

Seasonality of Child Growth: High Temperatures Coincide with Growth Faltering among Young Children in Burkina Faso

Ilana Cliffer,¹ Elena Naumova,² William Masters,² Nandita Perumal,¹ Franck Garanet³ and Beatrice Rogers²

¹Harvard T.H. Chan School of Public Health; ²Tufts University Friedman School of Nutrition Science and Policy and ³Institut de Recherche en Sciences de la Santé

Objectives: Seasonal cycles in climatic factors such as temperature and precipitation affect the drivers of child growth and contribute to seasonal fluctuations in undernutrition. Current growth seasonality models are limited by categorical definitions of seasons that rely on assumptions about their timing and fail to consider their magnitude. In this study, we disentangle the relationship between climatic factors and growth indicators, using harmonic regression models to determine how child growth is related to peaks in temperature, precipitation, and vegetation.

Methods: Longitudinal anthropometric data collected between August 2014–December 2016 from 5,039 Burkinabè children measured

monthly from age 6–28 months were linked with remotely sensed daily precipitation, vegetation, and maximum air temperature. Using harmonic regression models, we compared the magnitude and timing of seasonal peaks in climatic factors and morbidity with that of nadirs in growth velocity (cm/month, kg/month).

Results: Length and weight velocity were slowest twice a year, coinciding both times with the highest temperatures, as rains start and end, and with peak fever and diarrhea incidence.

Conclusions: Our results suggest that child health and development are more affected by high temperatures than by other aspects of climatic seasonality such as rainfall. Pathogens causing diarrheal disease and fever thrive and have more opportunities to infect children while temperatures are high, and precipitation is low. Emerging shifts in climatic conditions will pose challenges to optimal growth, highlighting the importance of programmatic and policy-level changes that optimize timing of nutrition interventions and address environmental growth-limiting conditions.

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