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Nutrition surveys absorb significant human and financial resources. In Ethiopia, for example, Spiegel and colleagues1 analysed 125 surveys and assessments conducted in 1999 and 2000, and found that of the 67 surveys that set out to use standard methods,2 just six could be considered valid and precise. Forty-two other surveys intentionally included less than the 900 children expected in the conventional 30 × 30 (30 children in each of 30 ‘clusters’) sample design. It is likely that the cost, in both time and money, of fielding the standard design is a major factor leading implementers to compromise on sample size. Therefore, alternative designs that produce policy relevant information at a lower cost are highly desirable. Three such designs are evaluated in this issue, and are found to offer significant savings.3

Deitchler and co-workers4 used the principles of Lot Quality Assurance Sampling (LQAS) to develop alternative survey designs to assess the prevalence of Global Acute Malnutrition in a drought-affected region of Ethiopia. Specifically, they experimented with a survey that sampled six children in each of 33 clusters (the ‘33 × 6’ design); another that sampled three children in each of 67 clusters (the ‘67 × 3’ design), and a third ‘sequential’ design that was planned to incorporate up to three children in each of 67 clusters, but could be suspended as soon as the accumulated information exceeded a pre-determined benchmark. All three designs were compared with a standard
defines low risk; for example, in a study in Bangladesh, \( \frac{30}{30} \) survey design. Strikingly, the authors show that their \( \frac{33}{6} \) and \( \frac{67}{3} \) designs involved hardly any loss of precision when analysed using standard cluster survey techniques and compared with the conventional \( \frac{30}{30} \) design across a range of indicators. This finding has nothing at all to do with the specifics of LQAS, but rather suggests that, because of intra-cluster correlation, the conventional \( \frac{30}{30} \) design is highly inefficient in this setting. The investigators then go on to show that the samples can be validly analysed using LQAS methods to classify the whole area as high or low priority for intervention, with acceptable probabilities of misclassification that do not differ between the two sample designs assessed (\( \frac{33}{6} \) and \( \frac{67}{3} \)). They also find that, using the \( \frac{67}{3} \) design, valid judgements could have been made even before all the data were collected: in fact, after cluster 38, the prevalence could have been determined to be <15%, again with acceptable probabilities of misclassification, further reducing the overall time required to collect the data.

LQAS is not a new technique: over 800 surveys were conducted between January 1984 and December 2004,\(^2\) with applications including the small-area surveillance of leprosy, filariasis, schistosomiasis and trachoma, amongst other diseases. It differs from more familiar sampling approaches in that its objective is to simply to permit classification of the primary sampling units (or ‘lots’) into mutually exclusive high- and low-risk groups, based on pre-determined thresholds and tolerances of misclassification. This orientation makes it ideal for use by health system managers who need to identify pockets of high prevalence of disease or sub-standard service provision. It offers significant sample size savings over traditional surveys methods when there is space between the threshold that defines high risk and the second threshold that defines low risk; for example, in a study in Bangladesh,\(^6\) an acceptable level of immunization coverage was determined to be 85%, and the lower threshold was based on previous coverage surveys and set at 60%. Combined with the chosen tolerance of misclassification, this resulted in a required sample size of just 13 children per lot. The study reported in this volume shows that using clustered sampling within each lot—based on ‘spin-the-bottle’ starting points and progression from one house to its nearest neighbour—is an acceptable alternative to the simple random sample usually prescribed, greatly increasing the user-friendliness of the method. The major weakness of the study was that the samples compared with each other were not completely independent, as they ideally should have been.

Given the number of studies that have assessed the validity of LQAS and its clear advantages in terms of cost, it is disappointing that it is not more widely used for routine health service management in developing countries. Undoubtedly, one of the main reasons for this slow uptake is that the probability model upon which it is based is unfamiliar and confusing to many. However, with a much greater emphasis on demonstrating results now than in previous decades and the availability of freeware such as SampleLQ,\(^7\) which makes the task of setting the decision rules much easier, resistance may be lessening. Indeed, the experience of the ‘UPHOLD’ project, which has documented the successful scaling up LQAS as a key element of evidence-based decision making in 20 districts in Uganda,\(^8\) proves that the initial barriers can be overcome. It is now time to push for broad scientific acceptance of the methodology. This is likely to involve finding a more appealing name; using effective communication to emphasise the general principles over the detail of the probability calculations, and bringing together the various disease-specific champions into a broader coalition.

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### References