

# Uncounted Deaths: Estimating Postdischarge Pediatric Mortality

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Madrid et al<sup>1</sup> explored the “hidden” mortality in Sub-Saharan Africa: children who die after hospital discharge. Their study revealed a postdischarge mortality within the first 90 days after hospital discharge of 3.6%, which is consistent with the results of previous studies.<sup>2,3</sup> One-half of the deaths occurred within 30 days of discharge, and >80% of the deaths occurred without families subsequently seeking medical attention in this semirural setting. The authors used demographic and clinical variables collected at the time of hospital admission to derive models that were predictive of postdischarge mortality.

Several models were derived, including those without laboratory variables that would be scalable in resource-limited settings and models used to specifically target postdischarge mortality in infants <3 months of age, when postdischarge mortality is highest. The validation of these models in other resource-limited settings will be crucial. An optimal risk-stratification tool for postdischarge mortality would include variables that were already collected as part of routine care (or low-cost, readily available tests), have high interobserver reliability, and can be used across different pediatric age cohorts. The model would be used to identify children early enough in the hospital course to allow for the implementation of concrete, sustainable interventions after children return to their communities. A dynamic tool could be used to integrate variables that are available during the hospital stay, such as the normalization of vital signs or other markers of

response to therapy. Finally, this tool would be used to identify the children in whom early intervention is most likely to change disease prognosis.

How could these findings be integrated into programmatic change at the community level? This depends on several factors, including resource availability and family health-seeking behaviors. The authors noted that the majority of postdischarge deaths occurred in the community without further efforts to seek medical care by the children’s families. It is unclear if this is due to a sense of futility of treatment, a lack of finances or access, a lack of recognition of worsening condition, or other factors. Further understanding of reasons for not seeking further care may help to inform targeted efforts in children who are at high risk and where in the community these interventions may be most successful. For example, if a lack of recognition of deterioration is a reason for not seeking medical evaluation, improving in-hospital discharge information may be helpful. This could include focused instructions at the time of discharge as well as maternal education on warning signs and home care throughout the hospitalization. A study in Tanzania revealed that although fewer than one-third of pregnant women recognized danger signs during pregnancy, 91% of the women who did recognize these signs visited a health care facility.<sup>4</sup> Another study revealed that women who were exposed to a mass media campaign in rural Malawi were more likely to use antenatal and postnatal care services.<sup>5</sup> The authors of such studies suggest that improved

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education on when and why to seek care may lead to improved health care-seeking behaviors.

If a lack of access to nearby care is a barrier, community outreach programs in which the children are managed in their homes or nontraditional venues for care may be required to improve outcomes in children who are at risk for postdischarge mortality. The World Health Organization's Integrated Management of Childhood Illnesses<sup>6</sup> has been used to identify clinical criteria to allow health workers of different training levels to identify young (<5 years old) children requiring acute interventions. Targeted follow-up in children who are at high risk by community health workers with an Integrated Management of Childhood Illnesses-based algorithmic approach could allow for a prompter recognition of clinical deterioration and escalation in care. Health workers may also be able to target children who are at high risk in other locations that are likely to be visited by the family. Researchers in 1 Bangladeshi study used a day care clinic to reevaluate children who were admitted with severe pneumonia; >90% of patients returned for follow-up care. During these visits, vital signs were reassessed, children received nutritional therapy, and mothers received educational interventions.<sup>7</sup>

Finally, medications may be targeted toward children who are at high risk. The mass distribution of azithromycin has been shown to decrease mortality in children

in Sub-Saharan Africa outside of hospital settings.<sup>8</sup> Researchers in 1 group are currently studying whether postdischarge mortality can be reduced by treating 1400 1- to 59-month-old children with a 5-day course of azithromycin to decrease death and readmission.<sup>9</sup> The investigators will also study the risk of antibiotic resistance after taking azithromycin and will identify subgroups of children who may receive the most benefit from postdischarge azithromycin. Antimicrobial stewardship concerns aside, the obvious advantage to a medication-based approach is that implementation would not further strain existing health systems in resource-limited settings, potentially resulting in a more sustainable long-term model to reduce postdischarge mortality.

Madrid et al<sup>1</sup> have identified risk factors for postdischarge mortality in children in a resource-limited setting in Sub-Saharan Africa. The next steps to translating these findings into clinical practice will involve validating the findings in other populations and determining how to identify scalable, sustainable interventions that can be adapted to local environments.

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