

# Nutrition for the Preterm Infant

## FAST FACTS

### up to 50%

of very low birth weight infants weigh less than the 10th percentile at NICU discharge

## preterm

infants adjust their extrauterine growth trajectory by -0.8 z-score from birth with early weight loss and then are expected to maintain their z-score through NICU discharge

## WHEN TO REFER

Refer to Cincinnati Children's Hospital Medicine service any patient with failure to thrive requiring inpatient admission.

Preterm infants born <32 weeks or <1500 grams are automatically referred to NICU follow-up clinic at discharge—contact either Cincinnati Children's or Good Samaritan's clinic with concerns.

Preterm infants with growth concerns while on 24 kcal/oz feedings AND not seen in a follow-up clinic, refer to Cincinnati Children's NICU follow-up clinic.

**Cincinnati Children's NICU Follow-Up Clinic:**  
**513-636-3882**

**Good Samaritan NICU Follow-Up Clinic:**  
**513-862-4024**

Preterm infants miss out on the third trimester, when brain development and bone accretion occur rapidly, and require increased nutrition. Fortifiers/formulas for preterm infants provide extra protein, calories and minerals. After discharge, infants should be monitored for growth faltering. Better weight gain from term-corrected age to 18 months is associated with better neurodevelopmental outcomes. Catch-up head growth after NICU discharge is associated with improved cognition at school entry.

## ASSESSMENT

Use the Fenton growth curve for preterm infants until 44–48 weeks corrected age and the WHO growth curve after that (these two growth curves harmonize). Conduct weekly or biweekly anthropometric measurements for the first 4–6 weeks after NICU discharge. Measure length with 2 people; a length board is more accurate than measuring tape. Calibrate infant weight scales per manufacturer recommendations. Refer to [Peditools.org](http://Peditools.org) (a free, web-based resource) to calculate centiles and z-scores.

## HPE (HISTORY AND PHYSICAL EXAM) RED FLAGS

- Decline of weight-for-age z-score or crossing percentile lines
- Weight gain velocity <75% of expected rate of weight gain to maintain growth rate
- ≥ 5 consecutive days of protein/energy intake ≤75% of estimated needs

## MANAGEMENT/TREATMENT

- Human milk is the preferred primary source of nutrition.
- Most preterm infants go home on 22–24 kcal/oz feedings. Families who receive Similac Special Care 24 or Human Milk Fortifier at discharge are instructed to continue using these products before transitioning to NeoSure or a comparable preterm formula.
- The most common recipes for fortified human milk and formula are provided (see reverse). These recipes are not directly compatible with other products. Alternative formulas (hydrolyzed or low lactose) are not formulated for preterm infant's needs; use only if necessary.
- Caloric management:
  - Poor growth percentiles or decrease in weight z-scores despite adequate intake volume: increase caloric density.
  - Adequate weight/length gains: continue current diet.
  - High weight gain but inadequate length gain: Ensure length measurement is accurate. If length is truly poor, continue current diet or decrease caloric density depending on amount of excess weight.
  - High weight gain and adequate length gain: decrease caloric density.
- Encourage direct breastfeeding but at limited frequencies to ensure adequate nutrition. Refer to separate tool, "Breastfeeding Progression in the NICU Graduate," for detail.
- Preterm infants should remain on preterm formula/fortified maternal milk until at least 6 months corrected age to ensure protein and calcium delivery. High-risk infants may continue preterm formulas until 1 year chronologic or, if needed, corrected age.
- Preterm infants should remain on multivitamin with iron until 1 year corrected age if receiving human milk or until formula intake is 1 L or 32 oz/day.
- Base introduction of solids on feeding readiness, typically following development expected for corrected age.

If you would like additional copies of this tool, or would like more information, please contact the Physician Outreach and Engagement team at Cincinnati Children's.

# Nutrition for the Preterm Infant

Most Common Recipes for Increased Caloric Density of Human Milk and Formulas

Caloric Density	Small Batch	Medium Batch	Large Batch
22 kcal/ounce breast milk with HMF	50 ml breast milk + 1 packet (5 ml) HMF		
24 kcal/ounce breast milk with HMF	50 ml breast milk + 2 packets (10 ml) HMF		
22 kcal/ounce breast milk with NeoSure	3 ounces breast milk + ½ teaspoon	5 ounces breast milk + 1 teaspoon	16 ounces breast milk + 1 Tablespoon
24 kcal/ounce breast milk with NeoSure	4 ounces breast milk + 1 ½ teaspoons	8 ounces breast milk + 1 Tablespoon	16 ounces breast milk + 2 Tablespoons
22 kcal/ounce NeoSure	4 ounces water + 2 scoops	8 ounces water + 4 scoops	20.5 ounces water + 1 cup (this makes 23 ounces)
24 kcal/ounce NeoSure	3.5 ounces water + 2 scoops	7 ounces water + 4 scoops	18.5 ounces water + 1 cup (this makes 21 ounces)

**Not compatible with other formula products.**

For additional recipes, contact the Cincinnati Children's Follow-Up Clinic and ask to speak with a dietitian.