Role of empirical observations and model-based estimates with uncertainty for global and country-level monitoring

Experience of child mortality estimates

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Overview of Presentation

- Summary of UN IGME work
- Empirical data and model-based child mortality estimates
- Challenges and opportunities

I. The Work of UN IGME

UN IGME

- Year of birth: 2004
- Objectives of the UN IGME
  - **Harmonize estimates** within the UN system
  - **Produce consistent estimates** of child mortality worldwide **for reporting on progress** on child survival at global level
  - **Improve methods** for child mortality estimation, including data quality assessment methods, curve fitting methods, etc.
  - **Build and enhance capacity** of countries to produce timely estimates of child mortality
- Member agencies:

unicef | World Health Organization | WORLD BANK GROUP | United Nations

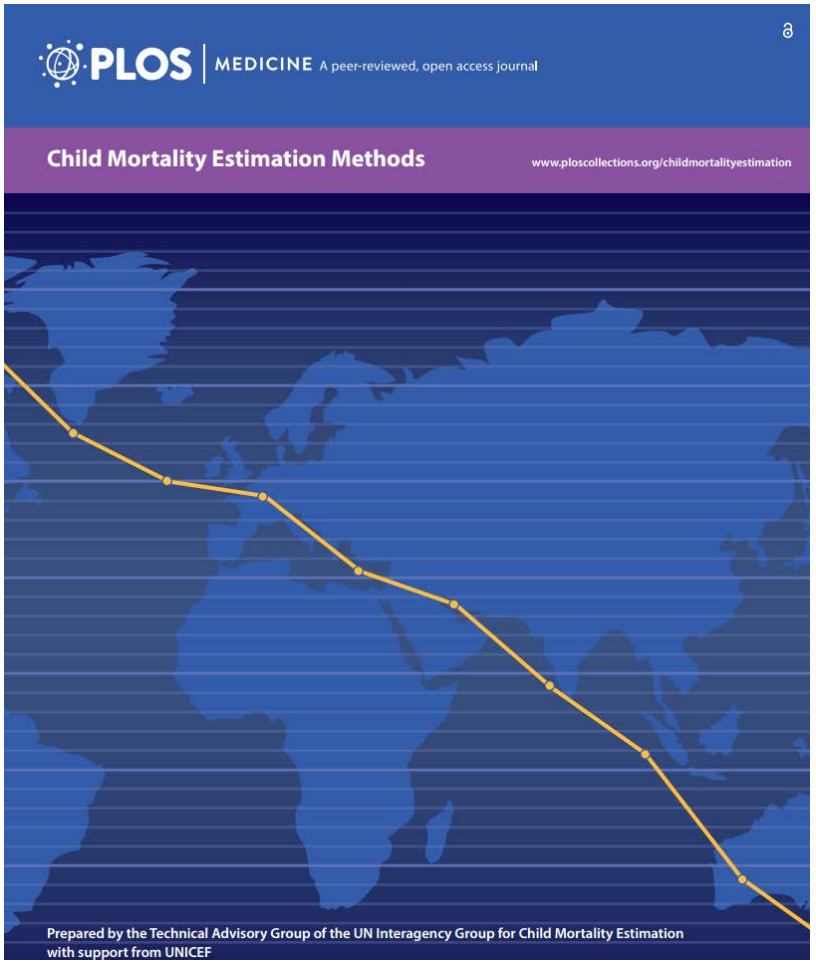
TAG of the UN IGME

- Technical Advisory Group (TAG)
  - Independent
  - Composed of leading experts in demography, statistics, biostatistics and public health
  - Provide technical guidance on estimation methods, technical issues and strategies for data analysis and data quality assessment
  - 2 meetings every year

Scope of the UN IGME work

- Estimation of child mortality
  - Currently produces estimates of U5MR, IMR, NMR and sex-specific U5MR, IMR
  - Planned work includes child mortality beyond age 5, disparities in child mortality, etc.

- Methodological development
  - Curve fitting modelling work
  - Estimates using smaller intervals
  - Data quality assessment
  - Age pattern of child mortality
  - Direct estimates vs. indirect estimates
  - etc.



Scope of the UN IGME work (cont'd)

- Country capacity building through regional workshops, country missions, remote technical support
  - Purpose
    - **Explain IGME estimation methods** to reach mutual understanding: why discrepancies exist between IGME and country official estimates, etc.
    - **Engage countries in the IGME estimation process**
    - **Provide technical training** to countries in data quality assessment and child mortality estimation
    - **Evaluate CRVS system**: completeness of birth and death registration; provide recommendations to improve CRVS
  - **Participants**: Officials from MOH and NSO; professionals from universities, research institute; UNICEF ROs and COs
  - **7 regional workshops**, 250 participants and about 120 countries
  - **About 15 country missions** in recent years: Rwanda, South Africa, Mongolia, Mexico, Belarus, Azerbaijan, Georgia, Kazakhstan, Uzbekistan, Tajikistan, etc.

Country consultation

- Purpose
  - Inform countries about the forthcoming UN IGME estimates
  - Provide opportunities to countries to share feedback on empirical data and the UN IGME estimates
  - **Not a country approval process**
- Process
  - WHO to send country consultation email to MOH directly after identifying focal point from countries
  - UNICEF to send to NSO through UNICEF country offices
  - Countries are given one month to provide feedback or new data
- 2015 country consultation results
  - 88 among 195 countries responded; 45 of those provided comments or additional data;
  - UN IGME draft estimates were revised for 33 countries using new data

Data use

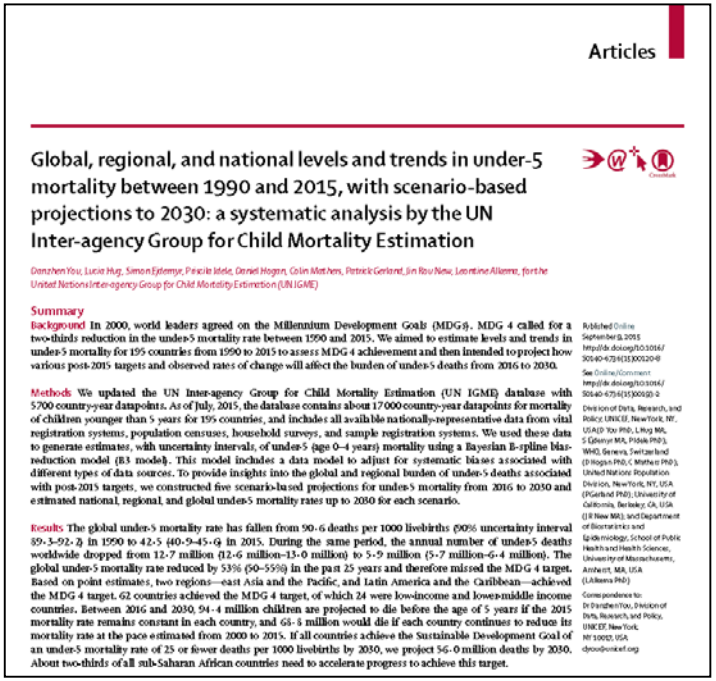
- In-depth analysis on child survival: A Promise Renewed report, Progress for Children report, The State of the World's Children report, MDG report, Call to Action Report, etc.

- IGME estimates and findings from UNICEF in-depth analyses are widely used by UN, UN agencies, NGOs, donors, public health community, etc.

- Also used in some countries for policy advocacy, planning and decision making

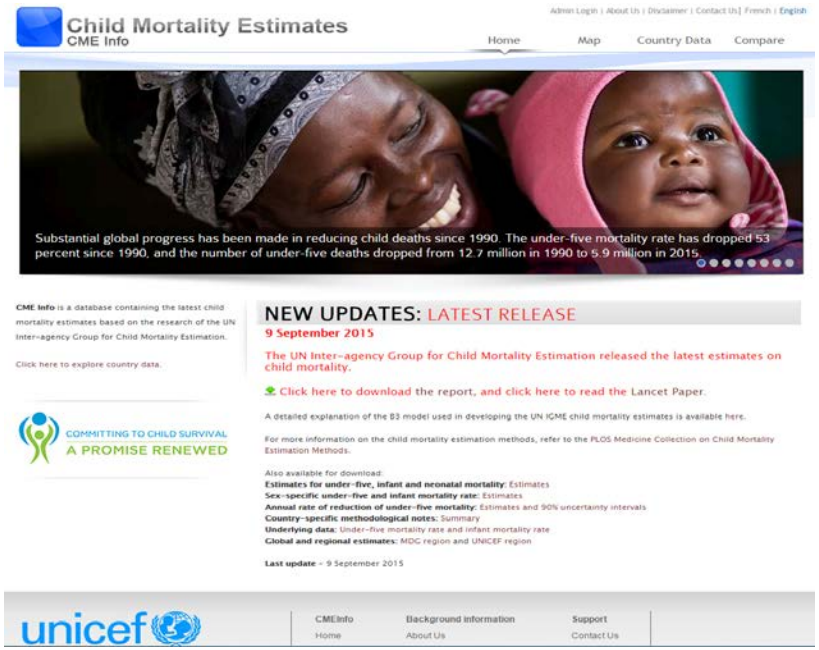
Data dissemination

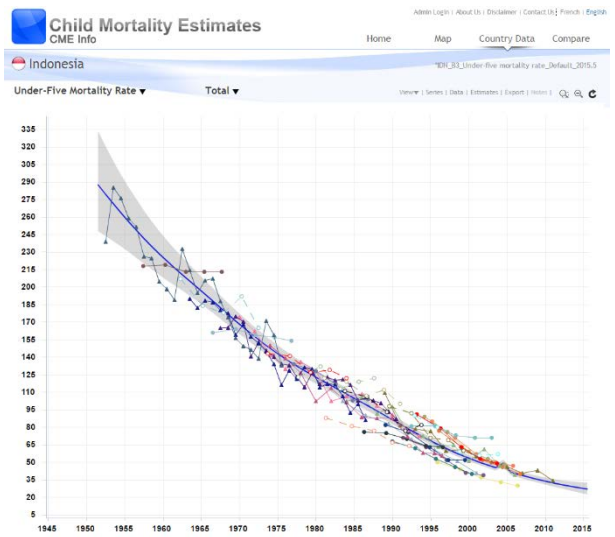
- Reports: IGME report, APR report, SOWC report, etc.
- Peer-reviewed journal articles, comments: Lancet, PLoS Medicine, etc.
- CMEInfo, data.unicef.org
- Press release, social media, etc.
- UNICEF ROs and COs, others

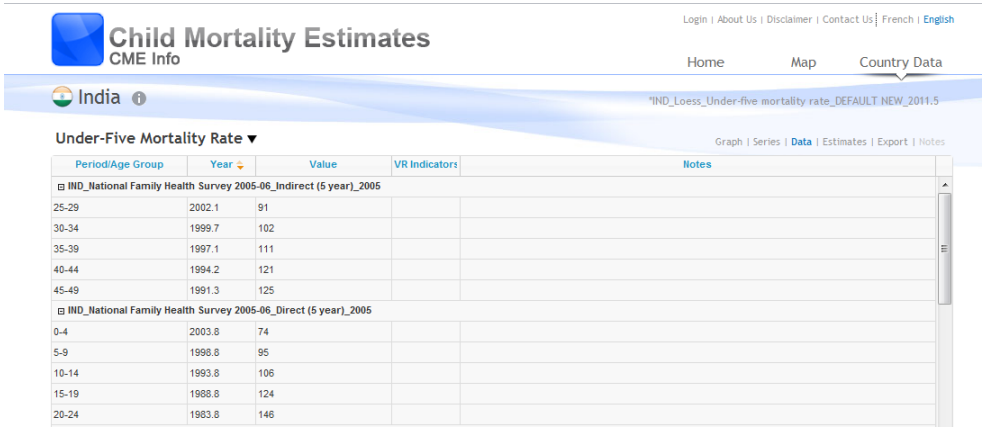


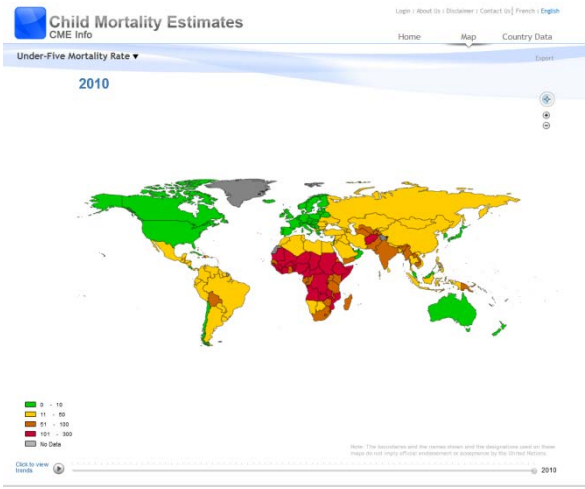
CME Info

The IGME's Child Mortality Database: **www.childmortality.org**





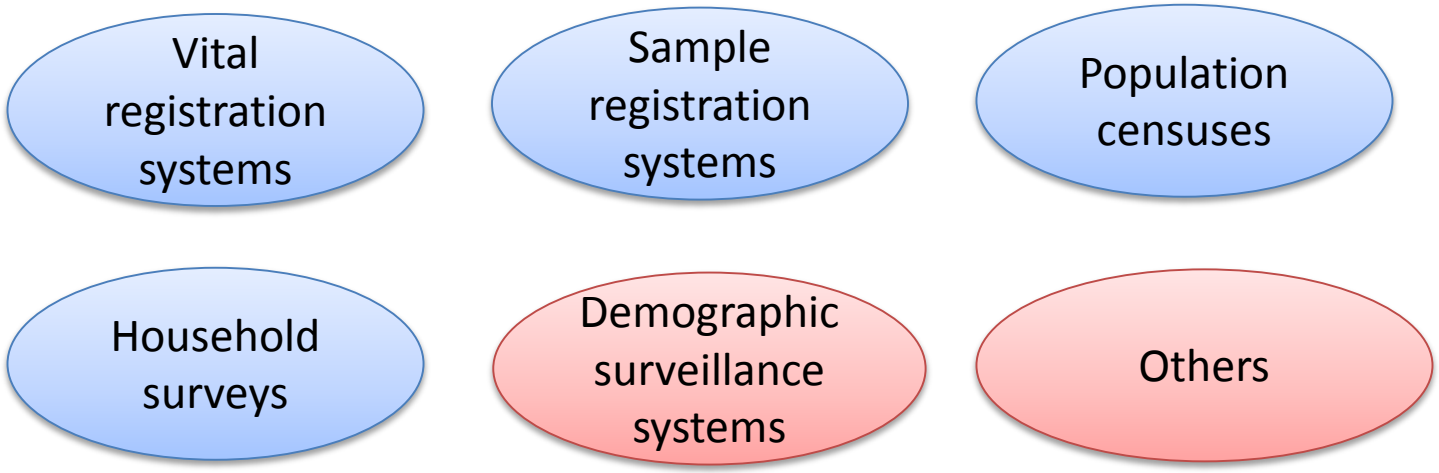




II. Child Mortality: empirical data and model-based estimates

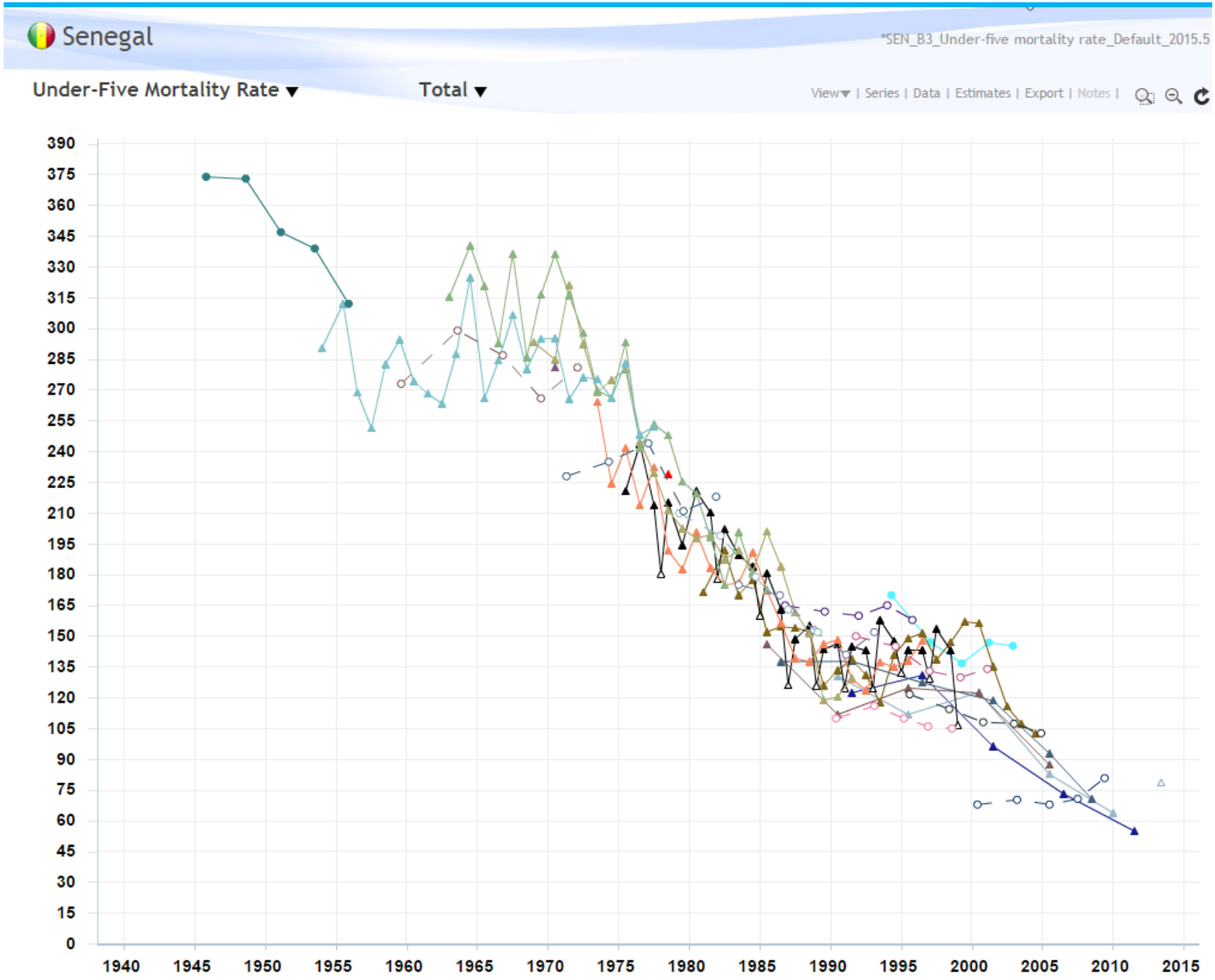
Data

- Data sources

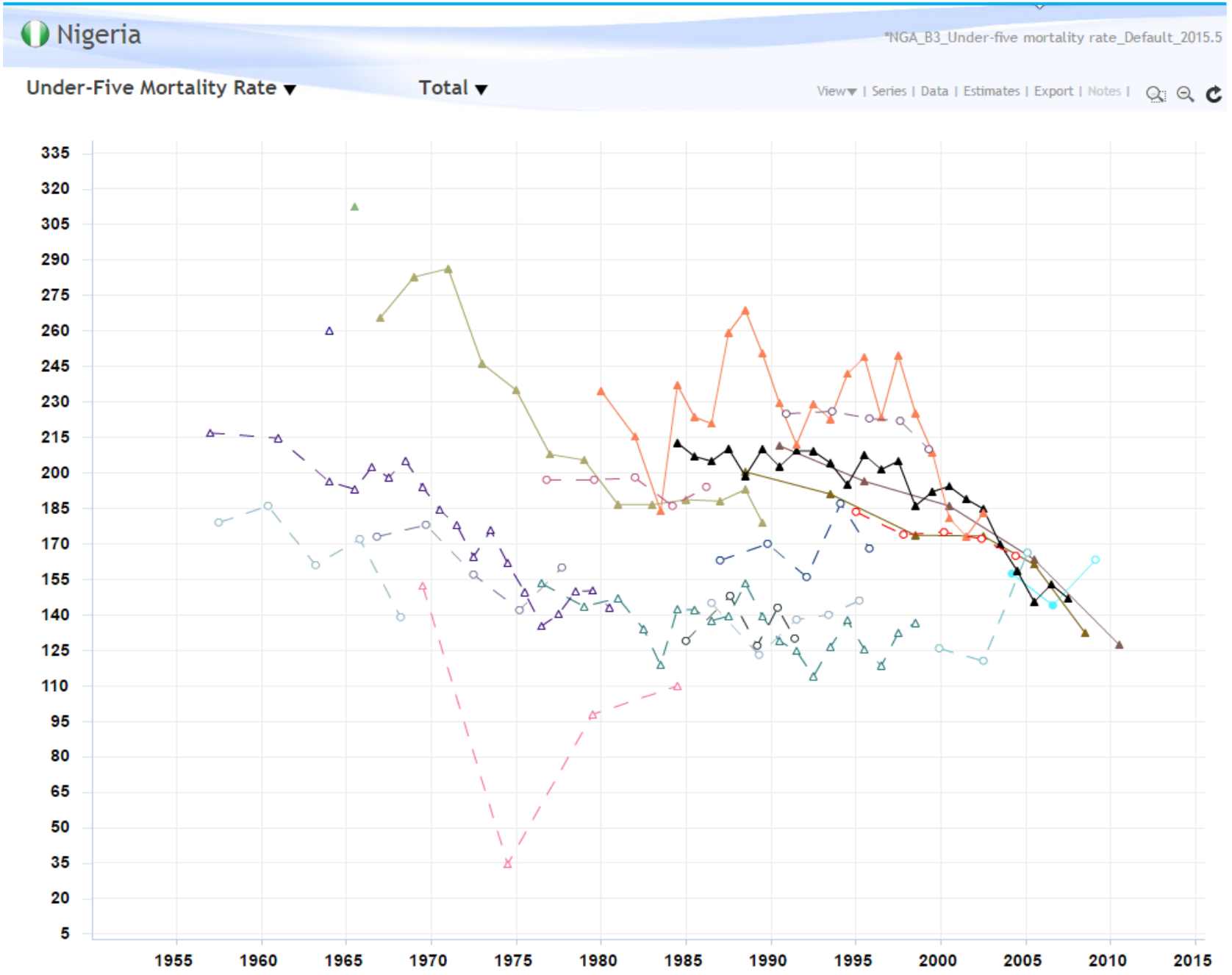


- Main data errors
  - omission of deaths
  - misreporting of age at death or date of birth
  - sampling errors (surveys)
  - violation of assumptions (indirect only)

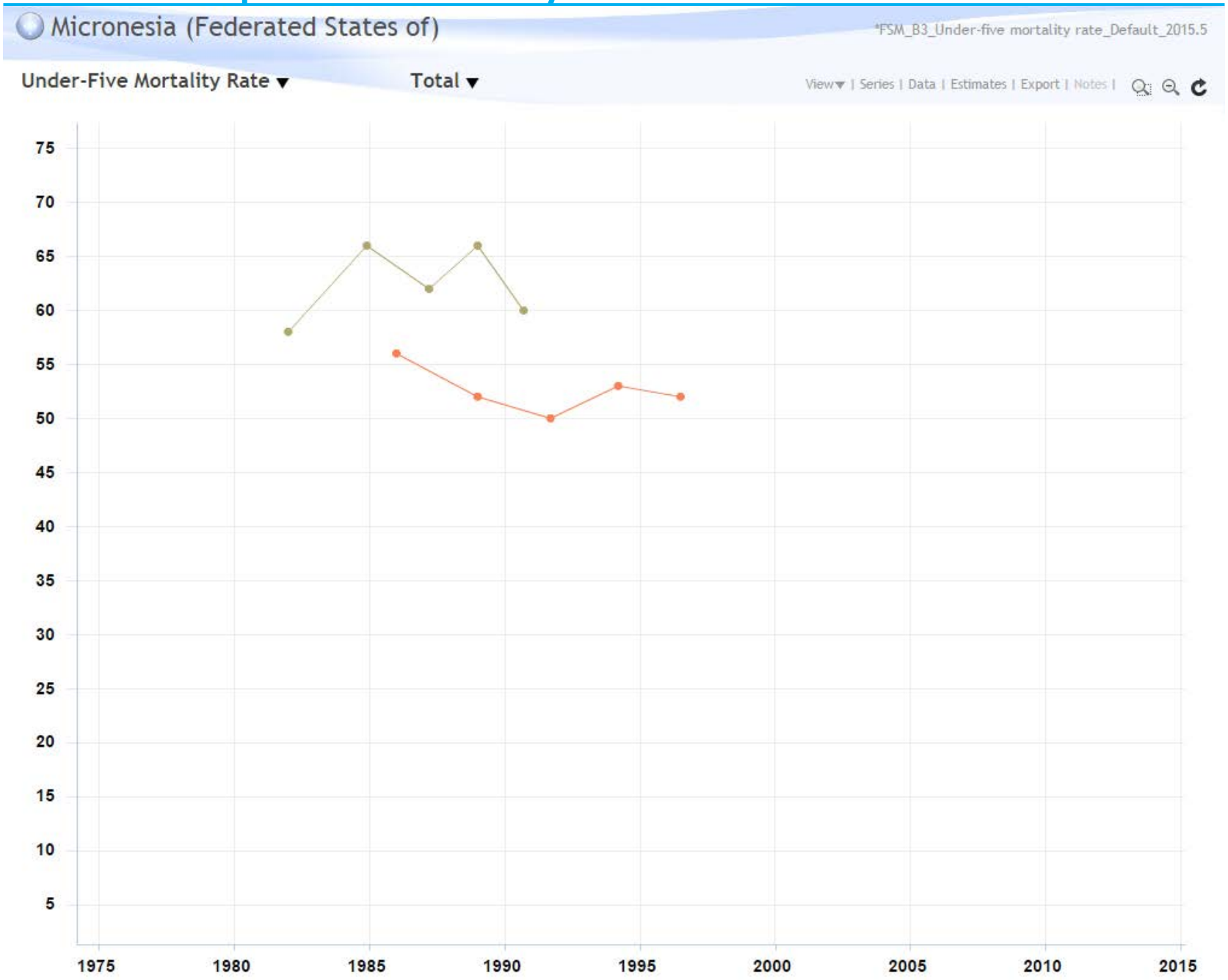
Data rich country with small variations



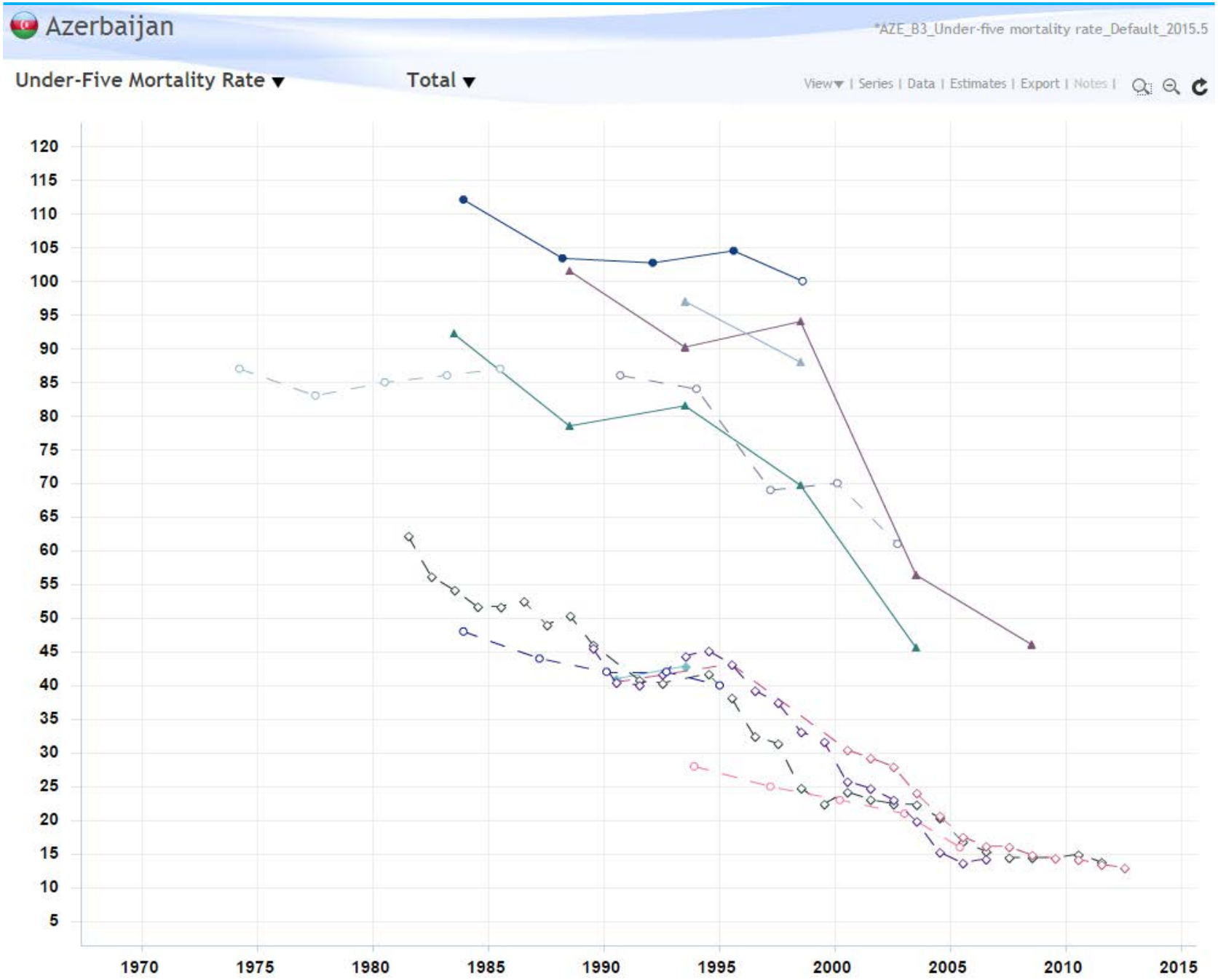
Data rich country with wide variations



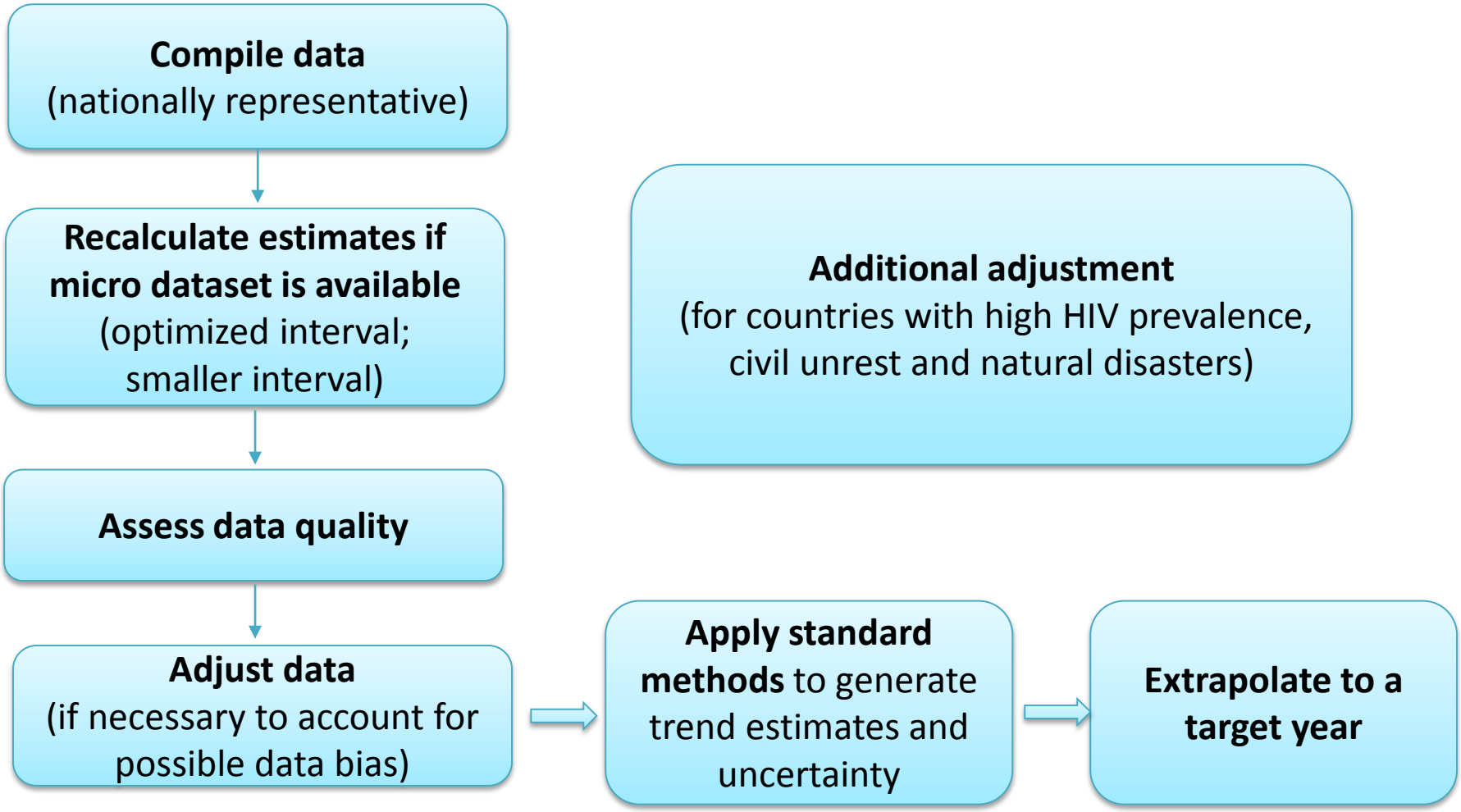
Data poor country without recent data



Incomplete VR data country

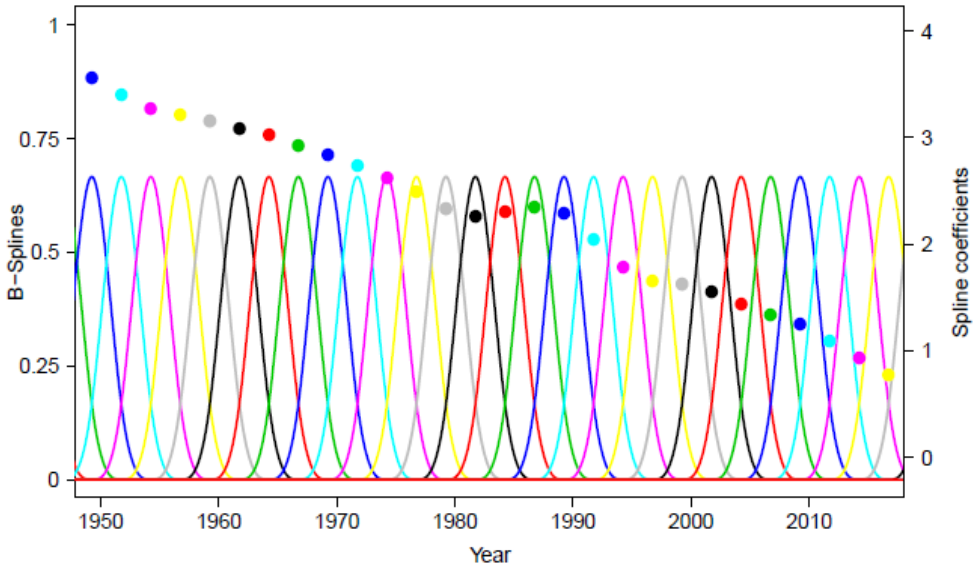


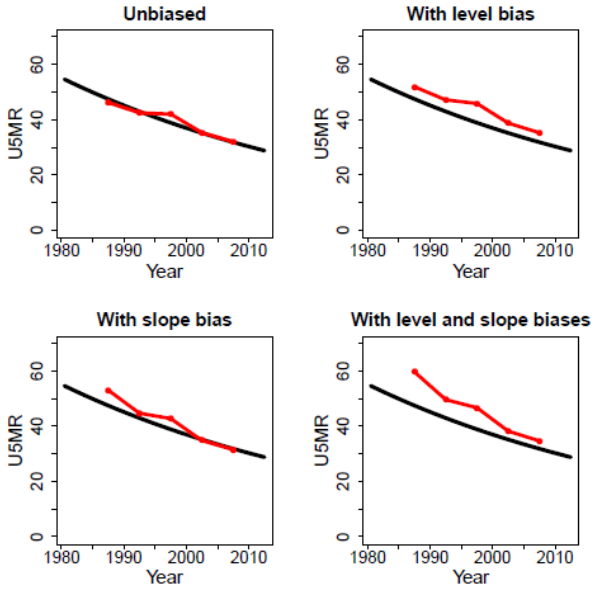
UN IGME approach to measuring child mortality



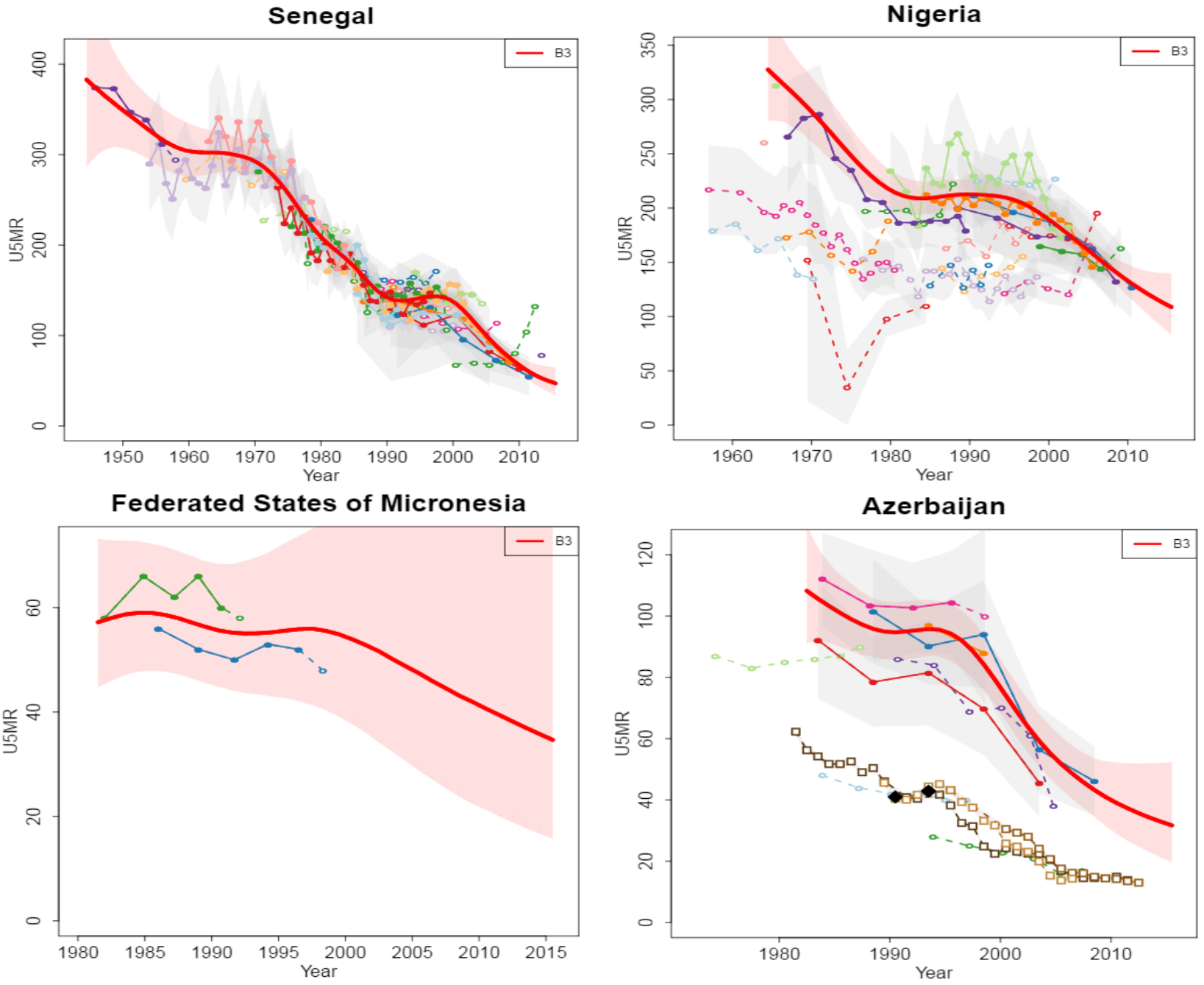
Curve fitting methods

- Bayesian, B-Spline, Bias-reduction model
  - Account for potential data bias
  - Better capture short-term fluctuations and annual rate of reduction, thus is better able to account for evidence of acceleration in the decline of mortality from new surveys
  - Allows the inclusion of additional information, e.g., incomplete VR data
  - Performs well in out-of-sample model validation exercises





UN IGME U5MR estimates with uncertainty



Why use a model to derive child mortality estimates?

- Lack of a single source of high quality data covering the last several decades
  - Lack of civil registration systems that accurately record all births and deaths
- Data quality issues in some data sources and discrepancies may exist between estimates from different sources
- Empirical data are usually not timely
  - Direct estimates: often refer to an average for a five-year period prior to the survey. IGME uses optimized smaller intervals if sample size allows
  - Indirect estimates: from women aged 25-29, refer to about 2-3 years before the survey
- Consistent trend line is needed for monitoring progress over time

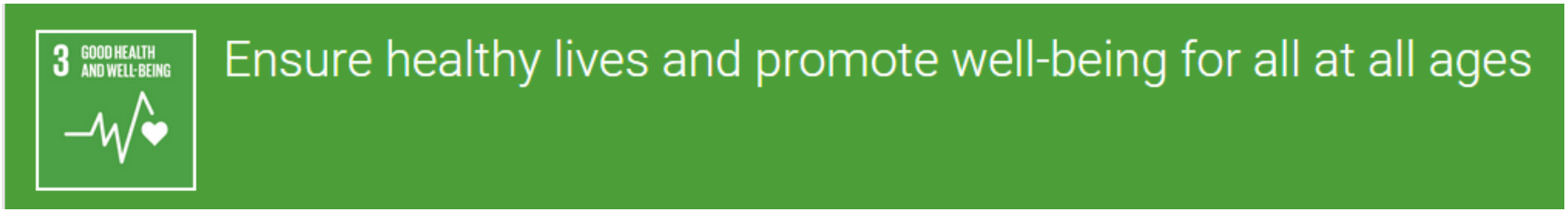
Pros and cons of global estimates

- Pros
  - Consistent, comparable, more reliable (quality assessment)
  - Transparent
  - Provide a broad picture of levels and trends in child mortality and monitor progress at global level
  - Contribute to methodological development
  - Contribute to capacity building at country level by engaging in countries through the process

- Cons
  - Quality of estimates relies on quality of empirical data
  - Sometimes confusing because of discrepancies to country official estimates
  - Insufficient involvement from countries in estimation and data utilization
  - Estimates of uncertainty produced but not used in monitoring MDG progress
  - Changing estimates for the full series in each round sometimes causes confusion and problems

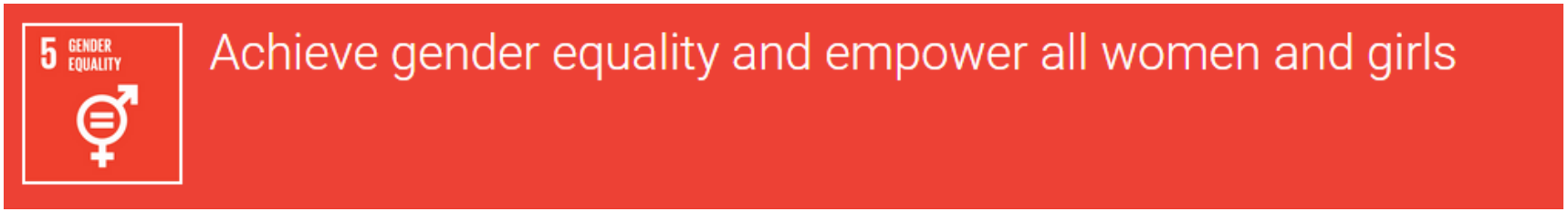
III. Challenges and Opportunities

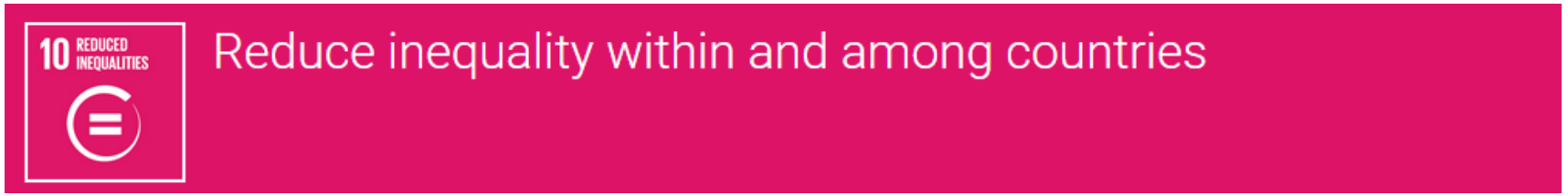
SDG target on child mortality



3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births

Relevant goals:





Challenges

- Poor availability of high-quality data
- Typically not timely
  - As of July 2015, about 40 countries do not have child mortality data for 2011 onwards
- Lack of subnational and disaggregated data
  - The SDG challenges for further disaggregation by age group, sex, social-economic characteristics and for small areas etc. For evidence-based decision making, planning and programming, subnational and disaggregated data are needed but these data are not available in many LMICs
  - **Household surveys** can't be used to generate child mortality estimates below provincial level due to the design of sampling frame and sample size
  - Mortality estimates from **censuses** are often underreported; census data are not fully used due to limited availability of micro datasets
  - Other data sources (disease surveillance systems, etc.) are often not fully used

Challenges (cont'd)

- Misuse and misinterpretation of data
  - Connect the latest data points from different surveys to obtain trend lines
  - Reference dates
- Lack of capacity in many countries
  - Calculation of indirect estimates from SBH, direct estimates from FBH
  - Data quality assessment
  - Modelling work

Opportunities

- Continued efforts in data collection from household survey programmes (MICS, DHS, etc.)
- Growing momentum for improving CRVS systems
- Improvements in data availability
- Advances in analytical methods
- Expanded knowledge of child mortality rates and trends in the world
- Data revolution: awareness of importance of data; possibility of innovation in data collection, reporting and utilization
- SDG 3.2: end preventable deaths of newborn and children under the age of five
- Stronger commitment and improved accountability

Recommendations

- Surveys and censuses: ensure high-quality data
- Need fully functioning and complete CRVS systems and HIS systems
- Innovative methods to collect, analyze and use data (e.g., geospatial mapping; combine or triangulate data from various sources to produce a more complete picture across both time and space)
- Fully use existing data and resources (disease surveillance data, health facility data, etc.)
- Capacity building at country level for data collection, analysis and utilization

Ideally **- no modelling work is needed if all countries have fully functioning CRVS and HIS systems to produce transparent, accurate frequent, timely and disaggregated mortality data, including COD data.**

Thank You