

Pediatric Malnutrition

Investing in the health of our nation's children is critically important. Towards that end, HNC is strongly committed to preventing malnutrition in children. The importance of good nutrition starts well before birth and plays a vital role in a growth and development through all life stages. This is underscored in Healthy People 2020's description of the physical determinants of infant and child health: "The cognitive and physical development of infants and children is influenced by the health, nutrition, and behaviors of their mothers during pregnancy and early childhood."ⁱ Good nutrition continues to play a vital role throughout childhood and into later life. The CDC confirms, "Healthy eating in childhood and adolescence is important for proper growth and development and to prevent various health conditions."ⁱⁱ

While the importance of good childhood nutrition is viewed almost universally as fundamental, it is frequently overlooked in children with both acute and chronic diseases, where a child's nutritional needs may be greater than those required for basic growth and development. Illness-related factors such as multiple medications and the stress of frequent medical treatments and hospitalizations can influence dietary intake, which further impacts nutritional status. As a result children with acute and chronic conditions are often at increased risk for malnutrition, yet the importance of nutrition is frequently sidelined as medical care takes precedence.

Pediatric malnutrition is generally defined as "an imbalance between nutrient requirement and intake, resulting cumulative deficits of energy, protein or micronutrients that may negatively affect growth, development, and other relevant outcomes."ⁱⁱⁱ

Disease-related malnutrition, a specific type of malnutrition impacting those children with acute and chronic diseases, certain injuries or who have undergone certain surgeries, is common in hospitalized children but is likely to be under recognized and inadequately documented. According to a special report by the American Society for Parenteral and Enteral Nutrition (ASPEN), the reported rates of disease-related malnutrition range from 6%-51% in hospitalized children.^{iv} However, these statistics may not accurately depict nutritional status of pediatric patients due to "lack of uniform definitions, heterogeneous nutrition screening practices, and failure to prioritize nutrition as part of patient care."

Additionally, in some instances, such as with very premature or very low birth weight infants, parenteral nutrition may be necessary to increase protein and energy intakes, among intake of other essential nutrients. Early use of parenteral nutrition in neonates can help in minimizing weight loss, improving growth and reducing risk of mortality.^{viviviii} However, while parenteral nutrition is essential for very low birth weight infants, for those premature infants who are larger, parenteral nutrition might not be required as enteral nutrition can be tolerated.

When not properly diagnosed and treated, malnutrition can affect more than growth and development in pediatric patients. It also increases the cost of care and the likelihood of poor health outcomes, including increased complications, longer hospitalizations, more readmissions, and increased mortality. For example, a 2016 prospective study of 400 Pediatric Intensive Care Unit patients, which specifically examined the effect of malnutrition on mortality, found that severe malnutrition was independently associated with higher mortality even among patients with similar pediatric risk of mortality scores.^{ix}

In the pediatric population, diagnosing and treating malnutrition is especially important to ensure that children have the opportunity for a timely recovery and are able to grow and thrive when their diagnosis is fully treated, especially when they suffer from other complex or chronic conditions. This is a critical consideration when considering healthcare policies impacting pediatric patient populations as improving rates of diagnosis and treatment of malnutrition, including increasing patient access to therapeutic nutrition, can provide significant, lifelong benefits to these patients.

The focus on the important role of nutrition in child health should not be lost because a child is ill. Improving rates of diagnosis of disease-related malnutrition and ensuring timely treatment with appropriate clinical nutrition therapies not only improve or maintain children's nutritional status and overall

health, but reduce complications, promote shorter hospital stays, decrease hospitalizations, reduced hospital readmissions and result in long term healthcare savings.

ⁱ “Maternal, Infant, and Child Health,” Healthy People 2020, Accessed: March 23, 2017. Available:

<https://www.healthypeople.gov/2020/topics-objectives/topic/maternal-infant-and-child-health>

ⁱⁱ “Childhood Nutrition Facts,” Centers for Disease Control and Prevention, Accessed March 23, 2017. Available:

<https://www.cdc.gov/healthyschools/nutrition/facts.htm>

ⁱⁱⁱ Mehta NM, Corkins MR, Lyman B, et al. Defining Pediatric Malnutrition: A Paradigm Shift Toward Etiology-Related Definitions. *J Parenteral Enteral Nutr.* 2013; 37(4): 460-481.

^{iv} Id. See also: Joosten KF1, Hulst JM., Prevalence of malnutrition in pediatric hospital patients. *Curr Opin Pediatr.* 2008 Oct;20(5):590-6. and Pawellek I, Dokoupil K, Koletzko B. Prevalence of malnutrition in pediatric hospital patients. *Clin Nutr.* 2008 Feb;27(1):72-6.

^v Moyses HE, Johnson MJ, Leaf AA, Cornelius VR. Early parenteral nutrition and growth outcomes in preterm infants: a systematic review and meta-analysis. *Am J Clin Nutr.* 2013 Apr; 97(4): 816-26.

^{vi} Christmann V, Visser R, Engelkes M, de Grauw AM, van Goudoever JB, van Heijst AF. The enigma to achieve normal postnatal growth in preterm infants – using parenteral or enteral nutrition? *Acat Paediatr.* 2013; 102(5): 471.

^{vii} Wilson DC, Cairns P, Halliday HL, Reid M, McClure G, Dodge JA. Randomised controlled trial of an aggressive nutritional regimen in sick very low birthweight infants. *Arch Dis Child Fetal Neonatal Ed.* 1997; 77(1): F4.

^{viii} Ehrenkranz RA, Das A, Wrage LA, Poindexter BB, Higgins RD, Stoll BJ, et al. Early nutrition mediates the influence of severity on extremely LBW infants. *Pediatr Res.* 2011; 69(6): 522.

^{ix} Nangalu R, Pooni PA, Bhargav S, Singh H. Impact of malnutrition on pediatric risk of mortality score and outcome in Pediatric Intensive Care Unit. *Indian J Crit Care Med.* 2016 Jul; 20(7): 385–390.