



Breastfeeding Overview

Very few interventions have a greater impact on the health outcomes of a preterm or ill infant than simply providing optimal nutrition.

Nutrition for the infant begins in utero with the swallowing of amniotic fluid. Growth factors, nutrients, stem cells, and a host of immunological properties in the swallowed amniotic fluid are essential to the optimal development of the fetus (Underwood, 2013; Underwood, Gilbert, & Sherman, 2005). Growth factors found in the amniotic fluid more than double the weight of the intestinal tract (Meier, Engstrom, Patel, Jegier, & Bruns, 2010).

An infant delivered prematurely misses out on some of the benefits of the amniotic fluid. For this reason, the mother's expressed breast milk (EBM) becomes essential to significantly improving both short- and long-term health outcomes (Meier, Johnson, Patel, & Rossman, 2017). The breast milk expressed by a mother who delivers prematurely is different from the milk she would produce if her infant was delivered at term. This early "preterm breast milk" has similarities to amniotic fluid and is high in growth factors and immune cells known to decrease the infant's risk for serious infections, such as necrotizing enterocolitis (NEC; Meier et al., 2017; Underwood, 2013).

The American Academy of Pediatrics (AAP), along with the U.S. Department of Health and Human Services, recommends breast milk feedings for all infants, healthy or ill (AAP, 2012). In addition to lower rates of NEC and other infections, preterm infants who are fed breast milk have been shown to achieve enteral feedings more rapidly, have lower rates of chronic lung disease and retinopathy of prematurity, and have improved neurocognitive and visual acuity scores, to name a few benefits (Meier et al., 2017; Rodriguez, Miracle, & Meier, 2005; Underwood, 2013).

Improved outcomes translate to shorter hospital stays and cost savings for both families and healthcare facilities.



Mother breastfeeding infant baby. © vitalinka

In a study published in *Pediatrics*, researchers analyzed data cited by the Agency for Healthcare Research and Quality on health outcomes related to breastfeeding for 10 pediatric diseases. The researchers found that if 90% of families in the United States complied with the recommendation to breastfeed exclusively for 6 months, the United States would save approximately \$13 billion per year in healthcare costs (Bartick & Reinhold, 2010).

Given the numerous health benefits of breast milk for the vulnerable infant, healthcare professionals have an important role to educate and encourage mothers to provide their own breast milk for their infants regardless of their choice of feeding method. For the mother who intends to bottle feed her infant with formula, the healthcare professional must separate the feeding method from the nutrient to allow the mother to make an informed decision about providing breast milk for her infant. Many mothers may be willing to pump when offered this option even though they did not intend to directly breastfeed (Meier et al., 2017). Counseling the mother of a very-low-birth-weight infant has the potential to increase the incidence of breast milk feedings without increasing stress or anxiety to the mother (Sisk, Lovelady, Dillard, & Gruber, 2006).



Ensuring successful breastfeeding at discharge begins when the infant is admitted to the neonatal intensive care unit (NICU) and should continue throughout the hospital stay by educating mothers on its benefits and techniques. These mothers need information on the science of breast milk along with the specifics related to hand expression and pumping. They need instruction on the use of a double electric breast pump, collection of EBM, the storage and transport of EBM, and, when indicated, positioning for direct breastfeeding (Meier et al., 2010).

In addition, it is important to tell the mother that although feeding her baby exclusively breast milk provides the greatest protection for her premature infant, providing breast milk for even half of her infant's daily feedings has the potential to reduce the risk of serious infection by half (Corpeleijn et al., 2012). If the mother has insufficient EBM for her infant's nutritional needs, donor breast milk is the best alternative for the preterm infant (Kumar et al., 2017; Quigley & McGuire, 2014).

Hand Expression, Pumping, and Milk Storage

Early, frequent, and effective milk removal determines milk production (Morton et al., 2009). Initiation of hand expression, preferably within the first hour after birth, has been shown to increase overall milk volume at 6 weeks (Parker, Sullivan, Krueger, & Mueller, 2015). Every mother should receive instruction on breast massage and manual expression techniques. She should be instructed to combine hand expression with her pumping sessions if she is separated from her infant (Morton et al., 2009). In addition, providing the mother with an opportunity to hold her

infant skin to skin may enhance her body's enteromammary response and produce immunoglobulins specific to the bacteria and viruses of her infant and to those in the hospital environment, along with increasing her overall milk production (Gulla, Dahlo, & Eilertsen, 2017; Moore, Bergman, Anderson, & Medley, 2016; Riskin, Almog, & Kessel, 2010).

The following guidelines should be provided to the new mother separated from her infant:

- If the mother is stable, instruct her to hand express her milk within the first hour after birth and to continue massage and hand expression before or after each pump session.
- In combination with hand expression, initiate pumping with a hospital-grade electric pump. Instruct the mother on pumping techniques, including handwashing, cleaning pump equipment, and the storage, labeling, and transport of EBM.
- Instruct the mother to pump every 2–3 hours during the day and at least once at night for a total of eight sessions in a 24-hour period.
- Provide an opportunity for skin-to-skin care and pumping at the infant's bedside.
- Provide the mother with a log to keep track of her milk volume and pump sessions.

Instruct the mother to inform the neonatologist or neonatal nurse practitioner (NNP) if she is taking any medication while providing milk for her infant in the NICU. The provider, with the lactation consultant, will need to assess the compatibility of maternal medications with breastfeeding and the use of EBM.

Storage of Human Milk for NICU and High-Risk Infants

- Freshly expressed human milk is safe at room temperature for 4 hours.
- Milk can safely be refrigerated for 2–4 days.
- Time in freezer: 1–3 months; time in deep freezer: ≤ 12 months
- Human milk that is previously frozen and cold thawed but not warm: ≤ 24 hours in refrigerator
- Milk that is being fed to an infant via continuous feeding can be safely administered over a 4-hour period.
- Storage of fortified human milk: Milk with fortifiers should be given as soon as possible after the fortifier is added and as quickly as tolerated. Time in refrigerator: ≤ 24 hours

Refer to *Best Practice for Expressing, Storing and Handling Human Milk* (2011) from the Human Milk Banking Association of North America for additional information (www.hmbana.org).



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Breastfeeding Overview for Parents

Pacifier Use for the Preterm or Ill Infant

Nonnutritive sucking, or sucking without taking milk, has been shown to have many benefits for preterm or ill infants, especially when provided during gavage (tube) feedings. Nonnutritive sucking may be provided with a pacifier or at the emptied breast (called nuzzling). Although pacifier use during the early postbirth period has been linked with breastfeeding problems in the healthy full-term baby, pacifier use during tube feedings for preterm or ill infants does not cause problems. Discuss nuzzling during tube feedings with your infant's healthcare provider or neonatal nurse practitioner.

Protecting Your Milk Supply

In the early weeks following your baby's birth, the breast pump did the work of maintaining your milk supply. It is natural to think that once your baby starts to feed at the breast, you can stop pumping. In fact, most mothers are anxious to get rid of the pump and just breast-feed. Remember, your baby may not be strong enough to empty your breast, and you have worked so hard to get your milk supply where it is. It is important to continue to pump your breasts after your premature baby has nursed to make sure your breasts are empty. This will ensure you continue to make enough milk. Stopping too quickly may cause your milk to dry up.

Maintaining Your Milk Supply

The first 2 weeks after having your baby is a very important time to establish a good milk supply. Your baby will be fed eight times every 24 hours; therefore, you will need to pump at least eight times every 24 hours. This is necessary to send the right signals to your breasts to make milk.

If you are separated from your baby, you may want to consider renting a hospital-grade pump. Contact your insurance company and discuss pump options with a lactation consultant.

Consider the following ideas for maintaining your milk supply:

- Pump every 2–3 hours during the day and 3–4 hours at night for a total of eight pump sessions every 24 hours.

- Prior to pumping, massage your breasts to promote the flow of milk. Pump for 15 minutes (20 minutes if you have multiples). Continue to pump an additional 2 minutes once the flow has stopped to be sure to remove as much milk as possible.
- After pumping, express your breast milk by hand for several minutes. Hand expression has been shown to increase milk production. Ask your nurse or lactation consultant to teach you this simple technique.
- Continue to take your prenatal vitamins while pumping or breastfeeding.
- Drink plenty of fluids; eat three healthy meals and three healthy snacks every day.

Whether you choose to directly breastfeed or to pump only, this journey can be very difficult at times. You may even wonder if it is worth all of the effort. Every study shows that it is worth it. Babies who are ill or premature and receive breast milk have fewer infections, fewer developmental delays, and stronger immune systems than babies who receive formula. Providing breast milk to your baby is a gift of love that will have health benefits for you and your baby that will last for years to come.

Tips for Storing Your Milk for Your Infant After Discharge from the NICU

- Wash your hands with warm water and soap before handling pump parts or breast milk.
- Use clean bottles or plastic nursing bags to store your breast milk.
- Write the date and time on each new bottle of pumped milk.
- Once at home, freshly expressed breast milk is safe at room temperature for 4 hours.
- Frozen milk can be stored in the freezer for 3–6 months.
- Thaw frozen milk in the refrigerator or in cold water and use within 24 hours.
- Do not store expressed milk in the refrigerator or freezer door; temperature variation is considered warmer inside door space.
- Do not add fresh milk to milk that is already frozen.
- Do not thaw or warm breast milk in the microwave.