Investigating Differences in Nutritional Parameters in Ugandan Children with *Plasmodium falciparum* Severe Malaria

Lucy D. Brown¹, Katrina Co², Caitlin Bond², Robert O. Opoka³, Dibyadyuti Datta², Chandy C. John²,

¹Indiana University School of Medicine, Indianapolis, Indiana;
²Ryan White Center for Pediatric Infectious Disease and Global Health, Department of Pediatrics, Indiana University School of Medicine, Indianapolis, Indiana;
³Department of Paediatrics and Child Health, Makerere University, Kampala, Uganda

**Background:** In 2018, malaria produced an estimated 272,000 deaths in children <5 years of age, accounting for 67% of all malaria deaths worldwide, with a majority in the WHO African Region. Malnutrition is an important risk factor for malaria. Wasting, Stunting and Underweight are crucial indicators of malnutrition. Annually, 14 million children <5 are classified as wasted and 59 million children are classified as stunted.

**Objective:** The objective of this study is to determine the association between each of the major manifestations of severe malaria (SM) and nutritional parameters – weight-for-age (WAZ), height-for-age (HAZ), and weight-for-height (WHZ) – in children from the Ugandan cities Mulago and Jinja.

**Methods:** To assess differences in WAZ, HAZ, and WHZ by the five types of SM and community controls (CC), we evaluated Z-scores from children <5 years old enrolled in a prospective cohort study (NDI, Neurodevelopmental Impairment in Children with Severe Malaria) at enrollment and 12-month follow-up.

**Results:** WAZ and WHZ at baseline were significantly lower among SM groups than in CC (p<0.001), but there were no significant differences observed at 12-month follow-up. There were no major differences in HAZ between the SM and CC groups. WAZ and HAZ at baseline were significantly lower among High Mortality (HM) versus Low Mortality (LM) groups (p<0.01). At 12-month follow-up, HAZ remained significantly lower in HM versus LM (p<0.01). There were no major differences in WHZ between the HM and LM groups. Compared to those who survived, the 27 children who died had significantly lower WAZ (p<0.05), but no major differences in HAZ or WHZ.

**Conclusion:** Underweight, stunting, and wasting may be risk factors for SM. Overall, a more comprehensive understanding of how SM elicits adverse effects in children is necessary. Nutrition intervention programs must be implemented to prevent child stunting, wasting, underweight, and mortality.