

Changes in cause-specific child mortality in India from 2000 to 2015: nationally-representative study of 1.3 million homes

Million Death Study Collaborators

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Key messages

- India avoided ~1 million (10 lakh) more child deaths with faster declines from 2005-15
- Biggest declines in mortality rates from pneumonia, diarrhea, measles, birth breathing problems and neonatal conditions
- Mortality rates from low birth weight rose in rural areas and poorer states (but not in urban areas or richer states)
- India would need to maintain the rapid decline of 1-59 month mortality AND accelerate declines in neonatal mortality to >5% annually to achieve the UN 2030 Global Goals
- Counting the dead and describing causes of death is essential to achieving health goals

What's new about this research?

- This is the first study to directly quantify changes in cause-specific child deaths in India, nationally and sub-nationally, from 2000-15 among randomly selected (“true snapshot”) homes
- Separate results for neonates (first month of life) and at 1-59 months for boys and girls
- **Based on ~ 100,000 interviews with parents who lost a child** (not a modeling study or projection of small samples)

How was the RGI study done?

- **Most deaths in India still occur at home, without medical attention. So causes mostly unknown. The Registrar General of India implemented the Million Death Study in over 1.3 million homes in over 7000 randomly selected areas.**
- **~ 900 trained non-medical RGI surveyors interviewed families to collect circumstances and symptoms for each death; these “verbal autopsies” include ½ page local language narrative**
- **Each death then examined independently by two of 400 trained doctors to assign a cause of death**
- **We combined cause-specific proportions from the MDS (2001 to 2013) with the United Nations death totals for India to estimate deaths by state, rural/urban areas, and sex**



RGI already released main results in 2016. This paper was funded by research agencies, who had no role in analyses or writing the paper

Sharmila* was 23. She was very weak. Before the delivery she was admitted to the Government Hospital Jamsdpur. On experiencing difficulty, they advised that she should be taken to Lucknow because they could not cope with it. The family did not have money to take her to Lucknow. So he brought her home. A professional Dai (*midwife*) came. The baby could not come out because of mother's weakness. The Dai pulled baby out with her hands together with the placenta. Excessive bleeding took place and Sharmila became unconscious. The child died about five minutes after the delivery and the mother died about half hour later.

Overall child mortality: 2000 to 2015

- **1.2M child deaths in 2015: 0.7M in first month of life and 0.5M during 1-59 months**
- **India still has one in five of all global child deaths (6M worldwide), the most of any country**
- **Mortality rate (per 1000 live births) fell in neonates from 45 in 2000 to 27 in 2015= 3.3% annual decline**
- **1-59 month mortality rate fell from 45.2 in 2000 to 19.6 in 2015= 5.4% annual decline**
- **Girl deaths at ages 1-59 months fell particularly fast, so now India has about equal number of under-5 boy and girl deaths**

Cause-specific child mortality per 1000 live births: 2000 to 2015

NEONATAL

- **Neonatal infection fell by 66%**
- **Birth asphyxia or trauma fell by 76%**
- **Tetanus fell by >90%**
- **Prematurity/low birth weight rose modestly**
(mostly term births with low birth weight)

1-59 MONTHS

- **Pneumonia fell by 63%**
- **Diarrhoea fell by 66%**
- **Measles fell >90%**

Neonatal mortality rates in rural areas twice that in urban areas. Faster declines in mortality for girls than boys at 1-59 months

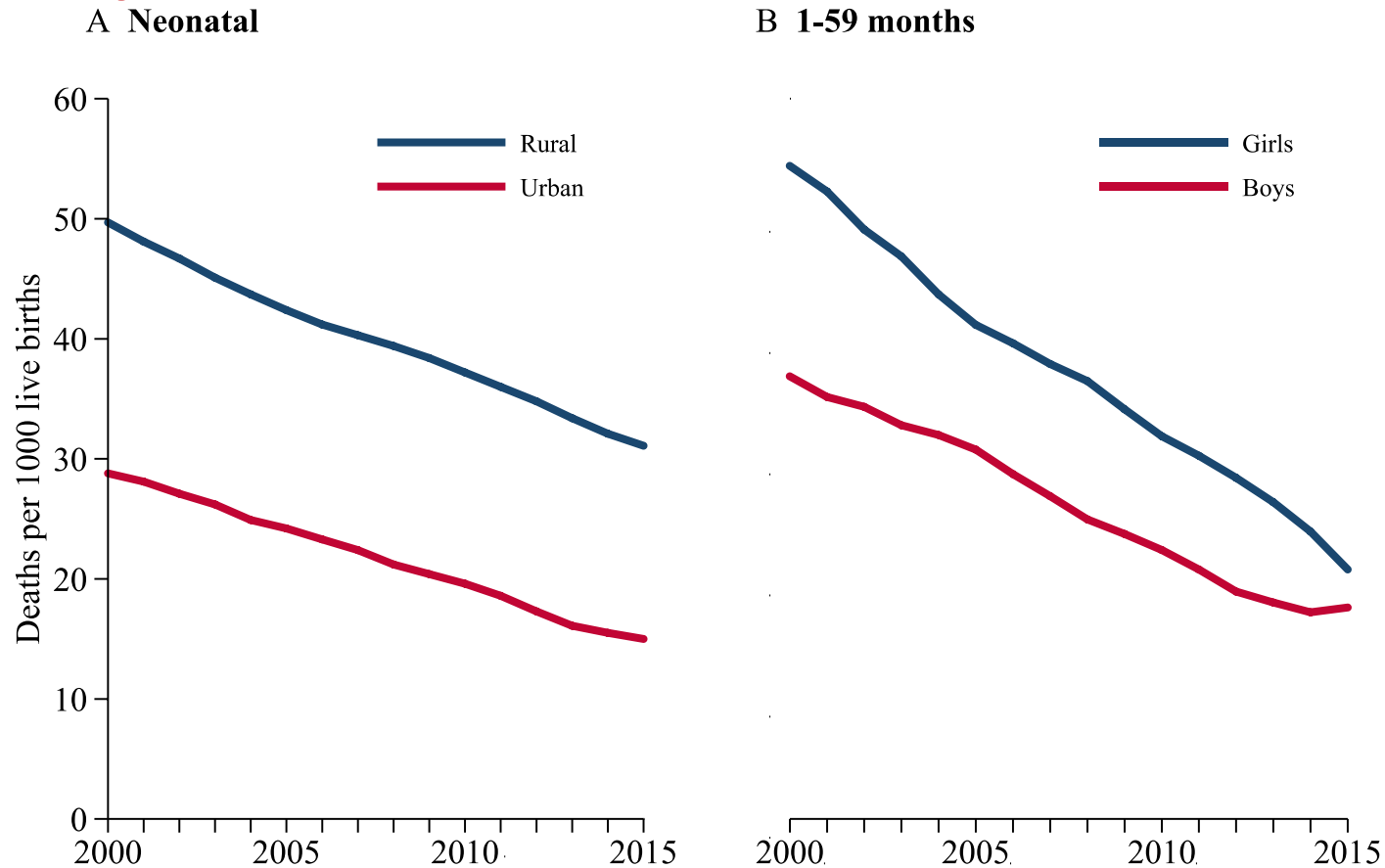


Figure 1: Mortality rates in children under five years in India, 2000-2015. All-cause mortality for (A) neonates in rural/urban areas (B) and 1-59 month children by sex.

Most common causes fell rapidly except neonatal mortality rates from low birth weight

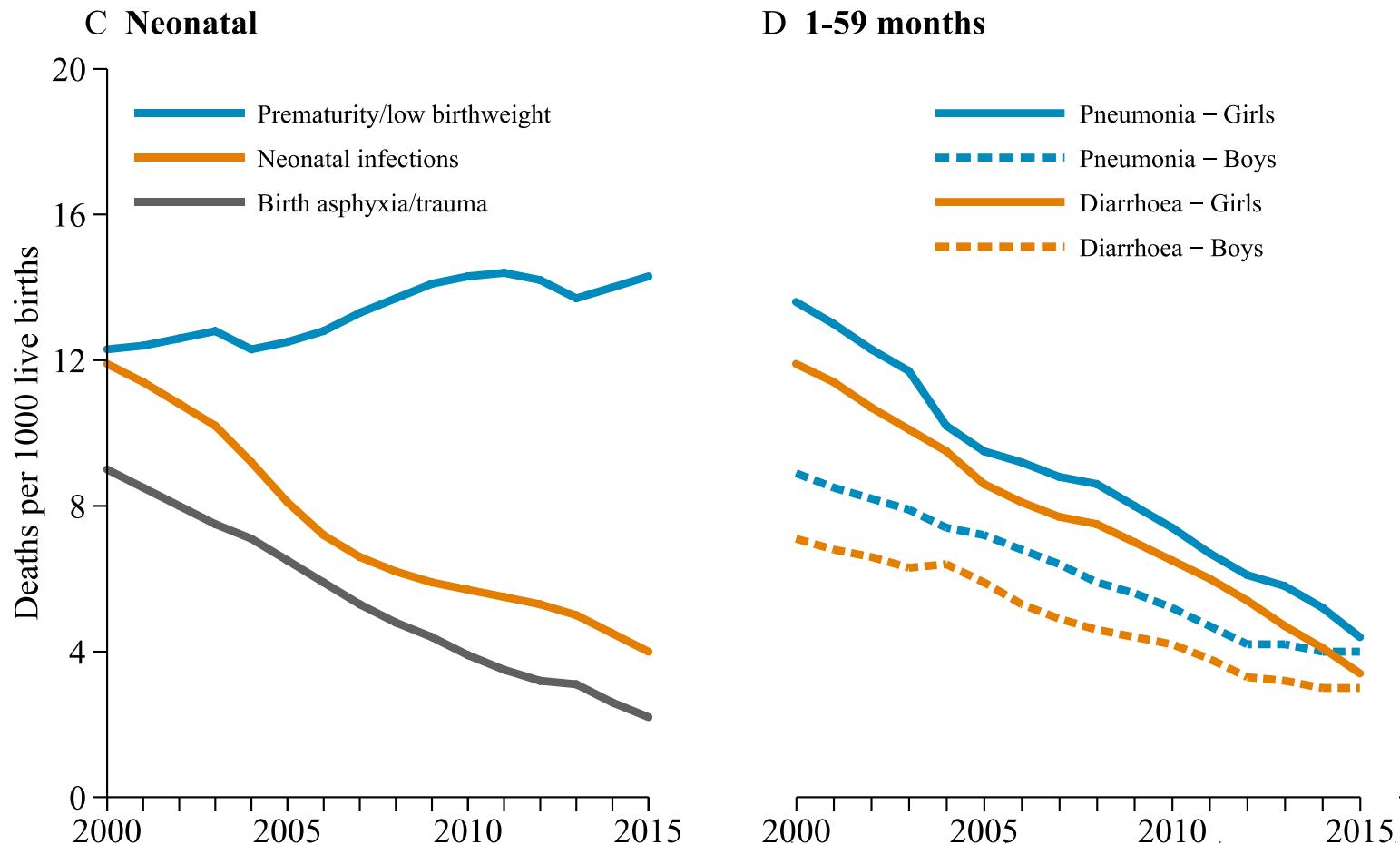


Figure 1: Mortality rates in children under five years in India, 2000-2015. Mortality rates for major causes for (C) neonates (D) 1-59 month children by sex.

Neonatal mortality rates from prematurity/low birth weight rose in rural areas and poorer states but fell in urban areas and richer states

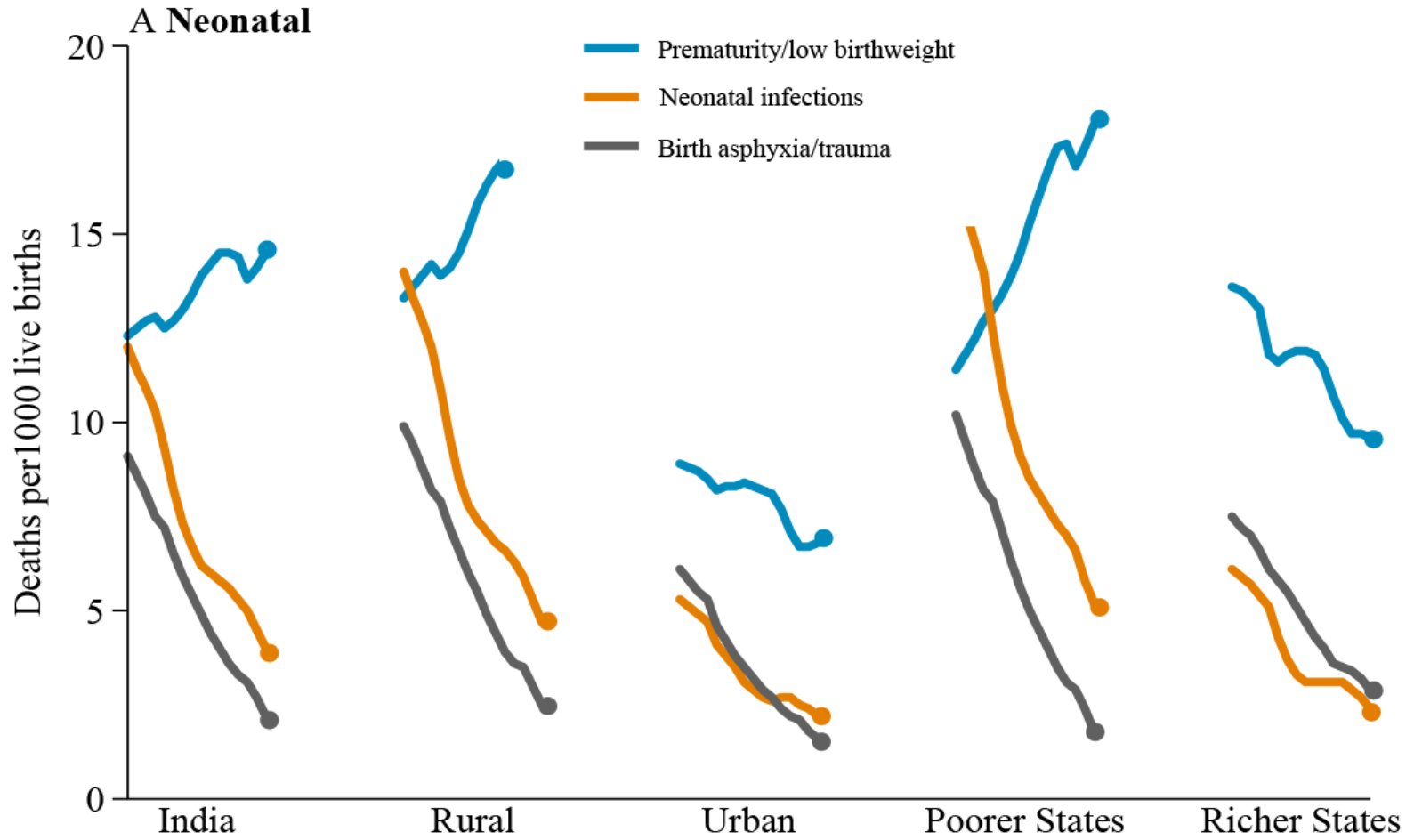


Figure 2A: Cause-specific mortality rates for neonates by type of region or state in India, 2000-2015

LARGE declines in mortality rates of most infections, slower decline in malaria, 1-59 months, both sexes

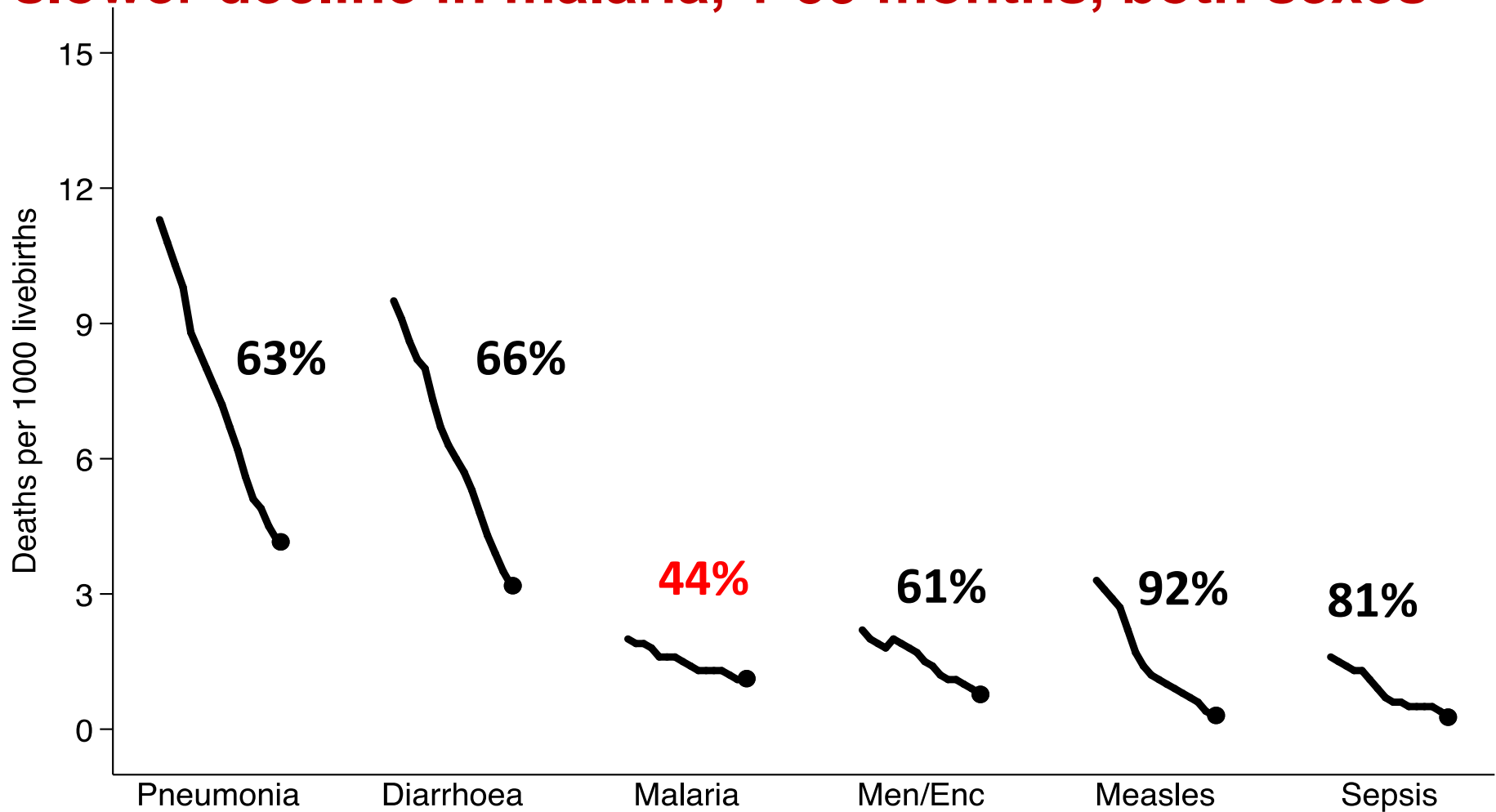


Figure 2C. Mortality rates for 1-59 month children for major communicable causes in India, 2000-2015. Percentages shown are the absolute percent change in mortality rates from 2000 to 2015.

Three causes of death account for 0.5 million of the 0.7 million neonatal deaths in 2015

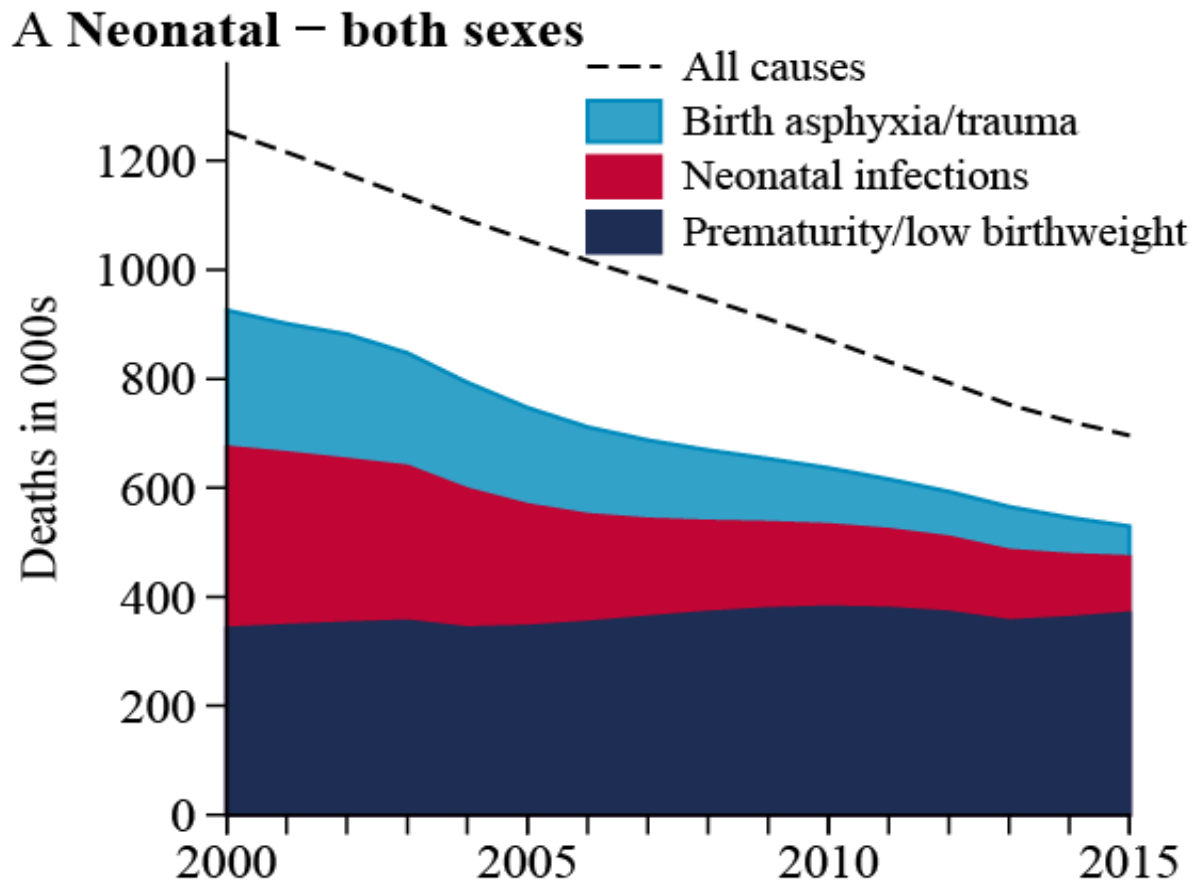
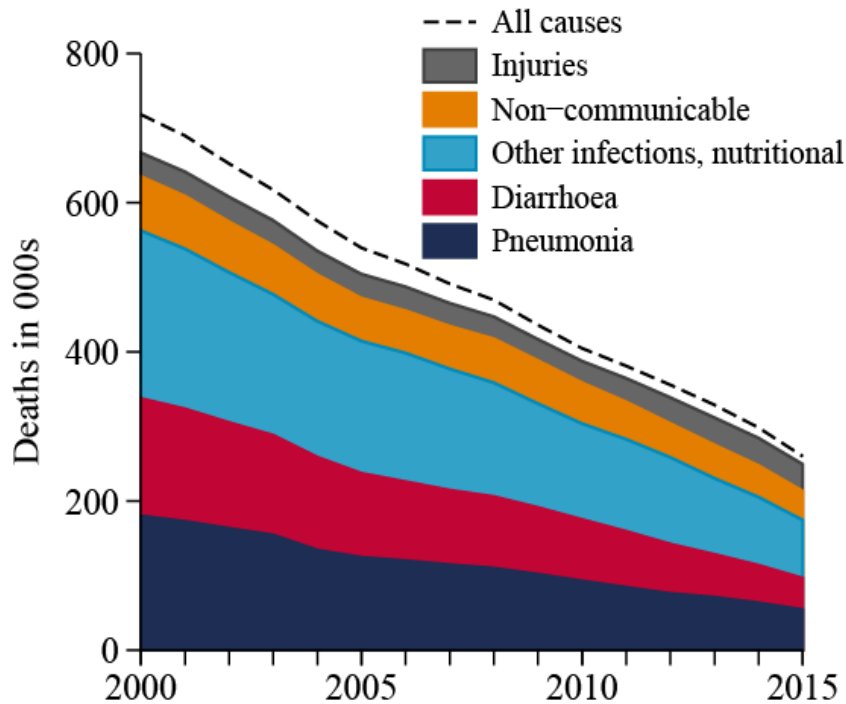


Figure 3A: Estimated deaths of neonates India 2000-2015

Pneumonia and diarrhea are top two causes of death at 1-59 months in 2015: ~225,000 deaths from pneumonia, diarrhea, malaria and measles

B 1-59 months – girls



C 1-59 months – boys

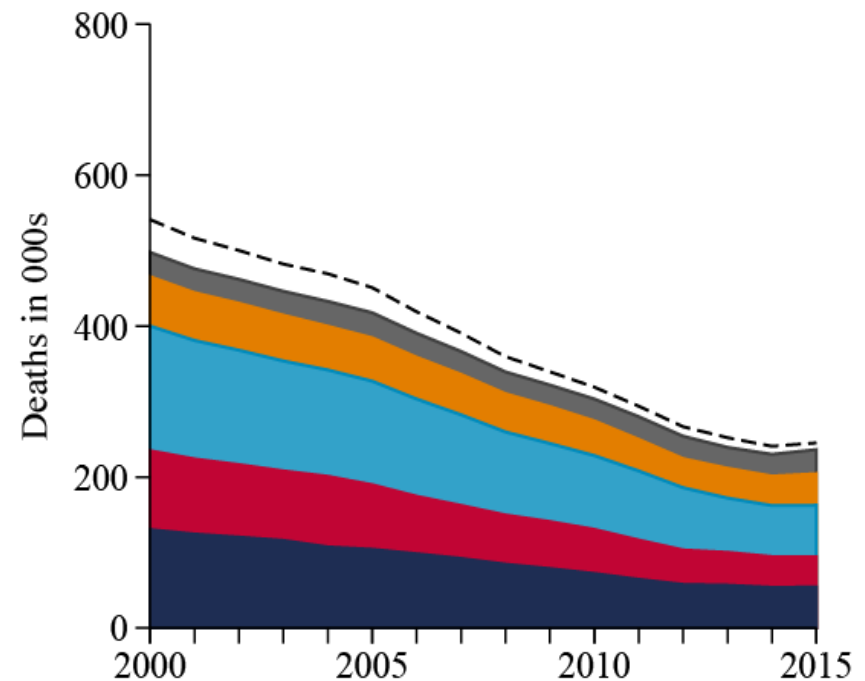


Figure 3B: Estimated deaths of 1-59 months, India 2000-2015.
(B) girls (C) boys.

State-level trends

- Neonatal infections and birth asphyxia/trauma mortality rates fell in rural and urban areas and in richer and poorer states
- Prematurity/low birth weight mortality rates rose in rural areas and in poorer states but fell in urban areas and in richer states
- Pneumonia and diarrhoea mortality rates for 1-59 months declined substantially between 2010-15, at an average of ~8-10% annual decline nationally
- The most rapid declines in pneumonia and diarrhea mortality rates occurred in rural areas and poorer states rural areas

At least 1 million (10 Lakh) children saved from faster progress since 2005

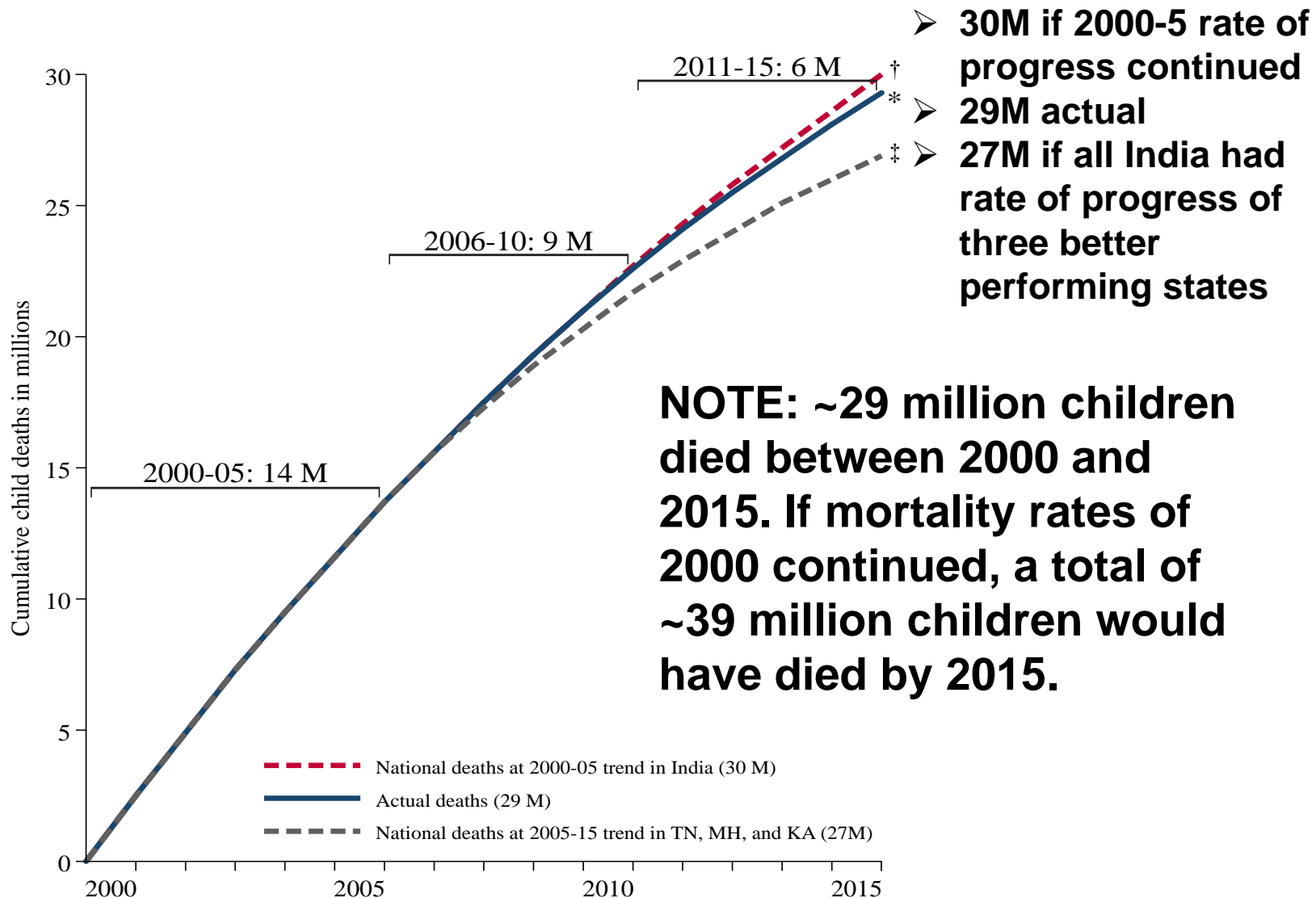


Figure 5: Child deaths for all causes since 2000 in India: actual, and projected

Implications for India*

- To achieve 2030 UN Global Goals for child mortality, India would need to maintain current declines in 1-59 month mortality and accelerate declines in neonatal mortality to >5% annually
- Feasible targets: 225,000 deaths at ages 1-59 months from pneumonia, diarrhea, malaria and measles
- Special attention for term births with low birth weight
 - maternal factors, including anemia, tobacco chewing play a role in low birth weight
- India could eliminate measles and tetanus deaths
- DIRECT counting the dead, interviewing homes to describe causes is needed at the district level (and is feasible)

* NOTE: The MDS aims to provide INFORMATION not recommendations

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