

Frequently Asked Questions

Neonatal, 1–59 month, and under-5 mortality in 597 Indian districts, 2001 to 2012: estimates from national demographic and mortality surveys The Lancet Global Health, September 19, 2013

Disclaimers: The aim is to give only information, not recommendations, to governments, organisations and individuals.

Note on Indian and western numbers: 1 lakh=100 thousand, 10 lakh=1 million, 1 crore=10 million

Q. What does this study add to what we already know?

A. India has committed to achieve the United Nation's Millennium Development Goal (MDG) of reducing under-5 child deaths per 1000 live births by two-thirds from **115 in 1990 to 38 by 2015**. We already know that child deaths in India fell from about 2.5 million in 2001 to 1.5 million in 2012. We also know that India has the largest number of child deaths of any country in the world.

However, lack of reliable estimation of district-based under-5 mortality is a key obstacle to rational planning and assessment of services as districts now control the program priorities within the National Rural Health Mission. The present study estimates neonatal, 1–59 month, and overall under-5 mortality by sex for 597 Indian districts in 2012 and assesses the progress of each district towards achieving the MDG of 38 child deaths per 1000 live births by 2015 (by comparing progress from the 2001 census). The study identifies the hot spots of child deaths, progress made, and female disadvantage for 597 districts.

Q. How was the study done? How were the data collected?

A. We divided the 2012 UN sex-specific birth and mortality totals for India into state totals using relative birth rates and mortality from recent demographic surveys of 24 million people, and divided state totals into totals for the 597 districts using 3 million birth histories. We then split the results into neonatal mortality and 1–59 month mortality using data for 109 000 child deaths from national mortality surveys. Note that while there are 640 districts in the 2011 census, we treated smaller northeast states and union territories as equivalent to a district for analytical purposes.

Q. Who funded the study?

A. The study was supported by grants from the Disease Control Priorities 3 (funded by the Bill & Melinda Gates Foundation), Canadian Institutes of Health Research, International Development Research Centre, and the US National Institutes of Health. The funding agencies had no role in the study design, data collection, data analysis, data interpretation, or writing the final scientific paper.

Q. Why do you have separate estimates for neonatal and 1-59 months mortality?

A. Of the 1.5 million child deaths in India in 2012, more than half (0.8 million) occurred in neonates (first month of life) and the remaining (0.7 million) occurred among children aged 1 to 59 months. Female and male mortality are roughly equal during the neonatal period, but are much higher in girls than boys at ages 1 to 59 months. The interventions needed to prevent mortality in these two sub-groups of children also differ.

Q. What are the main results of your research?

A: Key findings:

- About a third (222 districts) of the 597 Indian districts are on track to achieve the MDG of 38 child deaths per 1000 live births by 2015.
- An equal number of districts (222) will achieve the MDG only after 2020, meaning they lag behind by more than 5 years.
- These 222 lagging districts are home to 41% of India's live births and 56% of all child deaths.

- One-sixth (90 districts) of the 597 Indian districts will achieve the MDG only after 2023. That is, these districts lag behind by more than 10 years.
- More districts lag behind the relevant goal for neonatal mortality (251) than districts that lag behind the relevant goal for 1–59 month mortality (197).
- Just 81 districts account for 37% of all child deaths under age 5 nationally.
- Female mortality at ages 1–59 months exceeds male mortality by 25% in 303 districts in nearly all states of India, totaling about 74 000 excess deaths in girls.

Q. Is there a pattern of decline in the child mortality rate from 2001 to 2012?

A. Of the 222 districts lagging behind the MDG by more than 5 years, most (194 districts) are in the nine poorer states of Assam, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttarakhand, and Uttar Pradesh. None of the districts in Uttar Pradesh and Orissa are on track to achieve MDG4.

In 2012, nearly 13 million live births and 0.8 million child deaths took place in these 222 districts lagging behind the MDG by more than 5 years. By contrast, 203 of the 222 districts on track to reach the MDG by 2015 are in the richer states.

Notably, the number of districts lagging behind has increased between 2001 and 2012 in the richer states of Andhra Pradesh, Gujarat, and Karnataka. Only in the states of Kerala and Tamil Nadu have all districts achieved the MDG.

Q. Were there any hotspots where child deaths occur?

A. Just 81 of the 597 districts in India are home to 37% of the national child deaths. 68 of these 81 districts are in the poorer states (37 in Uttar Pradesh and 16 in Bihar). Among the districts in richer states, 5 are in West Bengal, 3 in Andhra Pradesh and 3 in Gujarat.

Q. How many children in the larger districts are at risk of child death?

A. Nationally, about 41% of 26 million births and about 56% of the 1.5 million all child deaths in 2012 took place in the 222 districts that lag behind the MDG by 5 years. By contrast, about a third (32%) of all births and less than one-fifth (18%) of deaths occurred in the 222 districts on track to achieve the MDG. This means that even with much faster progress in the good performing districts, India as a whole is not likely to reach the MDG by 2015.

Q. Which are the better performing districts?

A. The average annual relative decline in child mortality below age 5 was 3.7% across all districts between 2001 and 2012. This decline exceeded 6% per year in 47 districts, of which 10 are in Kerala, 15 in Tamil Nadu, and 21 in other states. However, only one district (Dungarpur) is in a poorer state (Rajasthan).

Q. Is the progress in child mortality different among neonates and children aged 1-59 months?

A. In 2012, 251 districts lagged more than 5 years behind the goal for neonatal deaths of 20 per 1000 live births; of these, 155 districts lagged behind the neonatal goal by more than 10 years. None of the districts in Chhattisgarh, Orissa, Rajasthan, or Uttar Pradesh was on track to achieve the neonatal goal. Many districts in the richer states (Andhra Pradesh-18, Gujarat-16, Haryana-14, Karnataka-11, Maharashtra-14, Punjab-7, West Bengal-10) also lagged behind the neonatal goal.

In 2012, 197 districts lagged more than 5 years behind the goal for children aged 1–59 months of 18 deaths per 1000 live births. Of these, 81 districts lagged behind the 1–59 month goal by more than 10 years.

Only in the state of Kerala have all districts achieved the goals for neonates and children aged 1–59 months.

Q. Is the mortality risk similar for girls and boys?

A. The mortality in the first month of life is roughly similar for boys and girls in India. However, girls in India have higher mortality at ages 1-59 months than boys; nationally, for every 100 boy deaths at these ages, 131 girls died.

Female mortality at ages 1–59 months exceeds male mortality by more than 25% in 303 districts and by more than 50% in 169 districts. Excess female mortality is seen in nearly all states, including Kerala and Tamil Nadu. Nationally, the 303 districts with excess female mortality are home to more than 58% of female live births and 68% of female deaths at 1–59 months, totaling about 74 000 excess deaths in girls.

Q. How do our estimates compare with the other results? Are they accurate?

A. The Annual Health Surveys (AHS) estimated child mortality in 284 districts of the nine poorer states for 2012. At the state level, the results for under-5 and neonatal mortality are reasonably similar between the AHS and our study (suggesting that the methods from the studies are likely reasonably accurate). The numbers of districts lagging behind MDG by more than 5 years was also similar in the AHS and in our study.

Q. What needs to be done to accelerate the reduction in child mortality?

A. Much faster progress in reducing under-5 mortality is needed in all districts of India. It might well be cost effective to focus resources on the 81 districts (many of which are districts with high population totals) which accounting for 37% of all child deaths.

More districts lag behind the neonatal goals than the 1–59 month mortality goals, and such districts are distributed among richer and poorer states, which suggest the necessity of renewed national attention on strategies to reduce neonatal deaths. 80% of neonatal deaths are due to birth asphyxia (lack of oxygen during delivery) or birth trauma, low birth weight and prematurity, and infections. Strategies such as safe delivery, early neonatal care and control of infections can reduce such deaths.

At ages 1–59 months pneumonia and diarrhoea together contribute to half of all deaths. These two diseases also contribute most to the female–male mortality gap at these ages. Effective interventions against these two diseases include introduction of *Haemophilus influenza* type B, rotavirus, and conjugate pneumococcal vaccines and expansion of outreach programmes for case management of pneumonia and diarrhea.

All districts could benefit from better accountability and assessment of their performance, including reporting on the causes of neonatal and 1-59 month deaths.

Q. What are some of the limitations of this study?

A. Our analysis is based on indirect estimates of mortality and thus there is a possibility of uncertainty in the estimates. The main statistical uncertainties arise from the data extracted from birth histories and deaths in children in various mortality surveys. A key recommendation is for the 2011 Census of India to provide district under-5 mortality rates as has already been published for the 2001 Census.

Q. What do these results mean?

A. At current rates of progress, the MDG will be met by India overall around 2020—by the richer states around 2015 and by the poorer states around 2023.

Accelerated progress to reduce mortality during the neonatal period and at ages 1–59 months is needed in nearly every Indian district.

The global progress in reaching MDGs for child survival by 2015 (or the follow up goals now being proposed for 2030) will depend very much on the sub-regions of India.