# Alternative metrics for tracking population-level trends in child linear growth

This is a summary of the following paper: *Aimone AM, Bassani DG, Qamar H et al (2023) Complementary and alternative metrics for tracking population-level trends in child linear growth. PLOS Global Public Health, 3, 4, e0001766.* **https://doi.org/10.1371/journal.pgph.0001766**

This study explored a range of child linear growth indicators, based on height distributions from anthropometric surveys, which were treated as potential alternatives or complementary metrics to stunting prevalence[1] – commonly used to track population-level trends in child nutritional status. Although stunting prevalence is straightforward to estimate, it has several limitations, including that the cut-off threshold has no biological basis and that it does not capture the whole population shift in linear growth faltering common in low- and middle-income countries (LMICs). Therefore, this study aimed to evaluate alternative linear growth metrics based on their correlations with stunting prevalence and 1) under-five mortality, 2) gross domestic product, and 3) maternal education.

The data used for this analysis came from 156 demographic and health surveys conducted in 63 LMICs between 2000 and 2020. The median sample size was 5,461, with sample sizes ranging from 1,290 to 239,588.

The study used Spearman's rank correlation coefficient (r) to identify indicators as alternatives to stunting if they were strongly correlated with stunting ($r > 0.95$) and at least as strongly correlated with the selected population indicators as stunting. Indicators were considered complementary if they were less strongly correlated with stunting ($r < 0.95$) but still correlated with population indicators.

The study identified several indicators as potential alternatives to stunting prevalence, including stunting at ages two to five years, mean height-for-age z-score (HAZ), and the 25th percentile HAZ. Six indicators were considered complementary to stunting, such as SITAR-IP[2], predicted HAZ at age two and five years, HAZ and height-for-age difference slopes from one month to two years, and growth delay slopes from one month to two years and from two to five years. Three other metrics including predicted HAZ at birth had weak correlations with population indicators ($r < 0.43$).

Among its limitations, this approach had a narrow scope, and the use of other indicators of health, socioeconomic status, or within-country inequalities may have yielded different conclusions. However, the availability of population-representative measures of some of the other relevant domains (e.g., cognitive development) was limited both in demographic and health surveys and from other data sources. The influence of regression modelling on model-derived metrics, the low number of surveys, and the lack of examination of variations in survey quality present additional limitations.

Future research should focus on the acceptability and interpretability of these metrics by stakeholders. Stunting prevalence, despite its limitations, is well known to policymakers. Adopting alternative and complementary indicators would require defining benchmarks and establishing guidance for their use – but they may offer conceptional advantages.

[1] Stunting prevalence is defined as the proportion of children in a population with a HAZ more than 2 standard deviations below the median of the World Health Organization Child Growth Standard.

[2] The Super-Imposition by Translation and Rotation Intensity Parameter (SITAR-IP) is a scaling factor that reflects the velocity of a linear growth curve relative to the mean velocity.

# Dietary diversity in Bhasan Char relocation camp, Bangladesh: Children and adolescents

This is a summary of the following paper: *Das S, Fahim S, Rasul M et al. (2023) Nutritional and dietary diversity status of under-5 children and adolescent girls among forcibly displaced Myanmar nationals living in Bhasan Char relocation camp, Bangladesh: A cross-sectional survey. BMJ Open, 13, e068875.* **https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10069579/pdf/bmjopen-2022-068875.pdf**

This cross-sectional survey of 248 children (aged 6–59 months) and 299 adolescent girls (aged 11–17 years) was randomly sampled from a population of 17,698 forcibly displaced Myanmar nationals residing in Bhasan Char relocation camp. Sociodemographic information, dietary diversity status, length/height, weight, mid-upper arm circumference (MUAC), and head circumference data were collected from all participants.

Children consuming at least four of eight food groups within the preceding 24 hours were deemed to have 'minimum dietary diversity'. Adolescent dietary diversity was determined using Food and Agricultural Organization 'Women's Dietary Diversity Score' guidelines.

For adolescent girls, severe (14.1%) and moderate (28.8%) stunting prevalence was high. Most consumed starchy staples (98%) and dark green leafy vegetables (79%), but few consumed animal-based proteins or vitamin A- or iron-rich foods. The distribution of dietary diversity did not vary much by nutritional status, with an overall average of 3.1 (SD 1.03) out of nine food groups consumed.

For children aged 6–59 months, severe (8.5%) and moderate (23.1%) stunting was also prevalent. Severe (1.2%) and moderate (10.9%) wasting was more common by weight-for-height than MUAC, which were 0.8% and 8.5% respectively. Only 25% of children aged 6– 59 months achieved minimum dietary diversity.

***"Nearly all the children we surveyed consumed diets that were mainly carbohydrate based and poorly diversified, irrespective of their nutritional status."***

Regression analyses showed that no anthropometric indices, for both adolescent girls or children in the study, were significantly associated to dietary diversity scores – which may reflect the generally poor dietary diversity across all groups, making it difficult to compare between each.

Appropriate measures were taken to sample only a single member from each household and validated anthropometry tools, pretested survey questioners, and pretested food frequency questionnaires were used, increasing the validity of this study. The researchers recruited enough participants for the study to be appropriately powered, based on their sample size calculation.

As the data collection period was short (7–12 November 2021), seasonality may skew these results as different periods of the year may present different crop shortfalls. All participants had access to improved drinking water and sanitation systems, which may not be true of comparable settings. There was a 100% response rate, which is unusual, but this may reflect the tightly controlled environment this group has been relocated to.

The findings for these two study groups are important. Both are disproportionally affected by malnutrition, yet they are distinct groups and we cannot extrapolate the findings to other child, youth, or even adult populations in this setting. Diets for these two refugee groups were poor compared to the local population and efforts should be made to improve their long-term nutrient status – through the provision of diversified and micronutrient-fortified rations.