

Further Reductions in Infant and Child Mortality: Opportunities and Challenges

Kenneth Hill

Harvard Center for Population and Development Studies

Li Liu

Johns Hopkins Bloomberg School of Public Health

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Average Annual Rates of Change 1990 to 2012

- **Key Points:**
 - **Acceleration of decline:**
 - Generally faster post-2000 than pre-2000
 - Globally, U5MR declined by 1.7% pa 1990-2000, 3.8% pa 2000-2012
 - **Variation by age range:**
 - Generally fastest for 4q1, slowest for neonatal
 - Globally, 4q1 declined by 5.1% pa, NNMR by only 2.8% pa, between 2000 and 2012
 - **Variation by region:**
 - Rate of decline of U5MR in MDR's (3.8%pa) much faster than that in LDR's (1.8%) between 1990 and 2000
 - Differential disappeared between 2000 and 2012 (MDR's 3.9%, LDR's 3.8%)
 - Sub-Saharan Africa had very slow progress between 1990 and 2000 (1.3%) but average progress 2000 to 2012 (3.9%)

Cause-Specific Mortality Under Age 5 in 2010

- Liu et al. analysis uses 2 age ranges, 0 and 1-59 months
- Neonatal period is dominated by pregnancy-related factors
 - Preterm and intrapartum complications represent between 50% and 62% of all NN deaths in all regions
 - Infections (sepsis/meningitis, pneumonia) account for between 10% and 30%, closely correlated with U5MR level
- Much more variability in causes after first month:
 - Major infectious diseases (pneumonia, diarrhoea, malaria, meningitis, AIDS, measles) account for nearly 70% in SSA, 30% or less in Europe, Latin America
 - Injuries range from 5% (Africa) to 30% (Americas)
- Declines of rates from 2000 fastest for infectious diseases
 - Neonatal tetanus in neonatal period, measles ages 1 to 59 months
 - Below average declines for malaria and injuries (in some regions increasing rates) ages 1 to 59 months

Opportunities and Challenges for Future Decline in Child Mortality 1

- Structural/clinical changes likely to continue
 - **Opportunities:**
 - Increasing urbanization
 - Increasing maternal education
 - Further fertility decline
 - Continued economic growth and poverty reduction
 - **Challenges:**
 - Near elimination of several vaccine-preventable diseases
 - Continued concentration of births in neonatal period
 - Continued concentration of births in sub-Saharan Africa (for global progress)
 - Weak implementation of cost-effective case management
 - Rise of injury mortality

Opportunities and Challenges for Future Decline in Child Mortality 2

- Changes that may or may not occur
 - Opportunities:
 - Development of new vaccines (malaria, diarrhoea)
 - Improved delivery care
 - Challenges:
 - Disease burden implications of global warming (malaria, nutrition)
 - Increasing microbial resistance
 - New or evolving infectious diseases (influenza)

Opportunities

Urbanization

- The proportion of births in urban areas will increase in the future
 - Product of two countervailing trends, increasing population proportion and lower fertility
 - In 4 example countries, proportions of births in urban areas increased by between 3 and 10 percentage points from early 1990s to late 2000s
- Under-5 mortality in rural areas of developing countries is on average approximately 60% higher than that in large urban areas
 - Partly effect of SES factors, partly health service access
 - Large urban slums do not have excessive child mortality

Maternal Education

- Extensive evidence that mother's education has a major impact on survival of her children
- Cohorts experiencing rapid increases in female education over last two decades now reaching peak childbearing ages
- Impact muted by lower fertility, and delayed by later fertility, among better educated, but effects substantial
 - In 4 example countries, proportions of births to women with secondary education increased by from 5 and 30 percentage points from early 1990s to late 2000s
- Continuing rapid increases in female education, particularly in settings with currently low levels, will ensure that this trend continues

Fertility Change

- Well-established excess child mortality risk among births
 - To very young or older (35+) mothers
 - Following short birth intervals
 - First birth or high parity (e.g. 4+)
- Except in sub-Saharan Africa, fertility change has largely run its course, and potential for further favourable changes is small
- In 4 example countries, only consistent changes from early 1990s to late 2000s have been:
 - Rising proportions of first births
 - Declining proportions of high parity births
 - Reduction in proportions of births after short intervals has been small, 3 to 5 percentage points

Economic Growth/Poverty Reduction

- Despite strong cross-sectional correlations, short-run effect of economic change on U5MR has not been consistently large
- Economic growth is likely to contribute to:
 - Increased access to health services/facilities
 - Improved water and sanitation conditions at household level
- Poverty reduction is likely to reduce under-nutrition
 - Under-nutrition contributes to nearly 50% of under-5 deaths
 - Chronic malnutrition of children 24 to 35 months has generally been declining – e.g. % stunted among children in interviewed households in Malawi declined from 66% in 2000 DHS to 56% 2010 DHS
 - But is still unacceptably high in many settings, e.g. Malawi

Challenges

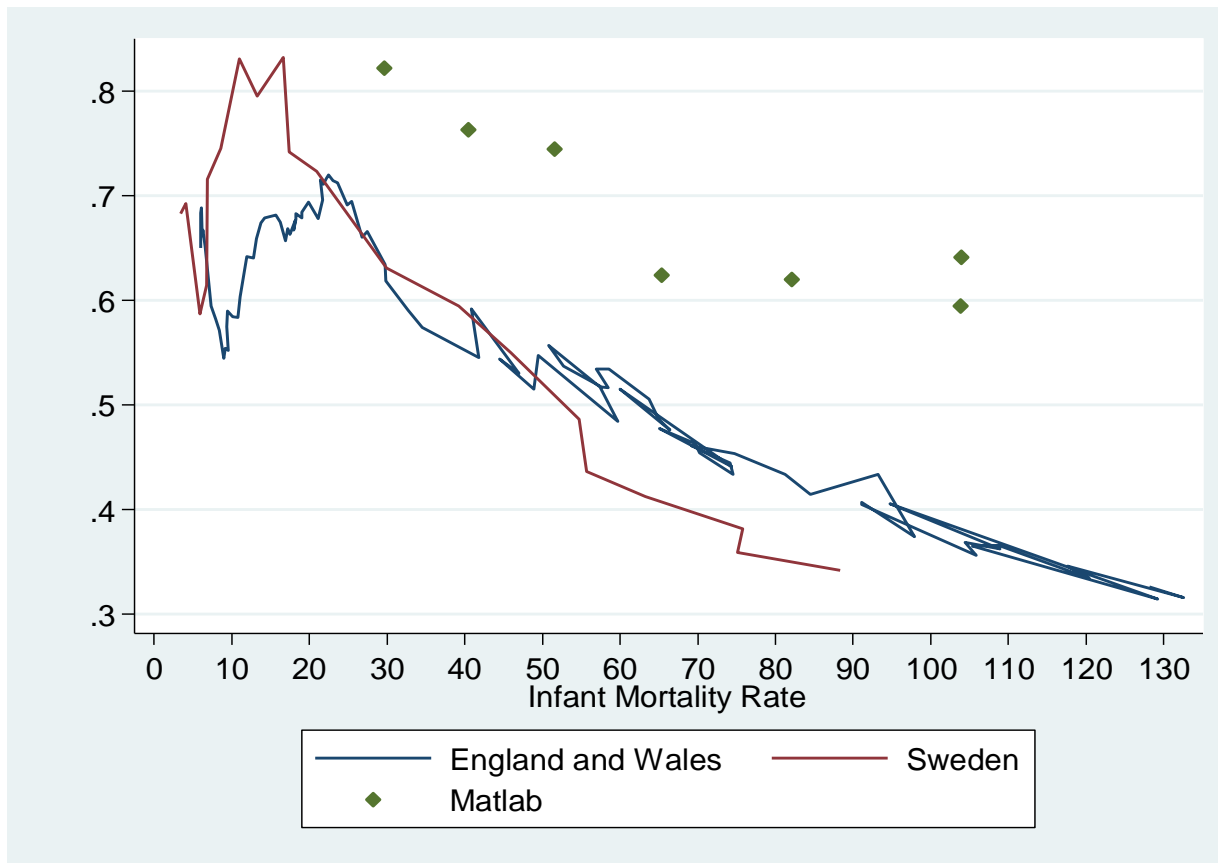
Declines of Vaccine-Preventable Diseases

- Immunization programs with well-established vaccines in developing regions have been hugely successful
 - Dramatic declines in mortality from e.g. measles and neonatal tetanus
 - No scope for further major declines
- Utilization and effectiveness of “new” vaccines has been less dramatic
 - “Low-hanging fruit” has been picked

Increasing Concentration of Deaths in Neonatal Period

- Under-5 mortality declines have been slowest in neonatal period
 - Leading to increasing proportion neonatal of infant deaths as IMR or U5MR decline
 - Although this pattern is the historical norm, the proportion neonatal of infant deaths is already high by historic standards
- Neonatal deaths are largely the result of preterm or intrapartum complications
 - Effective interventions will require increased proportions of facility deliveries with high-quality care
 - Likely to be relatively expensive

Proportion Neonatal of Infant Deaths by IMR: Historic Patterns and Matlab, Bangladesh



Concentration of Births in High-Mortality Regions

- Differential fertility declines by region will concentrate births in high mortality regions
 - UN WPP (2013) projects that the share of global under-5 population from 2010 to 2035:
 - Will increase in sub-Saharan Africa from 22% to 31%
 - Will decline in other less-developed regions
 - Will decline only marginally in more developed regions
- These shifts will not affect potential achievement of country targets (unless reflected sub-nationally), but will affect global performance

Failure to Implement Cost-Effective Interventions

- While preventive interventions (notably vaccines, bednets) have been widely implemented, effective case management has lagged
 - Particularly ORT for diarrhoea, antibiotics for pneumonia
- Although this could be seen as an opportunity, the failure of community case management interventions is a challenge
- Given recent rates of utilization change, 50% of high-U5MR countries are expected to have U5MR rates in excess of 50‰ in 2035

Rise of Injury Mortality

- In some regions:
 - Injuries are the largest single cause of death among children (especially boys) aged 12 to 59 months
 - Injury mortality rates among 1-59 month-olds have increased since 2000
- Interventions to reduce injury mortality are not well-researched but are likely to be expensive
 - Emphasis on built environment

Conclusions

- Progress in reducing child mortality over the last 2 decades has been impressive, though generally not adequate to achieve MDG-4 (ICPD) target
- Future progress depends on the balance of a number of favourable and unfavourable factors, some readily forecastable, some not
 - Among favourable forecastable factors are increased urbanization and improved educational profiles of mothers
 - Among unfavourable forecastable factors are current low rates of mortality from readily preventable infections, and concentrations of deaths in the neonatal period and of child populations in high mortality regions
- Progress can be accelerated by wider implementation of effective case management interventions