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Challenges and Innovations in Using Community-Based Workers to Improve Vital Events Registration in sub-Saharan Africa: Validation against full birth histories in four countries

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Abstract

Evaluating the scale-up to the MDGs is high on the international development agenda. Hence, there are increasing demands for measurement of short-term changes in mortality among children below five years of age in low-income countries. We report findings from a five-year project in Ethiopia, Ghana, Malawi and Mali that developed and tested methods for the real-time monitoring of under-five mortality based on vital events reporting by community health workers. We validated these data and the resulting under-five mortality rate estimates against comparable full birth histories collected in household censuses and surveys. Our results showed variable completeness of annualized births and under-five deaths reporting ranging from 30%-96% and 22%-91%, respectively. Resulting under-five mortality rates were under-estimated by 9% in Mali and up to 59% in Ghana. In countries lacking complete vital registration, no one-size-fits-all approach will be successful in guaranteeing complete and accurate reporting of vital events by community-based health workers.

Evaluating the scale-up to the MDGs is at the top of the international public health agenda, and work to develop plans for monitoring the goals beyond 2015 and strengthening accountability for women's and children's health are already under way. As a part of these efforts, there are increasing demands for measurement of short-term changes in mortality among children less than five years of age in low- and middle-income countries.

The "Real-time" Monitoring of Under-Five Mortality" (RMM) project is based at the Institute for International Programs of the Johns Hopkins University. The project works in five countries (Ethiopia, Ghana, Malawi, Mali and Niger) that are receiving support from the Government of Canada through the United Nations Children's Fund (UNICEF) as part of the Catalytic Initiative to Save a Million Lives – Integrating Health System Support (CI-IHSS) project. The RMM project collaborates with research institutions in each country, building sustainable capacity for program evaluation and the monitoring of births and child deaths.

The RMM project aims to develop and test methods to measure changes in under-five mortality for recent periods of 12 months or fewer, and to generate lessons for the future about the feasibility of monitoring under-five mortality in low-income countries. One such approach was based on training and equipping community based workers in selected districts in Ethiopia, Ghana, Malawi and Mali to report births and deaths occurring within their community, as a strategy for measuring mortality in real-time.

Test of such approach is timely. The last few years have seen a growing recognition of the importance of civil registration and vital statistics (CRVS) as drivers of human rights, health and development programs. The "Who Counts" series published in *The Lancet* in 2007 was an important milestone. The Commission on Information and Accountability for Women's and Children (CoIA) broadened and reinforced the importance of evidence for accountability, and in May 2014 Canada hosted a Summit in Toronto on "Saving Every Woman, Every Child – Within Arm's Reach" that includes CRVS as a major action area. As a bridge between health system and communities, community-based workers are essential for successful development of a CRVS system in low-income countries.

Methods and Preliminary Results

In the four countries, community-level workers reported on vital events for at least 12 months, and the results were then compared with a "best-practice" census or household survey. In Ethiopia, Ghana, Malawi and Mali, we trained and supported existing community-based workers (paid cadres of Government health workers in Ethiopia and Malawi, volunteers in Ghana and Mali) to record all pregnancies, births and deaths up to the age of five years that occurred in their catchment areas. We compared these events with those identified through a "best practice" census (in Ghana and Mali) or survey with full birth history (in Ethiopia and Malawi).

Table 1 presents the standard metrics for process, data quality and accuracy of the RMM community-based method as implemented in the four countries, along with the average annual running cost per 1,000 population.

Table 1. Summary of process, accuracy and cost results for RMM methods tested

Country	Type of Worker	PROCESS	ACCURACY RELATIVE TO CURRENT BEST PRACTICE (Average Annual Ratio RMM:Best Practice Census or Survey)				ANNUAL RUNNING COST PER 1,000 POPULATION (US\$)	
		Average % of catchment areas reporting per month	Births	Under-five Deaths	Neonatal mortality rate	Infant mortality rate		Under-five mortality rate
Ethiopia (15 months, Jan 2012 – Mar 2013)	Health Extension Worker (HEW)	95.7	30.1	21.7	89.0	81.0	72.0	\$389
Ghana (21 months, Jan 2012 – Sep 2013)	Community-Based Volunteer (CBV)	97.8	96.3	71.8	66.9	63.2	40.8	\$1,505
Malawi (48 months, Jan 2010 – Dec 2013)	Health Surveillance Assistant	96.6	65.9	50.6	74.0	67.5	67.7	\$258
Mali (15 months, Jul 2012 – Sep 2013)	Community health volunteer (Relais)	100	90.3	90.8	128.8	120.0	100.6	\$4,098

Further confirmation of the validation results in Malawi will be conducted once data are available from the recent MDG survey. We summarize below the key results.

- The RMM community-based workers submitted their reports regularly, suggesting that these methods may be feasible for implementation at scale. The average percent of catchment areas for which monthly reports were submitted ranged from 96 percent in Ethiopia and Malawi to 100 percent in Mali.
- The accuracy of the community-based reports, relative to the best practice validation, varied widely by country and by type of event. In all settings, the concordance between community and best practice reports was higher for births than for under-five deaths.
- Community-based workers severely under-reported under five deaths and rates in Ethiopia and Malawi, but not in Mali. There was higher concordance for neonatal deaths than under-five deaths in all three settings, and higher proportions of neonatal deaths than the best practice survey in Mali. This suggests that methods relying on local reporting of vital events may perform better than household interviews in identifying early deaths, at least in some settings. Further investigation, using full pregnancy histories and the routine reporting of pregnancies by community-based health workers, is needed to evaluate whether the higher proportions of neonatal deaths suggest improved reporting of early deaths or rather potential misclassification of stillbirths (as neonatal deaths) by community-based health workers.
- In Ethiopia and Malawi, where we were able to conduct home visits to confirm the events reported by community-based workers, we learned that in general, they recorded the events they identified correctly and completely in their registers. Work on matching individual events recorded by the workers and the best practice surveys is ongoing and will provide more in-depth information on patterns of missing events.
- These ambitious applications generated important lessons for efforts to improve civil registration and vital statistics in settings with weak health information systems. Mali demonstrates that complete and accurate reporting of vital events by community workers is feasible, but that it requires locally-defined incentive structures and levels of supervision and monitoring that may be hard and costly to achieve in most settings.
- We were surprised by the extent to which the challenges with implementing community-based vital reporting systems varied by countries. In Ghana, RMM project areas were in very poor areas of the Northern region, with considerable population migration – both among nomadic tribes and because the cultural practice in some areas was for women to return to their families of origins from late-pregnancy through the first months of life. In Ethiopia, the Health Extension Workers charged with vital event reporting were often called away from their catchment areas for other duties. In Malawi, there were high rates of turnover among Health Surveillance Assistants, requiring frequent refresher training. Clearly, no one-size-fits-all approaches will be successful in guaranteeing complete and accurate reporting of vital events by community-based health workers.
- The costs of implementing these community-based methods also varied widely, reflecting combinations of the intensity of the RMM implementation as well as differences in the costs of doing business in each setting. Our preliminary findings suggest that the average monthly running costs per 1,000 population during the implementation period were much higher in Mali than in Malawi, and that both were considerably higher than Ethiopia. We cannot draw conclusions from these findings until we have a clearer understanding of the constituent costs in each setting.