

## 2.09 NUTRITION

### Introduction

There is a growing body of evidence which shows that optimal nutrition improves outcomes in hospitalized children. Malnutrition refers to any disorder of nutritional status resulting from a deficiency or excess of nutrient intake, imbalance of essential nutrients, or impaired nutrient metabolism. Malnutrition occurs in up to half of hospitalized children in the United States but varies considerably by age and disease state. Malnutrition in hospitalized children is a risk factor for unfavorable clinical outcome, prolonged hospital stays, delayed recovery, and increased care costs. An understanding of the fundamental nutritional requirements of pediatric patients is essential to providing optimal care for hospitalized children. Pediatric hospitalists must be able to reliably perform objective nutritional assessments and manage frequently encountered nutritional problems. They are in an optimal position to detect disorders of nutrition and improve the nutritional status of hospitalized pediatric patients.

### Knowledge

Pediatric hospitalists should be able to:

- Describe the normal growth patterns for children at various ages and the potential effect of malnutrition on growth.
- Describe the anthropometric measurements commonly used to assess acute and chronic nutritional status.
- Describe the basic nutritional requirements for hospitalized pediatric patients, based on gestational age, chronologic age, weight, activity level, and other characteristics.
- Compare and contrast the composition of human milk versus commonly used commercial formulas and explain why human milk is superior nutrition for infants.
- Describe the differences in composition of and clinical indications for commonly used commercial formulas, as well as protein hydrolysate and other specialty formulas.
- Compare and contrast the benefits and costs of blended foods versus commonly used enteral formulas as complete nutritional sources for children receiving gastric, duodenal, or jejunal tube feedings.
- List the indications for specific vitamin and mineral supplementation, including exclusive breastfeeding in infants less than 6 months, infants consuming less than 27 ounces of formula per day, chronic anti-epileptic therapy, food allergies resulting in extreme dietary restrictions, and others.
- List the factors that place hospitalized pediatric patients at risk for poor nutrition.
- Compare and contrast marasmus and kwashiorkor.
- Define the term protein-calorie malnutrition.
- List the signs and symptoms of common vitamin and mineral deficiencies including iron, calcium, zinc, and Vitamin D.
- Compare and contrast commonly encountered nutritional needs and risks between different types of eating disorders, including anorexia nervosa, bulimia nervosa, rumination, and Avoidant/Restrictive Food Intake Disorder (ARFID).
- Discuss the indications and contraindications for both enter-

al and parenteral nutrition and describe the complications associated with each.

- Describe the monitoring needs for pediatric patients on chronic enteral or parenteral nutrition, attending to electrolyte and mineral disturbances, growth, and other parameters.
- Discuss refeeding syndrome, the risk factors associated with its development, and the treatment for its most common manifestations.
- Explain the importance of nutrition screening, as well as the indications for consultation with a registered dietician, gastroenterologist, mental health professional, or other subspecialist.
- Discuss the maintenance and supplemental needs of patients with commonly encountered metabolic/mitochondrial disorders and inborn errors of metabolism, including Galactosemia, Phenylketonuria, Maple Syrup Urine Disease, and Hereditary Fructose Intolerance.

### Skills

Pediatric hospitalists should be able to:

- Assess and utilize anthropometric data to determine the presence, degree, and chronicity of malnutrition.
- Perform a focused history and physical examination, attending to details that may indicate a particular nutrient, vitamin, or mineral deficiency.
- Conduct a directed laboratory evaluation to obtain information about nutritional status and vitamin or mineral deficiencies, as indicated.
- Determine the basic caloric, protein, fat, and fluid requirements for hospitalized pediatric patients, for both maintenance needs and catch up growth.
- Provide educational and clinical staff support for lactating mothers, including those having trouble initiating or maintaining breastfeeding or milk supply or those with a breastfeeding complication, including nipple pain or compression, poor milk transfer, low supply, plugged ducts, or mastitis.
- Choose an appropriate formula, delivery device, and method of administration when enteral nutrition is required.
- Emphasize the importance of using enteral nutrition over the parenteral route whenever possible.
- Initiate and advance parenteral nutrition using the appropriate initial composition of parenteral nutrition solution, delivery device, and method of administration when required.
- Appropriately monitor laboratory values to ensure the efficacy of supplemental nutrition support and to screen for complications.
- Identify and treat complications of both enteral and parenteral nutrition, such as metabolic derangements, infection, and delivery device malfunction.
- Identify the signs of and effectively treat refeeding syndrome.
- Identify, treat, and/or consult appropriate specialties and services for children with eating disorders.
- Engage consultants, including registered dietitians, lacta-

tion, gastroenterologists, mental health professionals, and other subspecialists as indicated.

- Arrange an effective and safe transition of care from inpatient to outpatient providers, preserving the multidisciplinary nature of the nutrition care team when appropriate.
- Collaborate with the primary care provider and subspecialists to ensure coordinated, longitudinal care for children requiring specialized nutrition support.

### Attitudes

Pediatric hospitalists should be able to:

- Realize the importance of screening for malnutrition and optimizing nutritional status for hospitalized pediatric patients.
- Reflect on the value of effective communication with patients, the family/caregivers, and healthcare providers regarding the role of adequate nutrition in achieving optimal clinical outcomes.
- Acknowledge the importance of collaboration with registered dietitians and subspecialists to devise and implement a nutrition care plan.

### Systems Organization and Improvement

In order to improve efficiency and quality within their organizations, pediatric hospitalists should:

- Lead, coordinate, or participate in efforts to develop systems that support the initiation and maintenance of breastfeeding for infants.
- Collaborate with hospital administration, hospital staff, subspecialists, and other services/consultants to promote prompt nutritional screening for all hospitalized patients and multidisciplinary team care to address nutritional problems when identified.
- Lead, coordinate, or participate in the development and implementation of cost-effective, evidence-based care pathways to standardize the evaluation and management of nutritional issues in hospitalized children.

### References

1. Corkins MR, Griggs KC, Groh-Wargo S, et al. Task Force on Standard for Nutrition Support: Pediatric Hospitalized Patients; American Society for Parenteral and Enteral Nutrition Board of Directors; American Society for Parenteral and Enteral Nutrition. Standards for nutrition support: pediatric hospitalized patients. *Nutr Clin Pract*. 2013;28:263-276. <https://doi.org/10.1177/0884533613475822>.
2. Section on Breastfeeding, American Academy of Pediatrics. Breastfeeding and the use of human milk. *Pediatrics*. 2012;129:e827-e841. <https://pediatrics.aappublications.org/content/pediatrics/129/3/e827.full.pdf>. Accessed August 28, 2019.
3. DiMaggio DM, Cox A, and Porto AF. Updates in infant nutrition. *Pediatr Rev*. 2017;38(10):449-462. <https://doi.org/10.1542/pir.2016-0239>.