Further Reductions in Infant and Child Mortality: Opportunities and Challenges

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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

- **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