Child Survival in 2015: Much Accomplished, but More to Do

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Child survival targets in 1990-2030

Millennium Development Goal (MDG) 4: Reduce under-five mortality by two-thirds between 1990 and 2015

Sustainable Development Goal (SDG) 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
Outline

1. How is child mortality estimated?
2. What are the level of child mortality in 2015 and the trends in 1990-2015
3. How is child cause of death estimated?
4. What are the major causes of child deaths in 2015 and the trends in 2000-2015
5. What to focus on moving forward?
6. Take home message
1. HOW IS CHILD MORTALITY ESTIMATED?
Data sources for child mortality estimation

• Vital registration (VR) **continuing**
• Sample registration system **continuing**
• Surveys **done every 3-5 years**
  – World Fertility Survey
  – Demographic and Health Survey (DHS)
  – Multiple Indicator Cluster Survey (MICS)
  – Other national surveys
• Census **done every 10 years**
Child mortality estimation methods

• Estimation for countries
  – Tabulation with adjustment: VR
  – Direct estimation from full birth history: DHS/MICS
  – Indirect estimation from summary birth history: Census, DHS/MICS

• Global estimation and comparison
  – Bayesian B-spline Bias-reduction (B3) model: by the UN Interagency Group on Child Mortality Estimation (IGME)
Direct estimation using DHS with full birth history

<table>
<thead>
<tr>
<th>Index (i)</th>
<th>Age in completed months</th>
<th>Numerator (Deaths)</th>
<th>Denominator (Risk)</th>
<th>Probability of dying = Di/Ri</th>
<th>Probability of surviving</th>
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<tbody>
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<td>R8</td>
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\[
U5MR = 1 - (1-q1) * (1-q2) * (1-q3) * (1-q4) * (1-q5) * (1-q6) * (1-q7) * (1-q8)
\]
Global estimation example - Nigeria
2. WHAT ARE THE LEVEL OF CHILD MORTALITY IN 2015 AND THE TRENDS IN 1990-2015
U5MR in 2015

You etc, Lancet, 2015
Global child survival, 1990-2015

Is the MDG 4 attained?

Under-five mortality rate by Millennium Development Goal region, 1990 and 2015 (deaths per 1,000 live births)
3. HOW IS CHILD CAUSE OF DEATH ESTIMATED?
Child cause of death ascertaining methods

- Medical certification of causes of deaths
- Verbal autopsy (VA)
- Minimally invasive autopsy (MIA)
Child cause of death data sources

- VR: WHO Mortality Database
- Sample registration system
  - India: Million Death Study
  - China: Maternal and Child Mortality Surveillance
- VA studies
  - National VA
  - INDEPTH and other health and demographic surveillance sites (HDSS)
  - Other community-based VA studies
<3% U5 deaths (U5D) occurred in countries with adequate VR
90% of U5D occurred in countries estimated by VA models

Liu etc, Lancet, 2014
Global child cause of death estimation

Under 5 deaths (all causes)

Vital Registration

Multi-cause models based on VR (VRMCM)

Multi-cause models based on VA (VAMCM)

Total number of global child deaths (IGME)

Cause distribution

Neonatal deaths (all causes)

India: subnational multi-cause model

China: MCMSS with adjustment

Single cause estimates for selected small causes

Under 5 deaths (all causes)

Liu etc, 2014, *Lancet*
Major causes of child mortality in 2015

- Neopatal death 45%
- Preterm 16%
- Intrapartum related events 11%
- Sepsis/meningitis 7%
- Other 3%
- Congenital 3%
- Meningitis 2%
- Malaria 5%
- Injury 6%
- Diarrhea 9%
- Other 11%
- Congenital 4%
- Intrapartum related events 1%
- Preterm 2%
- Other 11%
Regional cause distribution in 2015

Liu etc, 2015, in preparation
Cause-specific average annual rate of reduction in 2000-2015

Liu etc, 2015, in preparation
5. WHAT TO FOCUS ON MOVING FORWARD?
What regions and countries to focus on?
What age group and causes to focus on?
Other health and social economic interventions

- Universal access to reproductive health including family planning – SDG 3.7
- End poverty – SDG 1
- Improve women’s education – SDG 4 and 5

Liu etc, 2014, *Lancet*
Strategies to accelerate progress to achieve the SDG

• Better understanding of levels and causes of child mortality through strengthening of civil registration and vital statistics systems

• Accelerated scaling up of life-saving interventions through renewed funding and implementation research

• Innovative research to identify more affordable and feasible interventions in LMICs for major causes

• Multi-sectorial approach to induce social change and development
6. Take home message

• Despite not achieving the ambitious MDG 4, enormous strides have been made in child survival since 1990.

• However, ~5.9 million children will still die before celebrating their fifth birthday in 2015.

• Leading causes of child deaths: preterm birth, pneumonia, and intrapartum related events.

• To achieve the SDG child survival target, more to do to scale up life saving social and public health interventions to further improve child survival.
Thank you!

• For further information:
  – lliu26@jhsph.edu
  – Country-specific estimates and input data:
    • For levels of child mortality: http://childmortality.org
  – 4th Term Methods and Measures in Population Studies (380.651.01)
Average annual rate of reduction in 1970-2015

You etc, Lancet, 2015
Reduction in cause-specific mortality in 2000-2015

Liu etc, 2015, in preparation
Estimation example 1 - US