

Double burden of under-5 mortality in LMICs



Under-5 mortality is a proxy for the social, economic, environmental, and health-care systems into which children are born; an indicator of a population's wellbeing; and a basis for planning health strategies.^{1,2} However, in its aggregate form (which captures the number of deaths before age 5 years per 1000 live births), under-5 mortality masks heterogeneity along spatial, temporal, socioeconomic, age, and gender dimensions. This unfinished health agenda jeopardises informed targeting of limited resources. Neonatal mortality rate (NMR; deaths in the first month of life) exemplifies such masking. The global NMR has been declining much slower than the overall under-5 mortality and has thus become an increasingly important component of national under-5 mortality reduction strategies.³ Efforts to unmask under-5 mortality patterns through several lenses—including high spatial and temporal resolution,⁴ socioeconomic decomposition,⁵ and fine disaggregation of deaths during the first 5 years of life by time of death—provide crucial insights.^{6,7}

The most recent such effort, from Andrea Verhulst and colleagues,⁸ estimated 22 age-segment probabilities of dying from birth to the fifth birthday and compared the risk of death in each group between low-income and middle-income countries (LMICs) and high-income countries (HICs). In their *Lancet Global Health* analysis, the authors use birth histories from 277 household surveys collected from 81 LMICs and compare corresponding probabilities generated from 25 HICs based on vital registration (VR) data. Overall, the authors found two broad under-5 mortality age patterns: those falling within the expected range and those divergent from the VR model. The divergent patterns depict a U-shape pattern with excess mortality at both extremes of the 0–5 year age range: neonatal (younger than 28 days) and late-age (older than 6 months) mortality. This double burden shows a spatial pattern, with countries in South Asia and sub-Saharan Africa bearing most of the burden. The authors propose that this approach can help to identify the most vulnerable age groups, which are closely linked to specific causes of death, and thus direct efforts to avert deaths appropriately.

These findings come at time when the world is striving for the ambitious targets within the Sustainable

Development Goals (SDGs), after having missed the under-5 mortality Millennium Development Goals target. By 2030, all countries aim to reduce NMR to less than 12 per 1000 live births and under-5 mortality to less than 25 per 1000 live births. As a pathway to achieving these goals, reducing health inequalities, and dealing with the double burden of under-5 mortality, concerted efforts to deal with the excess mortality are required. Whether one agrees with the authors' starting point of taking HIC VR-based age-disaggregated patterns of under-5 mortality as a standard of comparison, the differential risks of death identified in some LMICs can provide a useful glimpse of the underlying causes of mortality.

In addition to addressing the preventable causes mentioned by the authors, excess under-5 mortality in the neonatal period—the first high-risk age—could be due to mortality related to prematurity (higher risk of prematurity and lower access to neonatal intensive care). The omission of stillbirths in this analysis conceals the crucial importance of skilled care at birth, as most fresh stillbirths share this risk factor with the second most important cause of death among neonates—birth asphyxia. Lastly, improved diagnosis and treatment for babies with birth defects in HICs might underlie the higher burden of neonatal mortality in LMICs.

The second high-risk period starts at age 6 months. The protective effect of exclusive breastfeeding might partly explain why there is a lower mortality between the neonatal period and 6 months of age, before an increase is seen after 6 months. Therefore, there is a need to protect and encourage exclusive breastfeeding until 6 months of age, especially as this is near-universal practice in many LMICs and is under threat due to aggressive marketing of breastfeeding substitutes.⁹ Infectious and parasitic diseases such as malaria, diarrhea, and pneumonia are major causes of child deaths after 6 months of life. However, it is also important to protect and promote continued breastfeeding practices as a means of reducing mortality at this age. Poor family planning can often force siblings to be weaned once a new baby is born, potentially putting the first baby at risk if breastfeeding is terminated. Therefore, ensuring family planning and health education are accessible among women and girls

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will ensure both empowerment and autonomy, which have a crucial role in reducing excess mortality.

Despite the extensive work by the authors, some level of caution should be exercised when interpreting the findings. First, the age patterns of mortality did not include stillbirths, which are often omitted or misclassified as neonatal deaths and vice versa.^{7,10} Second, Health and Demographic Surveillance Systems (HDSSs) are of limited use in validating patterns derived from household surveys, which the authors acknowledge. HDSSs are situated in geographically small, heavily researched sites with inhabitants benefiting from trials of novel health interventions. Therefore, HDSS-derived mortality patterns are not comparable to those of the general population, nor are they nationally representative.¹¹ A more useful comparison and validation could be from LMICs where VR data achieve high coverage. Although VR data are a cornerstone for identifying and targeting areas with the highest mortality burdens, the scandal of invisibility is a third burden in LMICs. Complete and accurate VR will reduce over-reliance on household surveys, which have limited temporal coverage, inadequate sample size, and recall bias. Finally, it is also important to unmask mortality patterns by gender to reach those farthest behind first and ensure nobody is left behind.

The findings of Verhulst and colleagues provide additional evidence to double our efforts in addressing the main causes of excess mortality in early childhood before 2030.

We declare no competing interests.

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For more on Vital Registration coverage see <https://unstats.un.org/unsd/demographic-social/crvs/#coverage>