off differed by socio-demographics in Bangladesh but not Tanzania
 - Break-off differed by survey topic, with lower breakout rates when interesting survey content was earlier

Post-survey adjustment

- **14 articles described weighting**
- **7 used post-stratification weights only**
- **2 studies had complex designs (using FTF weights as the base)**

Additional methods:

- **Propensity score weights**
- **Raking**
- **Weighting for multiple phone numbers**
- **Logit modeling for non-response**
- **Calibration entropy**

Adjustment Error

- **Nine articles addressed the effectiveness of weights**
- **5 weights made the sample more representative but had mixed results improving the outcome of interest.**
 - **2 studies (Myanmar and Brazil) had comparable outcomes btwn FTF and CATI**
 - **2 studies did not compare outcome of interest**
 - **1 study (Bangladesh/raking) found study outcomes remained different**
- **4 weights were unsuccessful**
 - **Weighting for multiple phone numbers only (Cote D'Ivoire)**
 - **Post-stratification weights in Burkina Faso (2018)**
 - **Complex weights for COVID-19 vaccination status (Uganda) did not change point estimate**
 - **Multi-country study with propensity score matching using household information**

Overall Representativeness of CATI surveys in LMIC

- 20 articles studied representativeness
- RDD: 2 studies had good representativeness (Colombia, Myanmar)
- FTF follow-up: more representative than RDD surveys. 4 surveys generally match FTF sampling frame (Ethiopia, India, Lesotho, Uganda)

Patterns of under-representation in RDD surveys

Less education	Berry et al., 2021 Glazerman et al., 2023 Greenleaf, Gadiaga, Guiella, et al., 2020 Larmarange et al., 2016 Lau et al., 2019; Maffioli, 2020 Pariyo et al., 2023; Ramesh et al., 2023
Asset poor	Glazerman et al., 2023; Maffioli, 2020
Low income	Nagpal et al., 2021; Ramesh et al., 2023
Women	Larmarange et al., 2016; Lau et al., 2019; Maffioli, 2020; Ramesh et al., 2023; Woelk et al., 2024
Rural dwellers	Larmarange et al., 2016; Lau et al., 2019; Maffioli, 2020; Pariyo et al., 2023 Larmarange et al., 2016
People living in less populous regions	Greenleaf, Gadiaga, Guiella, et al., 2020; Larmarange et al., 2016
Older adults	Glazerman et al., 2023; Greenleaf, Gadiaga, Guiella, et al., 2020; Larmarange et al., 2016; Lau et al., 2019; Pariyo et al., 2023

THANK YOU