At birth, all newborns need a great deal of energy and nutrients from food to help their bodies grow, and to adjust to life outside the womb. Babies who are born early (premature) and/or with a very low birth weight (VLBW) (less than 1,500 grams or 3.3 pounds) may be smaller, may grow at a slower rate, and may have problems with learning and with motor skills as a result of feeding problems.* We know that babies born early undergo rapid growth and change and often do not yet have all the skills required for feeding. They also may have other health issues, such as breathing or stomach problems, that may disrupt the feeding process.

Yet, feeding is more than a process of giving food. It also is a time in which parents are partners with their baby and learn how to respond to their baby’s cues. Because the baby’s network of nerves is still growing and changing, such cues may differ from those of a healthy, full-term baby. Thus, parents of premature babies may have trouble trying to adjust to their baby’s feeding cues. In this topic sheet, we look at the “big picture” of feeding, and at ways to address the unique needs of premature babies and their parents.

Goals of feeding = food + skills + bonding
The main goals of feeding are to:
1) provide food for growth and healing; 2) help your baby achieve new skills; and 3) learn cues that help you respond to your baby’s needs and that help the baby learn how to respond to you (this is part of the bonding process). We’ll look at each of these goals below.

1. Food: What special nutrition needs do premature babies have? A key goal for feeding while your baby is in the NICU is to help your baby obtain the extra nutrients needed for growth and health.

In the womb, the baby grows and changes very quickly for the first several weeks. The baby obtains nutrients, such as calcium and iron, from the mother’s bloodstream. Calcium is needed for strong bones and for other body functions. Iron helps build healthy blood cells and promotes growth of the nervous system (the network of nerves connecting the body and brain). As the baby moves around, he or she pushes against the wall of the womb — this helps strengthen the baby’s bones.

At birth, the baby’s growth and change is disrupted. The body still is growing quickly, but now does not get nutrients (such as calcium and iron) from the mother. The lack of calcium and lack of movement

against the womb wall may decrease bone strength and growth. Rapid growth of the baby’s organs causes a decrease of iron in the baby’s blood. Iron also may be decreased in babies who lose a lot of blood after birth. Studies show that babies born early have only half the amount of iron as babies born at full-term. The iron deficiency can sometimes delay growth of motor skills and learning. As the baby grows, his or her body uses up energy and protein faster than the baby can absorb it from food. This increases the risk that the baby will not gain the weight needed to grow and to heal.

How will my baby be fed after birth? Some babies born before 32 - 34 weeks gestation may need assistance to get the nutrition they need to grow. Breast or nipple feeding, which may be too tiring for some infants, may be supplemented or replaced with tube feedings. Infants that cannot tolerate nipple or tube feedings may receive nutrition through a vein. This is called parenteral nutrition.

Providing nutrients through a vein, or through a tube in the mouth or nose, may increase a baby’s risk for ►infection. Doctors are aware of this risk and will remove your baby from the tube when your baby is able to feed without it.

When your baby is ready for breastfeeding, your health care team will work with you to achieve this. If your baby feeds with a bottle, doctors may advise using a special nipple that helps adjust the proper flow of milk. This gives your baby time to rest and to breathe while feeding. In general, your baby’s feeding skills improve as your baby grows.

2. Skills: Premature birth may lead to feeding problems for mothers and babies.
For babies, problems may include:

- Feeding skills — Babies born early cannot yet put all their feeding skills together. The ►network of nerves that connects their brain and body is not yet fully formed. This affects the baby’s skills with sucking, swallowing, and breathing, which are required in order to feed from a bottle or breast. This skill usually doesn’t develop before 32 - 36 weeks in the womb.

- Breathing problems — Even if your baby can suck and swallow, he or she may not be able to breathe well while feeding if the heart and lungs are not fully functioning. Other breathing problems, such as ►respiratory distress syndrome (RDS), also may disrupt feeding.

- Fatigue — Feeding requires a lot of energy and may easily tire a premature baby.
For mothers, if you choose to breastfeed, problems with feeding may result from:

- **Stress** — Being in the NICU with your newborn is a very stressful time. Worries about your baby’s health, being away from your baby, and/or recovering from the birth are only a few reasons for parents to feel stressed. For a mother, stress and other aspects of the birth can disrupt her body’s process of breast milk production (by slowing the body’s release of two hormones, oxytocin and prolactin, that start milk flow in breast tissue).

- **Delayed onset of milk** — With most full-term births, the mother’s body makes breast milk within 30 - 48 hours after birth. This process is called lactogenesis [lack-toe-JEN-eh-sis]. In premature births, this process can be delayed by the mother’s body. Just as the body of a premature baby is going through many changes, so is the mother’s body. If your baby is born before your own body has gone through the steps required to produce milk, then your body may need time to begin this process. In some cases, holding your baby skin-to-skin (called kangaroo care) may help “jump-start” your body into producing milk. Also, this process may be helped by trying to pump milk within 6 - 12 hours after birth and 6 - 10 times per day.

- **Medical problems** — Illness and/or medicines given to you before birth may reduce the volume of milk you can produce. Also, it may be a challenge for some mothers to produce enough milk often enough for the baby’s needs. Always check with your doctor when you are given a new medicine to find out if it affects breast milk. After your baby is born, be sure to let your care team know if you would like to breastfeed your baby.

Talk with your doctor, nurse, or a lactation consultant (a person who helps women with breastfeeding questions) for help with any of these issues.

### 3. Cues: How can I know what my baby wants and what he or she feels?

Many studies show that feeding time is a time during which parent and baby respond to each other’s cues very closely and when parents remain alert to the baby’s unique needs. The baby’s response, in turn, creates a physical and emotional response for the parent.

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With premature babies, feeding becomes not only a time to connect with your baby, but also a time to help coach your baby in the skills needed for feeding. Whether you feed your baby from the breast or from the bottle, baby and parents can work together as one system.

There is no single list to describe every baby’s feeding cues. Your baby’s signals to you will depend on his or her unique needs at that time. As a parent, one way you can help your baby is to be aware of these signals and to think about what they might mean. Filling out the chart below can help you keep track of your baby’s feeding cues. Finding ways to respond to different cues is not always easy – talk with your health care team for help with these cues.

<table>
<thead>
<tr>
<th>Cue</th>
<th>What does this mean for my baby?</th>
<th>What are some ways to respond to this?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long pauses in sucking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid breathing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dribbling milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closed mouth, tongue at roof of mouth, head turns away from nipple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased heart rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long pauses in breathing</td>
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</tbody>
</table>

**What can parents do?** Feeding is important to your baby’s health and growth. Learn about your baby’s unique needs for feeding and what you can do to help.

In the NICU, talk with the health care team about questions, such as:

- Can I hold my baby skin-to-skin?
- How will any medicines I am taking affect breast milk and my baby?
- Is breast milk the only food my baby needs right now?
- Is there a quiet/private place I can go to breastfeed and/or to pump milk?
- About how many times per day should I try to pump milk and/or breastfeed my baby?
- What is the best type of breast pump to use?

It is helpful to tell the nurses when you will be at the NICU, so they can try to schedule feedings for those times.

**At home:** Most babies are not sent home from the NICU until they are able to feed well, but some premature babies still will need help with feeding at home. This help may include:

Producing breast milk can be a challenge for mothers of premature babies. Keep in mind that this is due to your body’s natural process. Over time, many mothers are able to produce enough milk for their baby’s needs.
• Fortified milk: If your baby is not growing enough or has problems with feeding, doctors may give you a nutrient mix to add to some feedings. This is called fortified milk. Your baby’s doctor, nurse, or dietitian can tell you what it contains and how to mix it with the milk. This is a normal treatment and does not mean there is anything wrong with your breast milk.

• Tube feeding: In some cases, infants who are feeding with a tube may be sent home with the tube still in place. This happens only if doctors think the benefits of being at home outweigh any risks of feeding with a tube at home. If your baby needs this type of help, your NICU team will teach you how to help your baby with this type of feeding.

• Breastfeeding: If you breastfeed your baby, try to pump extra breast milk before bringing your baby home. This will signal your body to keep producing milk, so you will have enough for your baby. Talk to your baby’s doctor, nurse and lactation consultant about when to begin weaning your baby.

Helpful Tips: Feeding

• Feed your baby in a calm, quiet place.
• Ask your NICU team to show you how to hold your baby for feeding.
• With either bottle or breast, watch your baby to see if he or she:
  – can latch onto the nipple and stay on to suck       – can let go of the nipple on his/her own
  – can suck and swallow well                        – stays awake while feeding
  (you may be able to hear your baby swallow)        – is relaxed and content after feeding
• Feed your baby according to his or her needs. At first, most premature babies need to be fed about every 3 hours to make sure they are getting enough milk. As your baby grows, feeding may occur less often. If your baby is growing well, he or she may need feeding only "on demand" (when hungry). Your baby’s health care team can help advise you about what is best for your infant.
• Seek help from your NICU team if you have problems with any type of feeding or with pumping milk.

About breastfeeding

Does breast milk help my baby? Yes. Studies show that mother’s breast milk is the best food for almost all infants.* Doctors will advise if your baby also needs extra nutrients (protein, vitamins, carbohydrates, and fats) added to the milk. Keep in mind that breast milk feedings are helpful for both you and your baby.

For babies, studies show that breast milk is best and is helpful for those born with a low (less than 2,500 grams or 5.5 pounds) or very low birth weight (less than 1,500 grams or 3.3 pounds).** Breast milk of mothers who give birth early (prematurely) is higher in the nutrients and other agents that help fight infection and promote health.*** It is known that babies given breast milk are more likely to have:

• reduced risk for ► infection, ► retinopathy of prematurity (ROP), and ► necrotizing enterocolitis (NEC)

C1 - Caring for your baby in the NICU: feeding

• a shorter stay in the NICU
• improved growth and function of the baby’s ➤network of nerves — this helps improve vision, learning, and motor skills during childhood
• fewer ear infections, lung problems, and diarrhea during the baby’s first year (which may help prevent future hospital stays)
• reduced risk for ➤sudden infant death syndrome (SIDS), type 1 and type 2 diabetes, childhood obesity, and some other medical problems

For mothers, producing breast milk may have benefits, such as:
• reduced risk for cancer of the breast, ovaries, and uterus • reduced stress and better bonding with your baby

Women are advised not to feed their breast milk to their baby if they have:
• taken certain strong medicines or drugs (most medications are compatible with breastfeeding but tell your doctor about any medicines or drugs you are taking)
• infections, such as HIV, herpes, or tuberculosis
• active sores on the breasts

Practice makes perfect: If your baby is not yet able to feed from your breast, your doctor may advise non-nutritive breastfeeding. Think of this as feeding practice for your baby. It simply means holding your baby to your breast so that he or she can get to know your taste and smell, and can learn how to latch onto the breast. This also helps you learn how to breastfeed your baby. Studies show that babies’ vital signs (such as heart rate and breathing rate) are more stable when the baby is breastfeeding (or trying to) than when bottle feeding.*

What happens if I can’t breastfeed? Although it is known that breast milk is best for most babies, some women are unable or choose not to provide breast milk. In this case, there are 2 options for babies:
• Donor milk — This is breast milk given by mothers who produce more milk than their baby needs. Your health care providers can give you more details about donor milk.
• Formula — Some formulas are well designed to promote growth and weight gain in premature babies.

➤Take a closer look at these Pediatrix topics
➤rapid growth and change - B1 - About premature babies
➤cues - B3 - Cues: “How does my baby feel?”
➤network of nerves - B2 - How babies’ senses develop
➤bonding - B4 - Bonding with your baby
➤infection - A4 - About infections
➤respiratory distress syndrome - F17 - Respiratory distress syndrome (RDS)
➤stress - D1 - Coping with stress in the NICU
➤retinopathy of prematurity - F18 - Retinopathy of prematurity (ROP)
➤necrotizing enterocolitis - F12 - Necrotizing enterocolitis (NEC)
➤sudden infant death syndrome (SIDS) - C2 - Caring for your baby in the NICU: about sleep


This information is for educational purposes only and is not intended to substitute for professional medical advice. Always consult with a health care professional if you have any questions about the health of your baby.