International experience with the use of analytical approaches and multiple data sources to evaluate the completeness of child mortality data from vital registration systems in LMICs

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UNICEF

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Presentation based on the work of the UN Inter-agency Group for Child Mortality Estimation (UN IGME)

Thanks to:

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UN IGME

- Year of birth: 2004
- Member agencies:

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

- Work scope of the UN IGME and its TAG
  - Estimation of child mortality
  - Methodological development
  - Country capacity building
- www.childmortality.org

Key issues for recording births and deaths in vital registration systems

Births and deaths records of children under age 5 may be affected by:

- Age misreporting
- Displacement of births and deaths
- Underreporting and omission of births and deaths
- Misclassification (because of different definitions etc.)

Methods to evaluate completeness and quality of child mortality data from VR systems

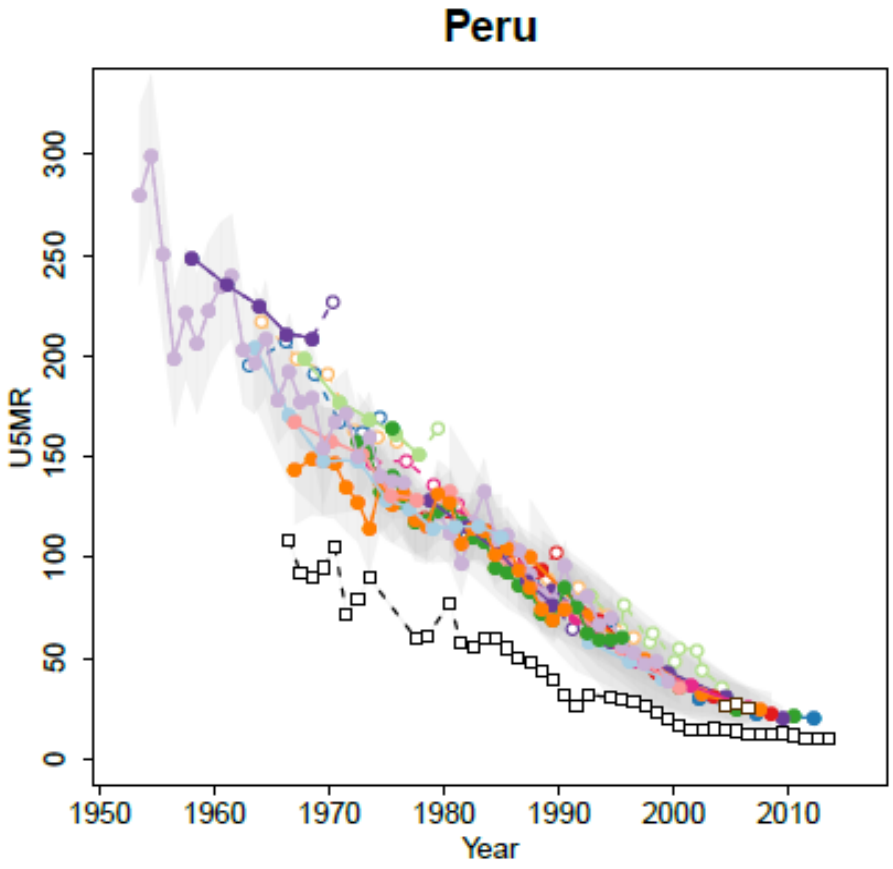
- **Cross checking**
  - Comparison to other data sources
  - Comparison to patterns in other countries

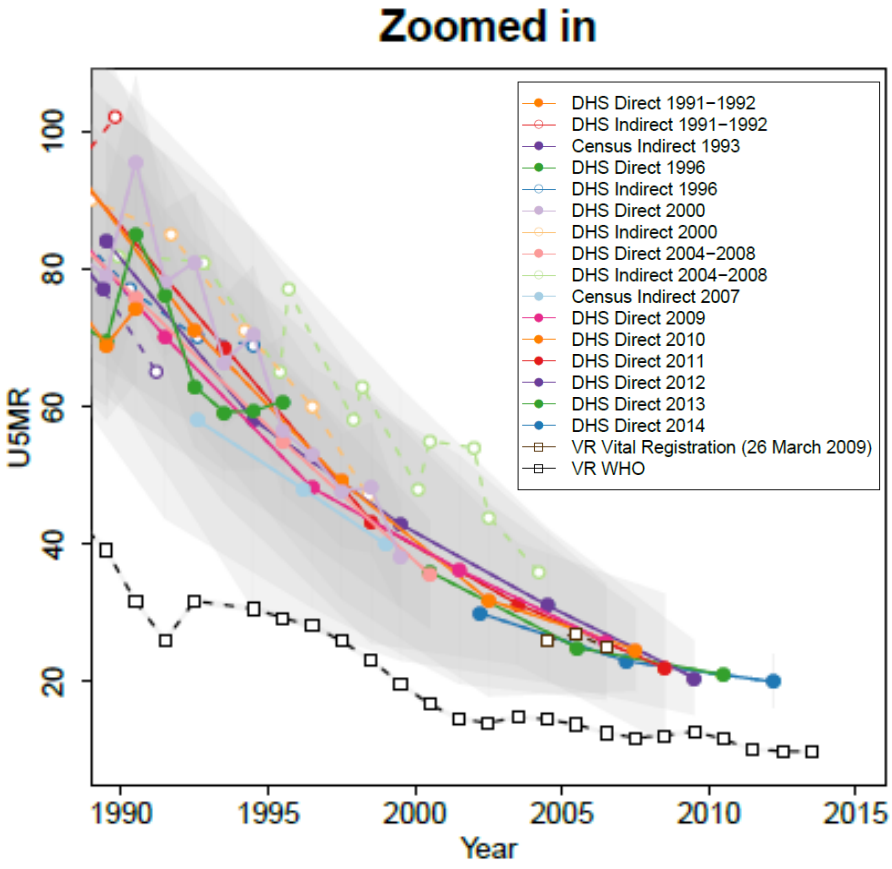
- **Internal checking**
  - Age patterns at death:
    - *Proportions of deaths by age*: early neonatal among neonatal deaths; neonatal deaths among infant deaths; infant deaths among under-five deaths; etc.
    - *Ratios of mortality rates*: stillbirths to early neonatal mortality rate; neonatal to post-neonatal mortality rate; neonatal to infant mortality rate; infant to under-five mortality rate; etc.
    - *Deaths distribution by age* (e.g., Age heaping at age one or one month)
  - Differentials in mortality:
    - Sex ratios of mortality
    - Ratio of urban to rural mortality
    - Mortality across regions

- **Registration legal framework, definition, data reporting flow**

Cross checking and internal checking

Comparison to other sources:
Data from different sources, time trends, U5MR, Peru





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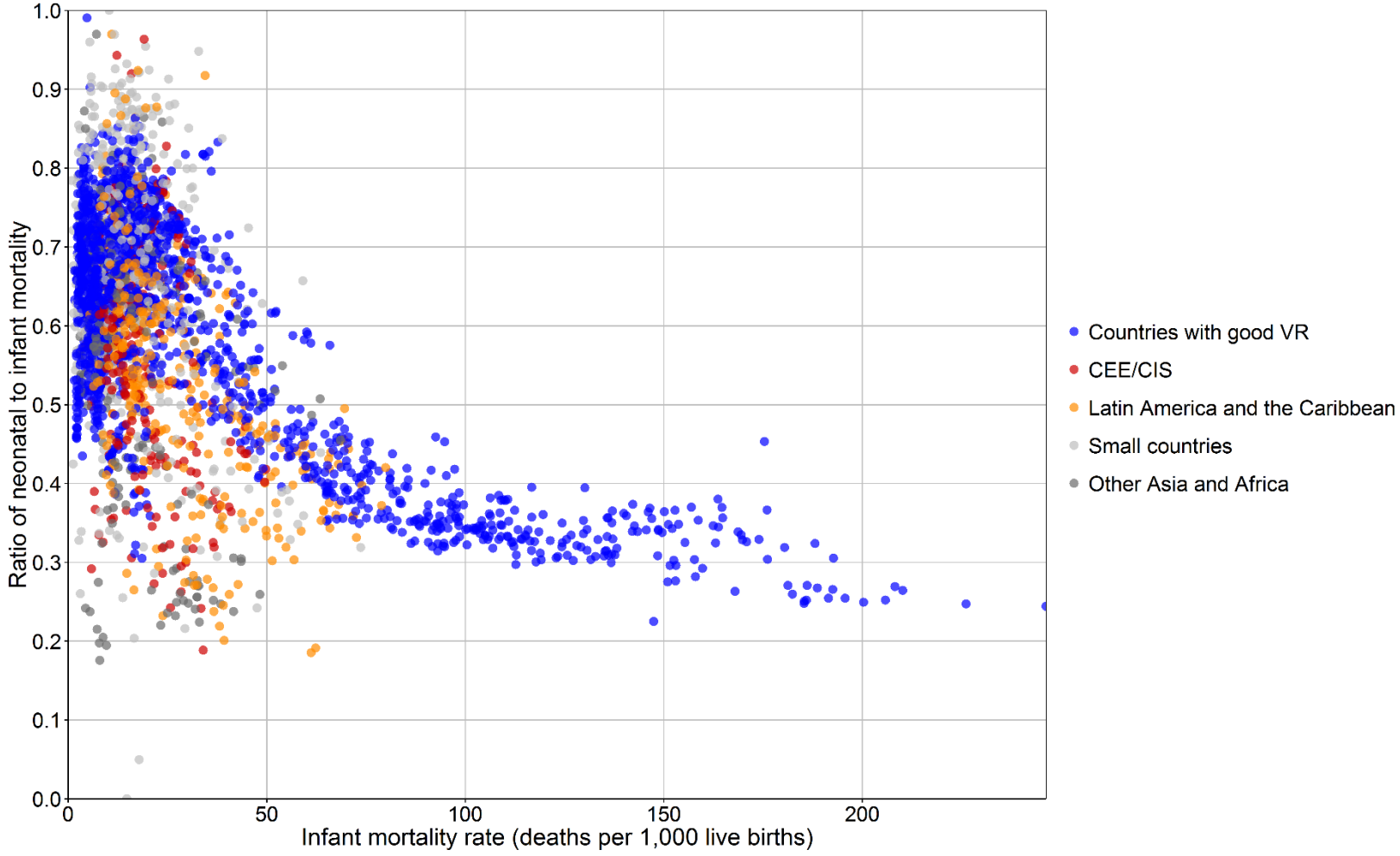
Global VR data:
Ratio of NMR to IMR vs. IMR



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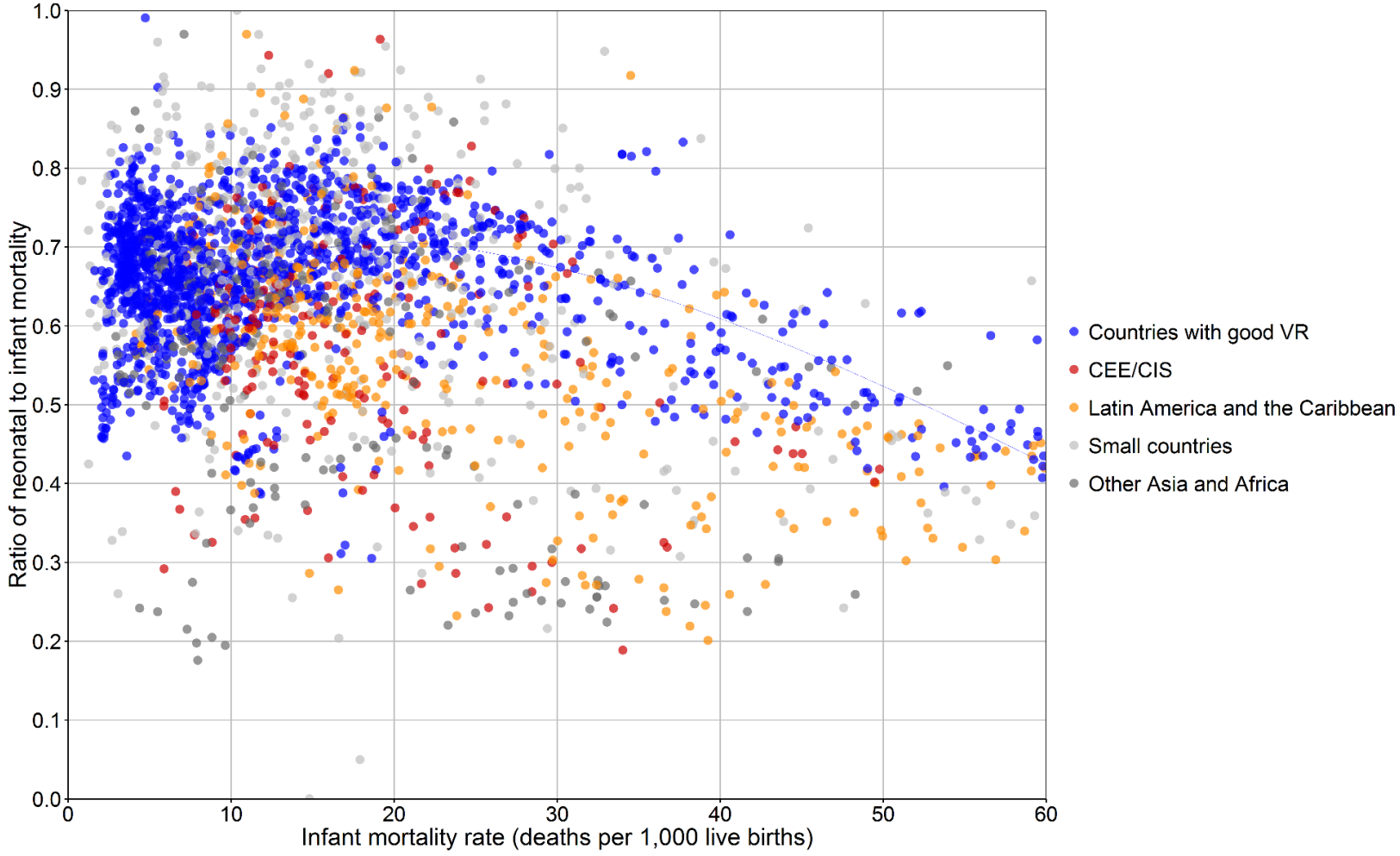

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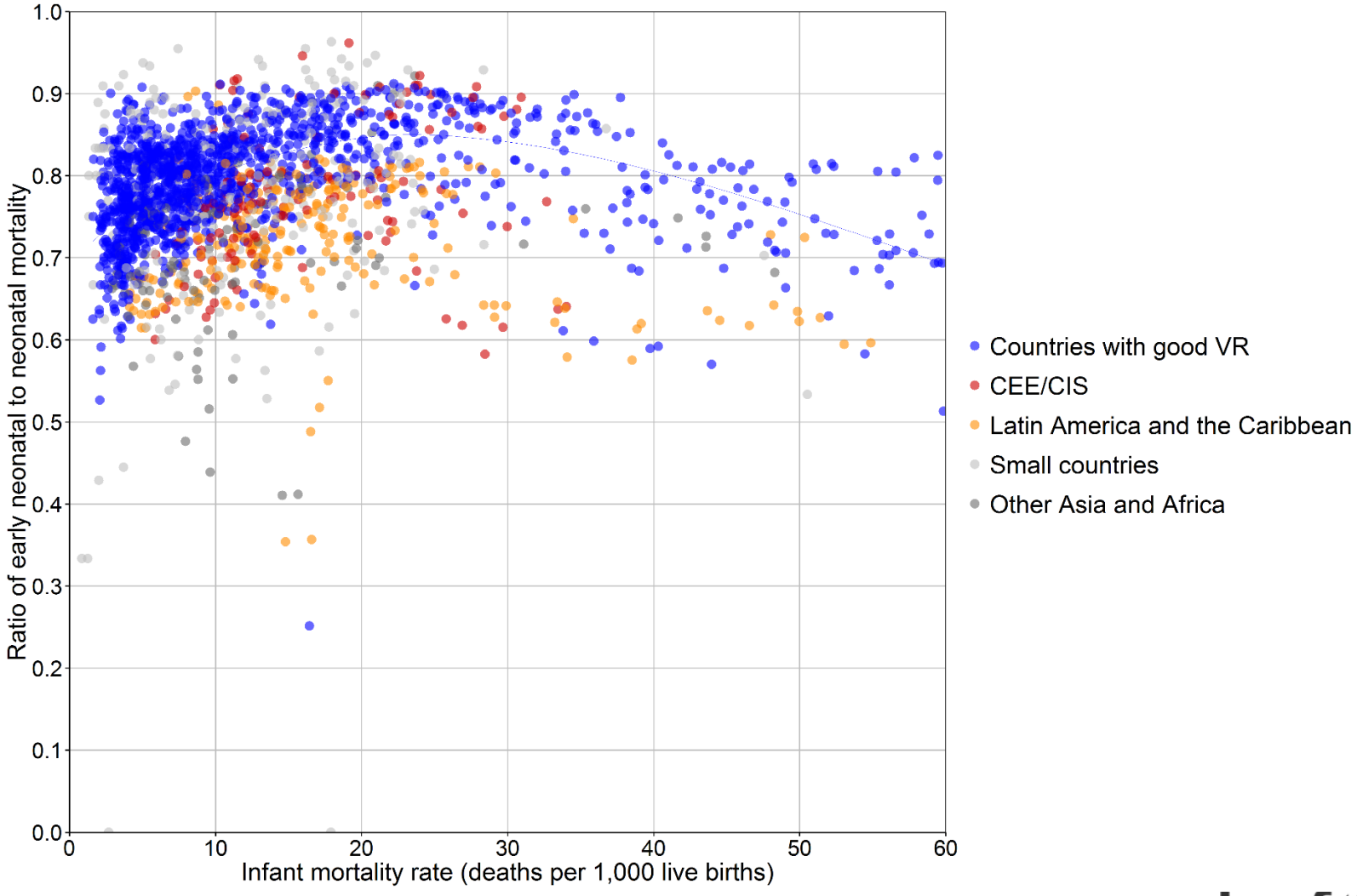
Global VR data:
Ratio of ENMR to NMR vs. IMR



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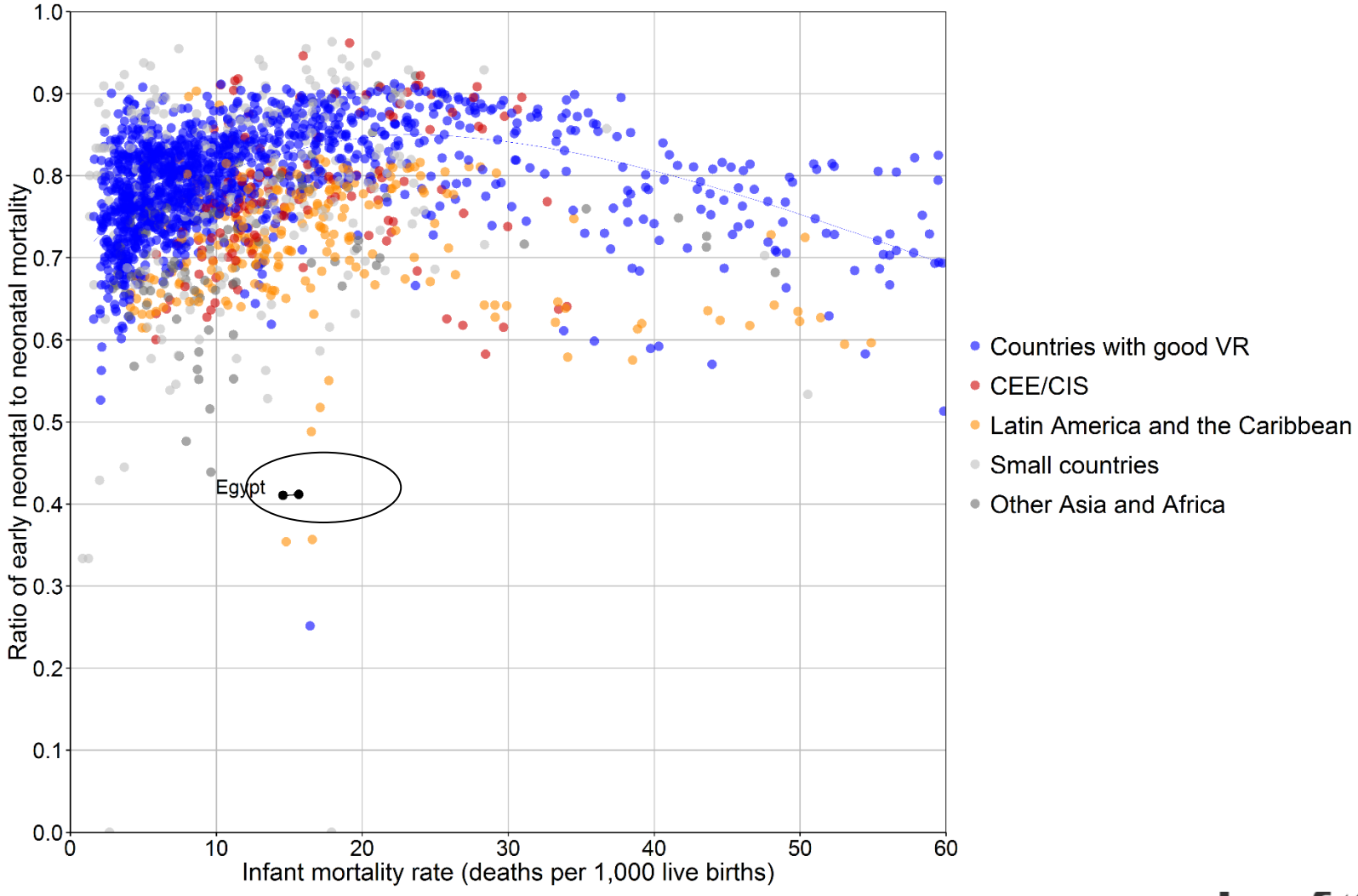
Egypt: Ratio of ENMR to NMR vs. IMR



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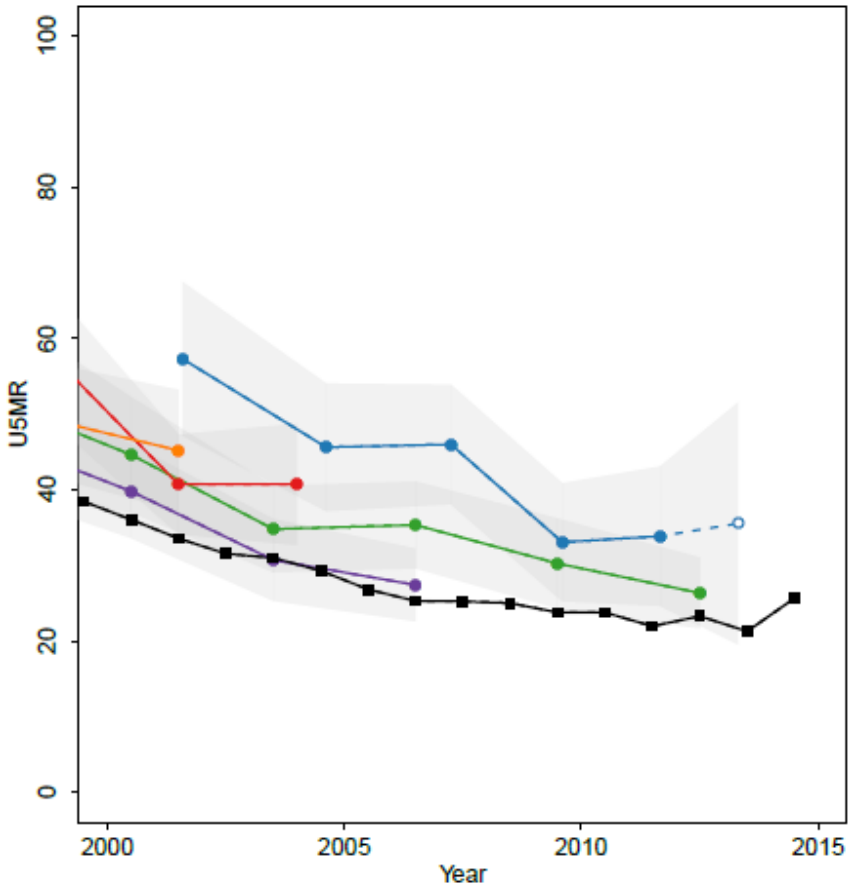
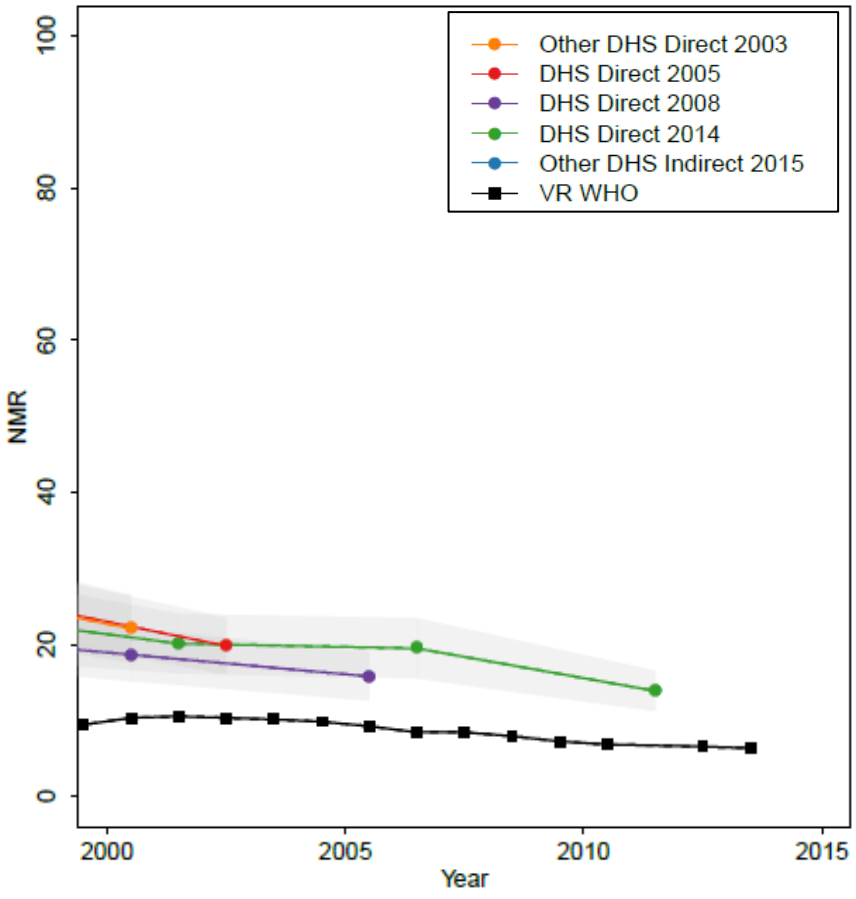
Egypt: low proportions and ratios

Year	Proportion infant deaths occurring in the neonatal period	Proportion of neonatal deaths occurring in the early neonatal period	IMR	NMR	Early NMR	Ratio of NMR to IMR	Ratio of Early NMR to NMR
2011	42.0%	45.0%	15.0				
2012	41.1%	41.1%	15.7	6.5	2.7	0.414	0.411
2013	42.7%	41.0%	14.6	6.3	2.6	0.432	0.410

Egypt: lower mortality from VR





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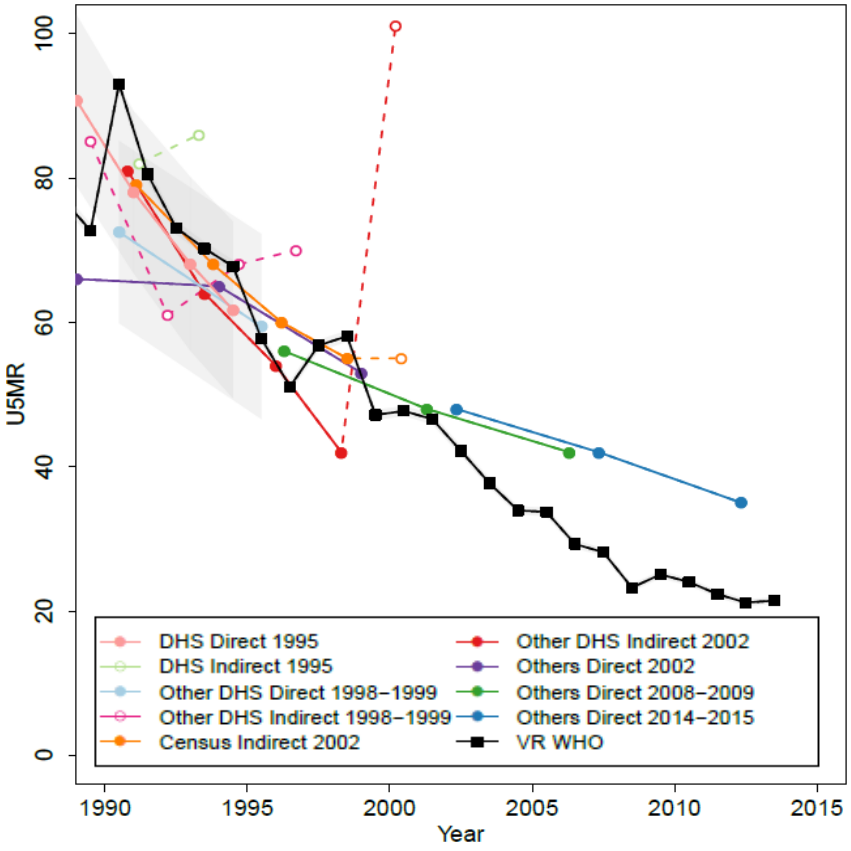
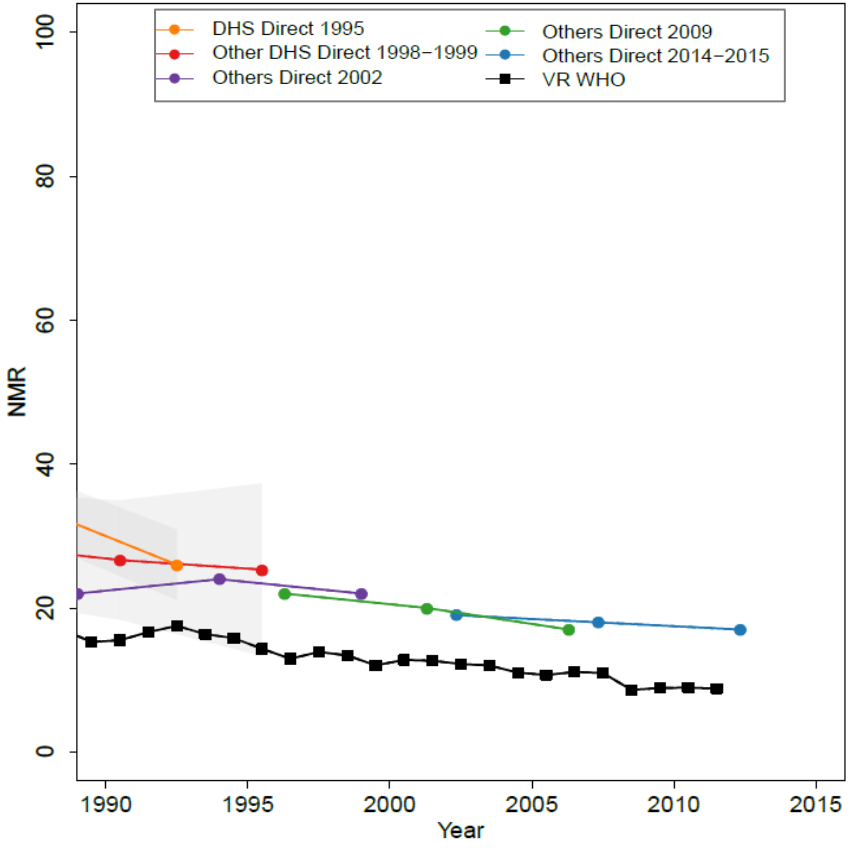
Data checks: data from different sources, time trends, U5MR and NMR, Guatemala





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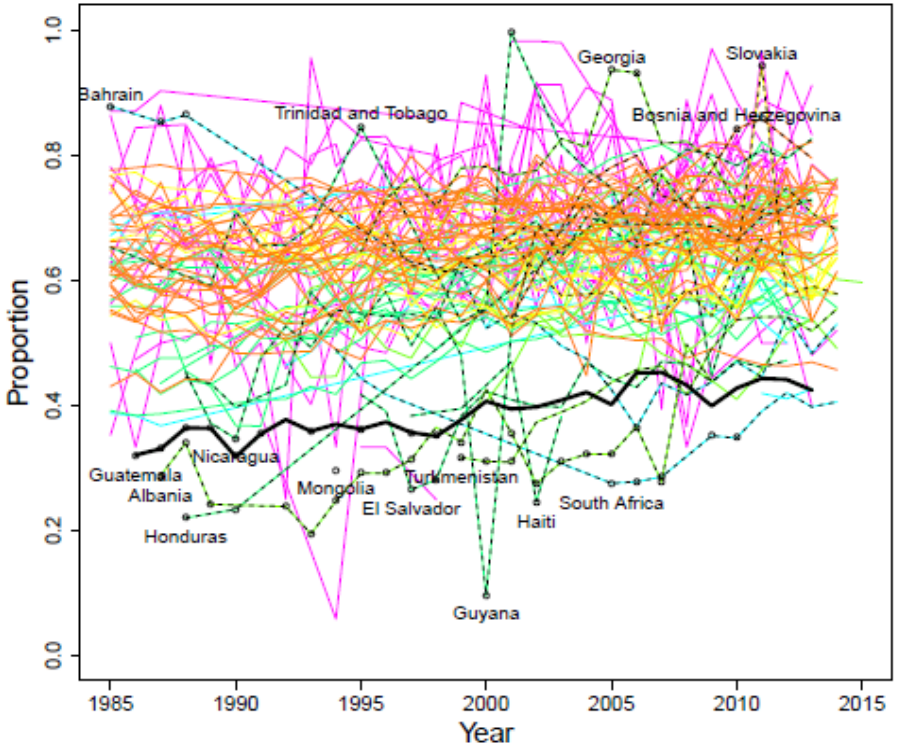
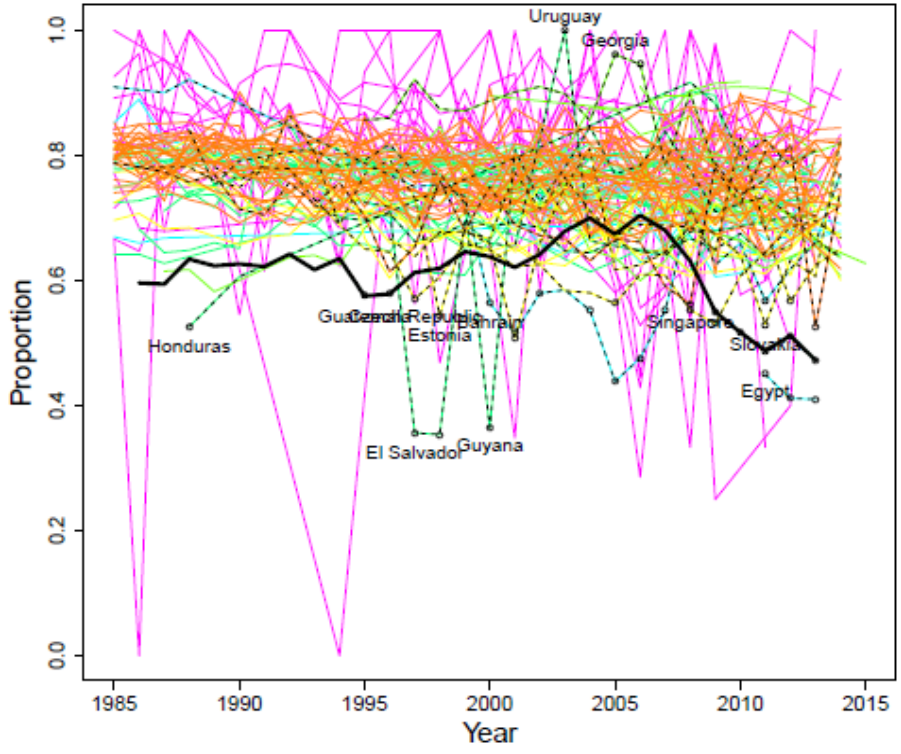
Outlying proportions, Guatemala

Proportion of infant deaths occurred in the neonatal period



Proportion of neonatal deaths occurring in the early neonatal period



Countries with good VR
Countries where VR needs adjustment
CEE/CIS
Latin America and the Caribbean
Other Asia and Africa
Small countries

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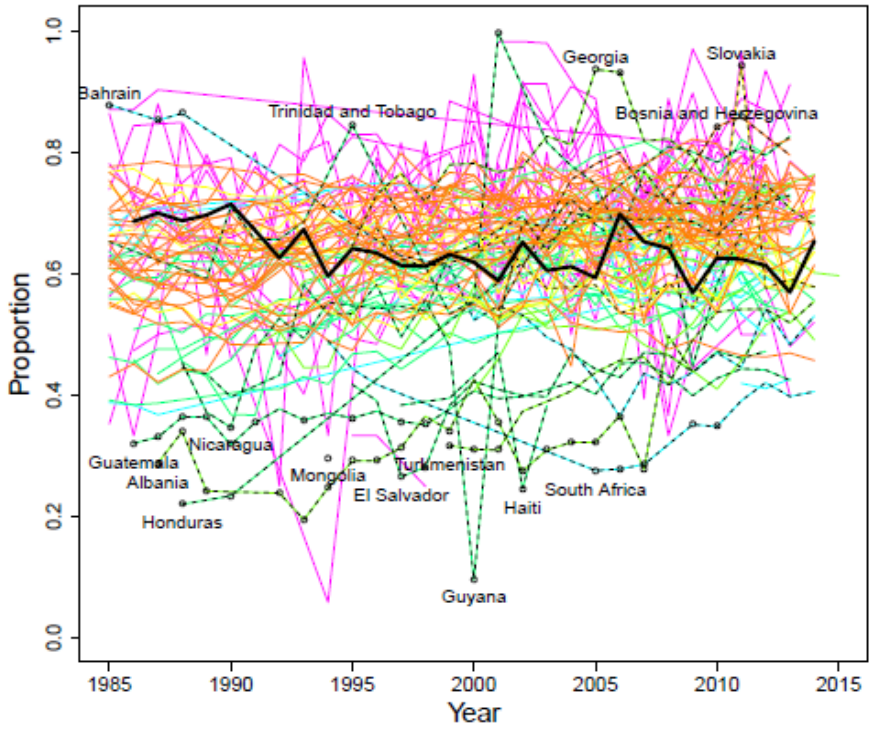
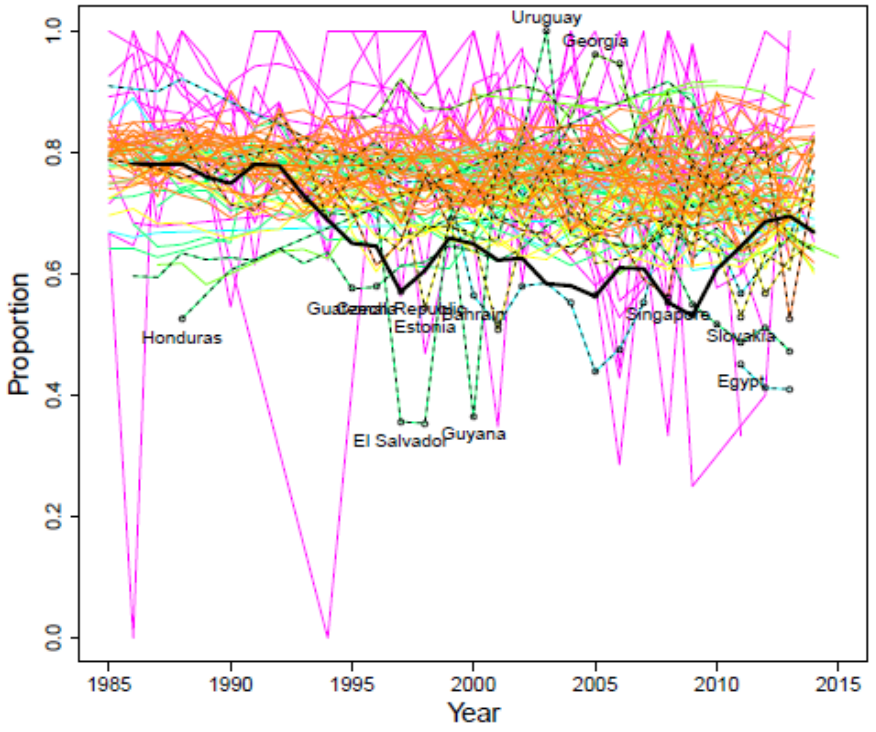
Outlying proportion of early neonatal deaths among neonatal deaths, misclassification of early neonatal deaths, Czech Republic

Proportion of infant deaths occurred in the neonatal period



Proportion of neonatal deaths occurring in the early neonatal period



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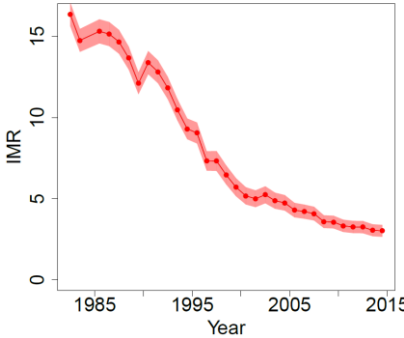

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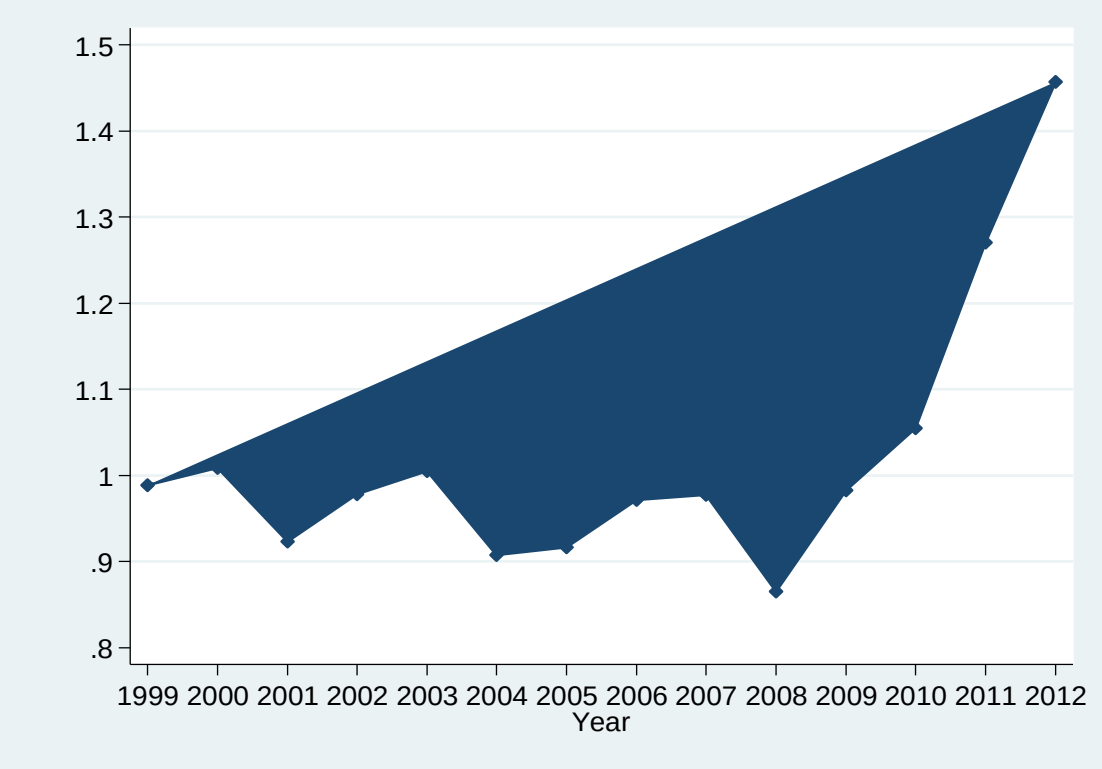
Ratio of stillbirths to early neonatal deaths, Kazakhstan



- Sharp rise in ratio (more stillbirths per early neonatal death) post-2008
- Suggests possible back-sliding from use of International Definition of Live Birth (IDLB) since 2008

Registration legal framework, definition, data reporting flow

To understand how system works

- Legal framework to identify barriers to registration
  - Is there any legal obligation to register births and deaths
  - Does the birth/death need to be registered within a certain amount of time from birth/death
  - What are the requirements for birth/death registration
  - Is a paper certificate issued as result of the registration
  - Is there a fee for birth/death registration? Is there a financial penalty for late registration
  - How is the registration system set-up? Electronic/paper submission
  - Where registration occurs (i.e. in hospitals, at local authority office etc.) and how widespread these registration points are throughout the country
- Registration in practice: might be different from laws
- Definitions: live birth, stillbirth, early neonatal death, infant deaths, etc.
- Data reporting and processing
- Inter-sectoral collaboration, commitment of government

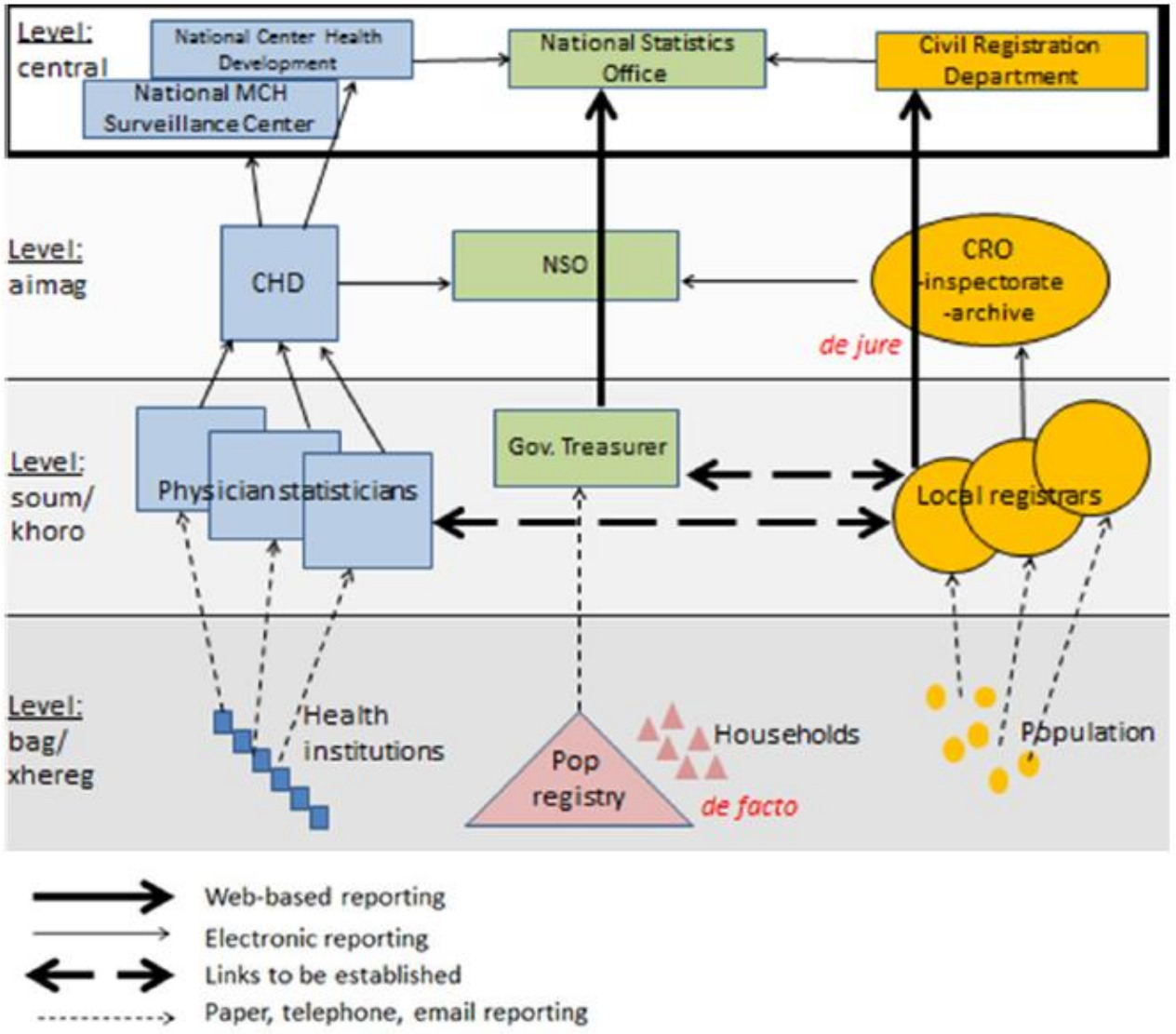
Flow of administrative data, *Mongolia*

National level

Provincial level (21 provinces)

District level (329 districts)

(average size 250 households)

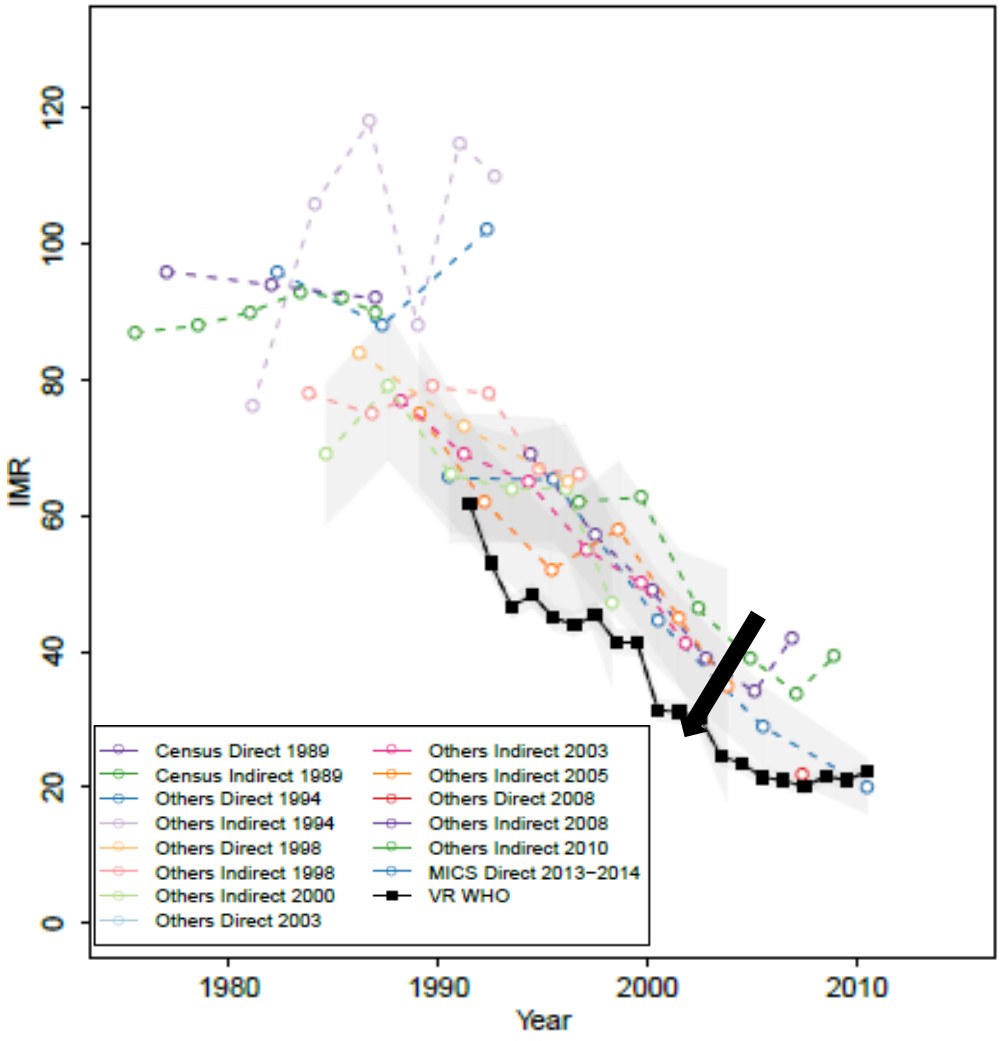


Population under age 1 and births by differnt soureces in Mongolia, 2002-2013

Year	NSO End year population under 1 (unadjusted)	NSO mid year population under 1 (adjusted)	Births from NCHD
2002	39,810	41,612	45,687
2003	39,427	42,109	44,744
2004	40,125	42,559	44,521
2005	40,125	43,054	45,171
2006	44,416	44,531	47,376
2007	52,474	52,840	55,774
2008	58,823	59,285	63,262
2009	64,074	64,581	68,762
2010	55,540	55,836	65,889
2011	64,737	63,010	70,576
2012	65,455	64,853	74,778
2013	70,937	70,263	79,780

- Recorded births are consistently higher than population under age 1
- Births are collected by National Centre for Health Development, while population from household registry

Improvements in registration in Mongolia



- Possibly omission of some early neonatal deaths
- Likely that increase/flattening in IMR is to a great extent due to improvements in registration

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Strengths, limitations and recommendations

Key strengths and limitations of methods

❖ Strengths

- Diverse methods
- Methods applicable to subnational/subgroup estimates
- Able to identify age heaping, potential omission, misclassification, etc.

❖ Limitations

- Detailed information: # of death disaggregated by day, month, age; by sex; by residence; by regions;
- Difficulties in defining exact levels of omission, incompleteness, misreporting and misclassification

Recommendations for national authorities

- Create incentives, remove barriers, use innovative tools to register birth and deaths
- Adopt standard definition, and reinforce training of physicians and other relevant service providers on the International Definition of Live Birth
- Adopt standard reporting format for reporting annual mortality data
- Evaluation of systems (health, registration and statistics; electronic/paper)
- Censuses and household surveys as validation sources: mortality module; add validation questions on birth and death registration
- Use multiple data sources, multiple methods to evaluate CRVS data
- Make detailed birth and death data available, disaggregated by age, sex, regions, urban/rural, etc. to have a full assessment. This is important in the context of the SDG agenda
- Underreporting is more common for neonatal deaths particularly early neonatal deaths. Efforts should be made to capture these deaths. This becomes increasingly important, given the increasing proportion of neonatal deaths among under-five deaths and that NMR now is a SDG indicator

Thank you

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