

A close-up photograph of a newborn baby's feet sticking out from a hospital bed. The baby is lying on a white blanket, and the feet are positioned in the center-left of the frame. The background is a blurred hospital room with medical equipment and a window. The text is overlaid on the right side of the image.

**Providing milk of
their own mother to
infants at risk**

Talking points

Proactive discussion about own mother's milk (OMM) during initial antenatal or post-birth consultation (Do not wait for mothers to ask feeding questions)

- We've spoken about what you can expect if your baby is born at 26 weeks with respect to treatment in the NICU. Let's spend a minute on what you can do to help your baby avoid complications and stay as healthy as possible during the NICU hospitalization.
- Your baby will need your milk as part of his/her overall treatment plan.
- Your milk nourishes your baby and helps him/her fight many of the common problems of premature birth.
- Receiving your milk reduces the chances that your baby will develop common complications of prematurity, such as infections and bowel disease.



Evidence

- Mothers of premature infants do not feel guilty, pressured or coerced by a proactive message from physicians and nurses about the importance of own mother's milk (OMM). Studies show that mothers expect the NICU care providers to share this scientific information with them so they can make an informed decision.¹⁻⁴
- This message is especially effective for women with socio-economic challenges at risk to deliver preterm and whose prenatal intent is more often to formula feed.¹⁻⁵
- Use of the terminology 'reducing the chances' versus 'benefits of OMM' most accurately reflects the research findings about outcomes of OMM for premature infants.⁶⁻²⁰

Why is my milk so important for my baby?

- OMM is best for all babies, but it's especially important for babies who are born prematurely.
- Premature babies have spent less time in their mother's body than full term babies, so some of the babies' organs and systems are not fully grown or developed. Also, they haven't had time to receive the same defences against infection from their mothers as full term babies.
- When mothers give birth prematurely, their milk is rich in substances that help to make up for the babies' shorter time in the womb. Mother's milk helps the babies' body organs grow as they should and also gives the babies an extra boost of protection against infection and other complications.

Talking points

- The other reason why we hope you'll provide your milk is that we don't want to feed formula to premature babies during the early weeks after birth. The latest research makes us think that formula may actually increase the chances your baby will develop complications – especially during the very early period after birth.



Evidence

- Premature infants have immature body organs and immunomodulatory and metabolic pathways due to their shortened gestation.^{6,7,21-25}
- The immature body organs and pathways are vulnerable to inflammation, oxidative stress and nutritional deficiencies, all of which are commonplace during the NICU hospitalization. These noxious processes can lead to short- and long-term complications in premature infants.^{6,7,21-26}
- OMM works via multiple mechanisms to prevent and/or downregulate the impact of these noxious stimuli on body organs and systems.²⁶⁻⁴⁸
- There is a dose-response relationship between OMM feedings and a reduction in the risk of complications of prematurity, including NEC, late onset sepsis, bronchopulmonary dysplasia and later neurodevelopmental problems, with higher doses of OMM conferring the greatest protection.^{7-17,19,20}

Evidence

- Mothers who deliver prematurely produce milk with higher concentrations of many of the protective components (lactoferrin, secretory IgA, interleukin-10) that downregulate inflammatory and oxidative stress processes. This is especially true of colostrum and transitional milk of the own mother.^{6,7,31,49-57}
- Bovine formula exerts a separate detrimental impact via several mechanisms, including: greater and prolonged post-birth intestinal permeability, direct cytotoxicity and gut dysbiosis.⁵⁸⁻⁶²

Talking points

But I've been very ill myself (or I have a chronic disease) that means I have to take prescription medications. Surely these aren't safe for a premature baby.

- Most mothers who give birth prematurely have been – or are still – ill themselves and, because of this, are taking medications that make them concerned about providing milk.
- In almost all situations, OMM is still best for premature babies.
- In the first days after birth, your baby will receive very small amounts of your milk, so little if any of the medication reaches him/her. These are the same 'early days' that we are most concerned about feeding formula to your baby.
- As we increase the amount of feeding over the first few days and weeks, many mothers are recovering from their pregnancy complications and often need lower doses and/or fewer medications.

Talking points

- However, we'll check your specific medication to make sure it doesn't cause problems in your baby. We can also call your doctor who prescribed the medications so that he/she understands our decision.
- We always balance any concerns about medications with concerns about feeding formula to premature babies. There are lots of studies that tell us that your milk is almost always better than formula, regardless of the medications you're taking.



Evidence

- Many mothers of NICU infants have existing and/or pregnancy-induced health problems that necessitate the use of prescription medications. In a recent prospective cohort study of 430 very low birth weight (VLBW) infants, 31% of the mothers were receiving medications for pregnancy-induced hypertension, 17% for mental health diagnoses and 8% for diabetes.⁵⁻⁷
- It is commonplace for many healthcare professionals to tell mothers to 'pump and dump', i.e. discard pumped milk 'just to be on the safe side'. Oftentimes, mothers discard irreplaceable colostrum. There are very few maternal medications that justify not feeding own mother's colostrum to a compromised NICU infant.^{6,7,26,63}
- The safe-side argument does not truly balance the documented risks of early formula feeding with the theoretical risks of most medications. For example, formula feeding within the first 14 days increases the risk of NEC 3- to 6-fold, depending on the study.^{12,15,64,65}

Evidence

- Frequently cited references for the safety of medications in OMM are focused on the fully breastfed, term and healthy infant who is cared for at home. In contrast, the NICU infant is observed and monitored constantly for common medication side effects (e.g. lethargy, sleepiness), and oftentimes, receives medications to bring about these very conditions (e.g. sedation).^{6,7}
- A neonatologist or advanced practice nurse with specific expertise in human milk and premature infants should individualize the safety of the specific maternal medication using this risk-benefit consideration.^{3,66}

But, I'm not sure I want to breastfeed my baby. I was planning to feed from the bottle.

- Lots of mothers of premature babies feel the same way. When a baby is born early, mothers often haven't even made up their mind about how they will feed. Oftentimes, when a mother has made a decision to feed formula, she changes the decision when her baby is born prematurely.
- Right now, your baby is too small to drink his/her milk directly from the breast, so you will start by removing your milk with a breast pump. We'll feed the pumped milk to your baby using a tiny feeding tube.
- During your baby's NICU hospitalization, you can talk to the doctors, nurses and other mothers to decide about how long you want to provide milk and whether you want to go on to feed your baby directly from the breast.

Talking points

- For example, many mothers want their babies to have only their milk but some want to feed their babies from both the breast and the bottle. Some other mothers want to pump their milk and feed it only by the bottle.
- The important thing is that you start removing your milk as soon as possible, and save every drop so we can feed it to your baby. You can make a decision about how to feed your milk as your baby grows.



Evidence

- It is important to validate the mother's initial intent to formula feed in a way that is not judgmental or dismissive. Mothers who change the decision from formula to providing OMM after premature birth consider it important that their initial plan is not criticized or dismissed by the professional as illegitimate.^{1,2,67}
- Helping the mother separate 'providing OMM' from 'feeding at the breast' is an important nuance for a mother whose initial intent was to feed formula.^{1,3,5-7,67}
- Emphasize that she will begin by providing OMM using a breast pump, so there will be no feeding at the breast initially. Help her understand that there will be plenty of time to make longer-term choices about pumping duration and/or feeding at breast during the NICU hospitalization.^{3,5,6}

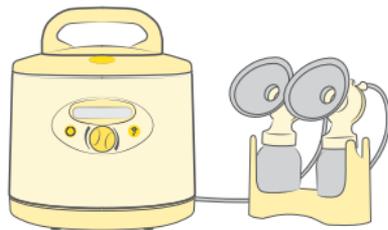
Evidence

- Emphasise the availability of resources to help her make these longer-term decisions as they become necessary (e.g. neonatologists, lactation consultants, breastfeeding peer counsellors, other parents). Clarify that these resources are available to share evidence (do not try to persuade her to breastfeed, which many women fear), so she can make the decision that is best for her.^{1,3,6,67-70}
- In one study, of the mothers whose goal was to provide exclusive OMM feedings for their VLBW infants after NICU discharge, 81% choose exclusive OMM feedings via a combination of breast and bottle. Small percentages choose either exclusive OMM feedings at breast (11%) or bottle only (8%).⁵ These findings exemplify that mothers choose many options for feeding exclusively OMM to their infants.

But I'm afraid that pumping will hurt.

My friend used a breast pump and she quit because it hurt.

- Many mothers have a friend or family member who has said that pumping is painful, so it is natural to think that all breast pumps hurt.
- These stories about pain are almost always because the mothers were using either a low-quality breast pump or using the breast pump incorrectly (for example turning pressure up too high). It is hard to pump if you don't have the right support.
- However, we'll make certain that you are using a high-quality breast pump and we'll show you exactly how to use it. One of our experts will sit with you during the entire first pumping session to help you use the pump comfortably.



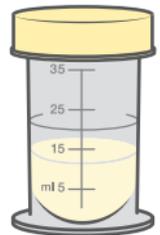
Evidence

- A major reason for mothers' plans to formula feed their NICU infant prior to changing the decision is fear of pain.¹ This fear is more common among African-American mothers and others who have had previously unsuccessful and painful experiences with breastfeeding and pumping.^{1,3}
- NICU healthcare professionals should assure that mothers receive a breast pump suitable for complete breast pump-dependency, i.e. effective, efficient, comfortable and convenient.⁷¹⁻⁷³
- In one study, mothers reported that having the breastfeeding peer counselor sit with them during the first pumping session to explain sensations, validate normality and answer questions was a primary facilitator of their continued lactation.⁶⁹ This intervention should be prioritized.^{3,66}
- This initial session can be used to teach correct breast pump usage (e.g. frequency and duration of pumping sessions, adjustment of suction pressures, correct fitting of breast shields) and validate the normality of pumping sensations.^{3,69}

Talking points

How long will my baby need my milk? Do I need to use the pump the whole time my baby is in the hospital?

- The most important time for your baby to receive your milk is during the days after birth when he/she first starts to receive feedings. The milk you make during this time is called colostrum, and it's more like a medicine than a milk.
- Colostrum provides many special substances that your baby's intestines need to grow and develop as healthy as possible. Colostrum also has many special substances to help your baby develop his/her own defences to fight infection. These same substances are not in formula or even in donor human milk.
- We'll also put some drops of colostrum in your baby's mouth to help boost his/her ability to fight infections.
- We want to use only your milk during these critical first days – ideally through the first 2 weeks or so.



Talking points

- After the first couple of weeks, your baby benefits from receiving as much of your milk as you can provide. Infections are always a possibility during the NICU hospitalization and your milk reduces your baby's chances of getting an infection and of developing lung and bowel diseases that are common in premature babies.
- If you're able to provide milk until your baby's discharge (or longer), several new studies suggest that this helps your baby's brain grow and develop. This brain growth is very rapid through full term gestation (your baby's due date), but after that your baby would continue to get the special nutrients that only your milk can provide.
- If you're able to continue to provide milk after your baby goes home from the NICU, the milk will continue to help protect your baby from germs that he/she may be exposed to from other children or family members. Also, lots of research shows that OMM has an effect on brain development when it is fed after NICU discharge.

Evidence

- Mothers who change the decision from formula to OMM often ask how long OMM provision is necessary because it had not been part of their post-birth feeding plan. These mothers need individualized, incremental benchmarks, not an indiscriminate recommendation, such as citing policy statements about breastfeeding throughout the first 2 years of life.^{3,6,7,67,69,71}
- The unique components of colostrum (high molecular weight proteins, including growth factors, antibodies, anti-inflammatory and anti-oxidant components, pattern recognition receptors) help the infant transition from intrauterine to extrauterine nutrition.^{6,23,31,34,45,46,49-54,74-76} Mothers who deliver prematurely produce colostrum with higher concentrations of most of these components.^{6,7,31,49,51,52,55-57}
- Oropharyngeal administration of colostrum appears to provide immunomodulatory activity via the oropharyngeal associated lymphoid tissues (OFALT). It may also provide protection of the mucosal barrier, reducing the risk of ventilator-associated pneumonia.⁷⁶⁻⁷⁹

Evidence

- Formula during the transition from intrauterine to extrauterine nutrition significantly increases the risk of NEC and may interfere with the programming of immunomodulatory and metabolic pathways.^{23,58–62,80–83}
- Although donor human milk (DHM) is not separately detrimental, it is dissimilar from own mother's colostrum in clinically significant ways and does not provide a similar concentration of high molecular weight protective proteins. DHM should not be considered 'just as good' as OMM.⁶³
- High doses of OMM during the first 28 days of life reduce the risk of sepsis in a dose-response relationship.⁸ One study has shown an association between high-dose OMM feeding during the first 28 days and nuclear grey matter volume at term-equivalent age and better neurodevelopmental outcome at 7 years of age.¹⁹

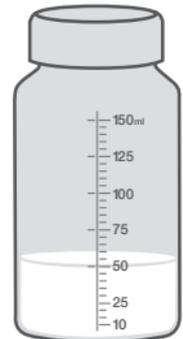
Evidence

- High doses of OMM during the NICU hospitalization reduce the risk of broncho-pulmonary dysplasia and increase neurodevelopmental outcome scores at 20 months corrected age in very low birth weight infants.^{9,10,13,14,84}
- New studies that incorporate brain imaging have highlighted that white matter injury is most closely linked with suboptimal neurodevelopmental outcomes in premature infants. Separate studies have focused on the importance of early nutrition as a neuroprotective mechanism for the developing brain. OMM contains optimal substrates (e.g. unique lipids, insulin-like growth factor, glutamine) that provide this neuroprotection.^{19,21,22,85–88}
- OMM feedings have been associated with optimal white matter development in term and preterm infants.^{20,89,90}

Talking points

But I don't have any milk yet. Why should I start pumping so soon?

- Most mothers produce only a small amount of colostrum at first – sometimes just a few drops. Think of this colostrum as 'medicine'. Your baby needs only a few drops of it to cover the inside of his/her mouth and intestines. It's like a special 'paint' that seals off the baby's fragile insides from germs.
- Even though only small amounts of milk are removed at first, it's still important that you use the breast pump. The special suction cycle you will use on the breast pump is like the sucking pattern of a full-term baby. Just like a baby, using the pump sends signals to your breasts to start making milk. You may not remove much milk right away, but the signals are important to establishing a good milk supply over the next days and weeks.



Talking points

- So, just as a full-term baby would start feeding right after birth, we want you to start pumping right after birth.
- Once your milk starts to flow (we call this the 'milk coming in'), you should begin to pump regular volumes of milk that increase greatly over the first 2 weeks of lactation.

Evidence

- Full-term infants who breastfeed on demand and are not separated from their mothers consume an average of 15 ml of milk during the entire first 24 hours of life, with each feeding yielding only 1.5 ml of intake.⁹¹
- Full-term infants feed an average of 10.2 times in the first 24 hours to extract this volume, and in doing so, provide a species-specific stimulation to the mammary gland.^{71,72,91-94}
- An electric breast pump that replicates the sucking rate and rhythm of the healthy term infants in the early days is necessary to provide this same stimulation during the same time frame for breast pump-dependent mothers.^{71,72}
- One new area of research demonstrated significantly more OMM output over the first 7 days (which was maintained at 3 and 6 weeks post birth) in mothers of VLBW infants who began breast pump use in the first hour post birth compared to those who began after the first hour.^{66,71,95,96} Pumping in the first hour post birth can be incorporated into the 'golden hour' practices.

Evidence

- Although hand expression (in the absence of breast pump use) is frequently recommended in the early post-birth period, there are no published data to support this practice. Instead, several randomized trials of breast pump use and hand expression conducted during established lactation reveal greater milk removal and prolactin/oxytocin response with breast pump use.^{71,97–100}
- One randomised study in mothers of VLBW infants showed that hand expression only (no breast pump use) during the first 7 days post birth obtained less OMM volume during these first 7 days when compared to mothers who used a hospital-grade electric breast pump. Furthermore, even though mothers using hand expression switched to breast pump use on day 8 post birth, they produced a mean of 119 ml less OMM per day over the first 28 days post birth when compared to mothers who used an electric breast pump throughout the first 28 days.^{66,71,101} Thus, 'hand-expression only' practices should be avoided and early breast pump use should be instituted for NICU mothers.

Talking points

But, what if I am not able to make any milk? I tried to breastfeed my first baby and had to quit because I did not have enough milk.

Other reasons:

**My breasts are too small / I do not have a good diet /
Inadequate milk runs in our family**

- Lots of mothers have these concerns and you're right – if you had problems with breastfeeding previously or have a family history of breastfeeding problems, be sure to let us know to watch you more closely to make sure that your milk production is on track.
- However, earlier problems with breastfeeding often occur because mothers didn't have the right help from experts at the time. We see this frequently with our NICU mothers.



Talking points

- Nonetheless, many mothers who give birth prematurely have problems making enough milk. These problems are less about prematurity and more because the mothers themselves have been ill before or during pregnancy and delivery. These problems in the mothers can affect milk-making, especially in the days right after giving birth.
- Our team of lactation experts will ask you about common problems that can affect milk-making in NICU mothers. They will also develop a specific plan with you for your pumping in order to prevent problems that are the most common in NICU mothers who must use a breast pump.
- In particular, we'll teach you about 'coming to volume', which is a stage of lactation that takes place during the first 2 weeks or so after giving birth. This is a very important time period for sending signals to your body to make milk, and to remove as much milk as possible.
- Our goal is to help you make at least as much milk during 'coming to volume' as a mother with a full-term breastfeeding baby, which is about 500 ml (17 ounces or around 8 milk storage containers that hold 60 ml each) a day.

Talking points

- Reaching this milestone (coming to volume) will help protect your milk supply throughout the NICU hospitalisation so that your baby can receive as much of your milk as possible.
- To help you do this, our lactation experts will plan to meet or speak to you every day for the first 2 weeks after your baby's birth.
- We'll watch you use the breast pump if you are in the NICU because this helps us detect any problems before they affect your milk supply.
- If there's a day during this time that you aren't in the NICU, we'll telephone you to make sure that your pumping is comfortable and that you aren't experiencing any of the common problems that occur during this time.

Evidence

- Although most previous breastfeeding problems are related to lack of expert lactation care, this is a vulnerable population (given the relationship between pregnancy problems and breast development/function) and problems should always be explored as a part of a full assessment.
- However, multiple studies document increased risk for delayed and/or impaired lactogenesis II in breast pump dependent mothers with NICU infants. This is especially true if the mothers have had pre-existing chronic conditions such as diabetes, infertility or overweight/obesity. Common birth-associated complications include pregnancy-induced hypertension, preterm labour, excessive antepartum/postpartum blood loss, prolonged bedrest, Caesarean delivery and the use of medications such as magnesium sulfate.^{3,102–108}
- Problems with impaired lactogenesis II and/or the failure to ‘come to volume’ predict longer-term problems with insufficient milk in this population.^{3,66,71,72,109,110}
- There are several available tools to assist with the monitoring and facilitation of ‘coming to volume’. These have been summarized extensively in review publications.^{3,66,71}

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