Author's response to reviews

Title: Using height-for-age difference (HAD) instead of height-for-age z-scores (HAZ) for the meaningful measurement of population-level catch-up in linear growth in children less than 5 years of age

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Author's response to reviews:

Dear Dr O'Donovan,

We would like to submit the manuscript entitle “Using height-for-age difference instead of height-for-age z-scores for the meaningful measurement of catch up growth in children less than 5 years of age” for consideration in BMC Pediatrics.

Chronic malnutrition in children remains an important global problem, with an estimated 165 million children under five being stunted, i.e. suffering from severe linear growth retardation. Evidence suggests that the most effective way to reduce linear growth retardation—a consequence of chronic malnutrition—globally is to scale-up interventions to prevent it (rather than treat or reverse), and that children should be exposed to these interventions during the full first 1,000 days of life (from conception to the child’s second birthday). A common view among the nutrition community is that linear growth retardation is largely irreversible after two years of age, when the window of opportunity for improving nutrition has closed.

A number of recent studies claim to have found evidence of catch-up growth after 2 years of age in children exposed to standard of care practices typical of developing country contexts, but in the absence of interventions specifically aimed at improving linear growth. However, this new body of research is based on the use of height-for-age z-scores (HAZ) to define catch-up growth.

Our paper challenges the use of HAZ for assessing changes in growth over time as populations of children age. We argue that because HAZ are constructed using standard deviations from cross-sectional data, they are inappropriate to assess changes in height over time or across ages. We propose instead to use absolute height-for-age differences (HAD).

Using HAD, we show not only an absence of catch-up growth between 2 and 5
years, but a continued deterioration reflected in an increase in absolute HAD. These findings support the current programmatic focus on the importance of the first 1,000 days for improving nutrition as globally promoted by global initiatives such as Scaling Up Nutrition (www.scalingupnutrition.org). But they also raise questions regarding the potential to improve growth beyond 2 years of age, the types and timing of interventions to do so, and their cost and long-term benefits on functional outcomes.

We believe that this paper is relevant to international readers ranging from researcher and clinicians to policy makers and program implementers and in line with the journal’s commitment to publishing novel and significant research that contributes to improving the health and wellbeing of people globally.

We would like to request to exclude reviewers who have authored (recent) articles whose results are directly challenged by our analyses: Andrew Prentice (author of a recent AJCN article on catch-up growth), Cesar Victora (who published growth curves using Z-scores showing that growth retardation stops at 2 years of age), and Tim Cole (who wrote an article claiming that HAZ should be used for catch-up growth).

Sincerely yours,

Jef L Leroy, PhD

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