



Facts for Feeding

Feeding Low Birthweight Babies

Health personnel and community health workers should know how to promptly identify low birthweight babies who require special care and how to counsel and support their mothers on feeding and caring for these babies. This *Facts for Feeding* provides guidance on breastmilk feeding options to ensure that this vulnerable group receives the attention needed to survive, grow, and develop.

Low birthweight (LBW)—defined as weight at birth of less than 2500 grams—is one of the most important contributing factors to neonatal and infant death, illness, and malnutrition. Studies show that LBW is also associated with the development of diabetes and heart disease in adulthood. Good feeding practices can reduce the increased risks of morbidity and mortality associated with LBW.

Every year around 21 million low birthweight babies are born. They represent 16 percent of all newborns, but large regional variations exist. The percentage of babies born with LBW is 28 percent in South Asia, 14–15 percent in sub-Saharan Africa and North Africa/the Middle East, and 7–9 percent in Latin America and the Caribbean, East Asia, and industrialized countries.

Preterm delivery and intrauterine growth restriction contribute to low birthweight

- **Preterm delivery** is defined as delivery after a pregnancy of less than 37 completed weeks. Babies born *at term* are delivered after a pregnancy of 37 completed weeks or longer. The length of pregnancy at the time of delivery is called the *gestational age* of the baby. The shorter the gestational age, the lower the average birthweight will be. In developing countries, most LBW babies are born after a term pregnancy. They are small because of restricted intrauterine growth.
- **Intrauterine (fetal) growth retardation or restriction** (IUGR) is often a result of maternal malnutrition either before conception or during pregnancy. IUGR babies enter the world malnourished. They have a lower birthweight than expected for their gestational age. Some are born at term while others are preterm.

IUGR babies born at term are at risk of having more problems than other term newborns. Problems include poor temperature regulation, low blood sugar, high red blood cell counts, and feeding difficulties. IUGR babies born before term often have problems associated with both prematurity and intrauterine growth restriction.

Most preterm LBW babies and some term LBW babies require special care and attention to feeding. This *Facts for Feeding* focuses on LBW babies who are medically stable but need extra care to ensure successful feeding. The exact definition of ‘medically stable’ will vary from program to program. At minimum, the baby is able to breathe without assistance. In this publication, LBW refers to babies who have a birthweight less than 2500 grams or are born preterm. The same approaches can be used for preterm babies who are not LBW and for term babies, whether they are LBW or not, who have feeding difficulties.

Inside you will find . . .

- Box 1. Kangaroo Mother Care
- Box 2. Breastfeeding behavior according to gestational age
- Box 3. Breastfeeding positions
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Skin-to-skin Contact

During pregnancy a woman meets all the needs of her unborn baby for oxygen, nutrients, warmth, and protection. At birth, the baby's survival continues to depend on meeting these needs. Babies born before term may have difficulty taking their first breaths because they have immature lungs. The health worker should dry the baby immediately after delivery and at the same time assess the breathing, promptly resuscitating the baby if needed. It is a good practice to have two clean, dry cloths at delivery—one to immediately dry the baby (discarding it when wet) and the other to loosely wrap the baby if resuscitation is needed. These actions, plus a cap put on the baby's head, will help keep the baby warm.

Once the baby is stable, place in skin-to-skin contact between the mother's breasts

The naked baby should be put next to the mother's naked skin with the baby's head and chest between the mother's breasts. Both mother and baby should be covered with a clean cloth or blanket. Keeping babies warm in this way gives them the best chance of transitioning to life outside the womb.

LBW babies are at special risk of *hypothermia* (low body temperature) if not kept warm. Hypothermia increases the risk of *hypoglycemia*, which is an abnormally low level of glucose (sugar) in the blood that can result in seizures/convulsions and even permanent brain damage.

Babies who are kept warm continuously (sometimes referred to as “maintaining the warm chain”) feed better than those with hypothermia. Kangaroo Mother Care (KMC), described in box 1, is an excellent method for providing temperature stability, particularly for preterm babies weighing less than 2000 grams at birth.

Box 1. Kangaroo Mother Care

Skin-to-skin thermal protection (kangaroo mother care—KMC) fosters greater involvement of mothers in the care of LBW babies and reduces reliance on equipment. Evidence indicates that using KMC for preterm babies results in stability of cardiac and respiratory function, lower rates of severe infection, increased breastmilk supply, higher rates of exclusive breastfeeding, and better weight gain. KMC is a gentle, effective method that leads to shorter stay and earlier discharge for hospitalized babies, encourages frequent observation of the baby by the mother, and fosters bonding.

All medically stable LBW babies are eligible for KMC. For most LBW babies, KMC can start immediately after birth. However, very preterm babies who are acutely ill may require specialized care until they are medically stable and ready for KMC. The three key elements of Kangaroo Mother Care are:

1. **Position.** During KMC, the baby (wearing only a diaper/nappy, hat, and socks) is placed between the mother's naked breasts and secured in a pouch or cloth tied around the mother's chest. The baby is carried continuously in this skin-to-skin position. The mother sleeps and rests in a semi-reclined position. Heat loss is avoided by keeping the baby in skin-to-skin contact inside the mother's clothing.
2. **Nutrition.** KMC is conducive to early and exclusive breastfeeding. The mother can offer the breast in response to the baby's cues. When KMC is first started, some preterm babies are unable to suckle at the breast. A mother can express her breastmilk directly into the baby's mouth, or the mother's expressed breastmilk can be given by cup or other appropriate feeding method.
3. **Support.** Mother and baby are rarely separated. The mother can observe any changes in the baby that may require follow-up care. The father or another family member can provide KMC some of the time.

Generally, KMC is initiated for medically stable preterm infants in a health facility and continued until they are feeding well and gaining weight. At this point they may be ready for discharge, and with careful follow-up, KMC can continue at home. Each infant who receives KMC needs to be followed carefully by a health care provider. A record should be kept with information about feeding, weight, and observations on problems and progress.

KMC has great potential for inclusion in comprehensive community-based programs where such care can be initiated in the home. To be successful, community-KMC requires clear guidance, frequent supervision, and thorough follow-up.

2 Facts for Feeding

Assess feeding options with the mother

Feeding is the centerpiece of care for the LBW newborn. The health care provider should help the mother assess the feeding options appropriate for her circumstances. The mother's options will depend on the level of prematurity of the baby and the severity of medical problems. Box 2 shows how breastfeeding behavior differs according to a baby's gestational age.

- Most term LBW babies can initiate breastfeeding immediately.** Exclusive breastfeeding is sufficient for term LBW infants for the first six months (with supplemental iron as described below). However, they require greater care and attention to temperature maintenance and the establishment of good feeding practices than normal weight babies. They may want frequent feeding though they may tire easily.
- Many preterm babies are not able to breastfeed in the first days or weeks, but they will benefit greatly from expressed breastmilk.** Preterm babies initially may have difficulty suckling at the breast because they are unable to latch on and suckle effectively. Sometimes the baby's mouth appears too small for the mother's nipple and areola. If the mother keeps her breasts soft and supports her baby using the under-arm hold described in box 3, the baby can latch on to the mother's breast more easily. Preterm milk, which has a higher concentration of proteins than term milk, is especially suited for the preterm baby. The mother

Box 2. Breastfeeding behavior according to gestational age

Gestational age	At the breast the baby can:
Less than 30 weeks	<ul style="list-style-type: none"> open the mouth and stick out the tongue lick milk from the mother's nipple take some breast tissue into the mouth make a few weak sucks
30-32 weeks	<p><i>as above and:</i></p> <ul style="list-style-type: none"> attach to the breast might make some (weak to strong) sucks with long pauses in between
33-35 weeks	<p><i>as above and:</i></p> <ul style="list-style-type: none"> might root (turn head and make sucking movements in response to the cheek being touched) have organized sucking bursts with long pauses take part of a feed from the breast or take one to all complete feeds from the breast
36 weeks and longer	<p><i>as above and:</i></p> <ul style="list-style-type: none"> usually breastfeed in a well-coordinated manner

Source: derived from Sandra Lang, 2002.

needs to know that every drop of breastmilk is valuable to her baby, especially colostrum. This sticky, yellow-white early milk is rich in antibodies, vitamin A, and other protective factors. With additional assistance and support, nearly every mother of a preterm baby will, in time, be able to breastfeed her baby.

- LBW babies of HIV-positive mothers need special attention.** The HIV-positive mother of a LBW newborn should be counseled on her feeding options based on the AFASS criteria (acceptable, feasible, affordable, sustainable, and safe). If the mother decides to breastfeed, she should follow the general feeding guidelines for infants of HIV-positive women, including exclusive breastfeeding for the first few months and prevention, recognition, and prompt treatment of breast conditions (engorgement, cracked nipples, mastitis, breast abscesses, and thrush). If her infant is unable to breastfeed initially, the mother can express her breastmilk and then feed it to the baby using a cup. If she is able to heat treat the milk, there is less chance of passing on the virus through the milk.

Good Feeding Practices

Offer encouragement and support

All mothers after childbirth need emotional support, encouragement, good nutrition, and rest. Feeding a preterm baby can be especially demanding and exhausting. The initial feedings may represent a learning process requiring time and patience. The assistance and reassurance of health care providers and the support of family are particularly important during this time.

Help the mother with first feedings; counsel on good feeding practices

The feeding guidelines for LBW babies as well as for babies weighing 2500 grams or more include initiation of breastfeeding within the first hour, exclusive breastfeeding (no prelacteal feeds, liquids, or other foods), establishment of good breastfeeding skills, and frequent breastfeeds.

Early and exclusive breastfeeding

Full term babies are usually alert during the first hour after birth and ready to breastfeed. The baby will open the mouth and put the tongue forward in anticipation, ready to take the breast. Expressing a few drops of milk onto the nipple helps to stimulate the baby to try to breastfeed. The baby should be allowed to smell and lick the nipple. If the baby is unable to coordinate the sucking and swallowing, expressing breastmilk directly into the baby's mouth may be helpful in initiating early feeds.

Good attachment

Good attachment is important for effective removal of milk from the breast into the baby's mouth and for stimulation of continued breastmilk production. Poor attachment can lead to sore nipples, breast engorgement and inflammation, mastitis, breast abscess, and reduced milk production.

To attach the baby to the breast, the mother should touch the baby's mouth with her nipple, aiming it (and part of the areola) at the roof of the baby's mouth. When the baby's mouth is wide open, the mother should move the baby quickly onto the breast, so the nipple and part of the areola are inside the baby's mouth.

The following are signs of good attachment:

- More of the areola (the dark area around the nipple) is visible above the baby's upper lip than below the lower lip
- Baby's mouth is wide open (touching the baby's cheek or lips with a finger or the nipple may be helpful)
- Baby's lower lip is curled outwards toward the baby's chin
- Baby's chin touches the breast
- Baby takes slow deep sucks, sometimes pausing
- Suckling is comfortable and pain free



Box 3. Breastfeeding positions

Seated comfortably, the mother can provide good support for the baby using any of the positions described below.

Under-arm hold. This position is useful for preterm babies and for babies with poor head control. When the baby feeds on the left breast, the baby lies on the mother's left forearm with the head near her breast and the legs pointing back under her arm. The mother's left hand gently cups the baby's head to provide support; her right hand can support her left breast as she uses her left arm and hand to guide the baby's mouth toward the nipple and areola. The mother can place the fingers of her right hand under her left breast and her thumb on top near, but not on, the areola. She can use this hand to hold the breast so that the nipple touches the baby's cheek to encourage the rooting reflex. She should remove her hand from the breast once the baby is latched on. Sometimes a folded or rolled up towel or blanket is needed to support the arm that holds the baby.

Cross-cradle hold. This position is often used when preterm babies are first introduced to feeding at the breast. When the baby feeds on the left breast, the mother's left hand supports her breast and her right hand and forearm support the baby's head and trunk. In this position, the mother can easily see the baby's mouth and face while providing steady, gentle support for the baby's head.

4 Facts for Feeding

Box 3 continued...

Traditional hold. When using the traditional position, the mother holds her baby across her chest. When suckling on the left breast, the baby's body is supported by the mother's left arm and hand, with the baby's head on the mother's left forearm. The baby should be held close to the mother. This position usually works well for babies with good head control.

Proper positioning

Good attachment is easier to achieve if the baby is in a position where the baby's head and body are straight, not bent or twisted. The whole body should be supported. Good support of the head is especially important for preterm and sick babies. The health worker can help position the baby, show the mother different breastfeeding positions as described in box 3, and check for correct positioning and attachment.

Frequent breastfeeds

Babies should breastfeed frequently, 8–12 times per 24 hours, every 2–3 hours or more frequently, when needed. The smaller the baby, the more frequent the feeds need to be. Sometimes babies weighing less than 1200 grams need to be fed every 90 minutes. LBW babies may take longer to feed than larger babies. They may pause for longer periods during the feed to rest and continue this feeding pattern for an hour or more. They should be left at the breast and allowed to continue feeding when they are ready. Some may require expressed milk by cup after breastfeeding.

Teach the mother how to manually express colostrum and breastmilk

In some preterm babies, the ability to suck may be weak or absent. If the baby is unable to feed at the breast, the health care provider can help the mother of a preterm baby express her breastmilk and feed it to the baby from a cup. The mother should start hand expressing as soon as possible after delivery. She can then give colostrum to the baby, sometimes drop by drop directly into the baby's mouth or by spoon. She should express as much milk as possible every time the baby needs to feed, about every 2 to 3 hours, with no long interval between each breastmilk expression.

Breastmilk expression often takes 20–30 minutes or longer for adequate expressing of milk. Many women cannot feel whether their breasts are producing milk; it is important to express even if the breasts do not feel full. If the milk supply is too low and needs to be built up, the mother should express more frequently for a few days (every hour during the day and every three hours at night). Box 4 describes the process for expressing breastmilk. The mother can store the expressed breastmilk in a clean covered container for up to 24 hours in a refrigerator.

Box 4. Guidelines for hand expression of breastmilk

A mother should:

1. Wash hands
2. Prepare a sterile/clean container
3. Gently massage breasts in a circular motion with her fingers
4. Position thumb on the upper edge of the areola and the first two fingers on the underside of the breast behind the areola
5. Compress and release the breast with the fingers and the thumb a few times
6. If no milk is expressed, move thumb and fingers towards or further away from the nipple and try again
7. Repeat compressing and releasing rhythmically
8. Rotate the thumb and finger positions to remove milk from other parts of the breast
9. Express for 3–5 minutes from one breast, then the other breast, then back to first side; continue alternating breasts until the milk just drips from the breast at the start
 - Avoid squeezing the breast, pulling out the nipple and breast, and sliding the finger along the skin
 - Some mothers find that pressing in towards the chest wall at the same time as compressing helps the milk to flow. Use the following rhythm: position, push, press; position, push, press.

Feeding Expressed Breastmilk

Box 5. Guidelines for cup feeding

To feed expressed breastmilk by cup, the mother should:

- Swaddle the baby to prevent the baby's hands from knocking the cup and hold the baby closely
- Support the baby's head and sit the baby upright or semi-upright in her lap
- Hold the small cup to the baby's lips; the baby might make sucking motions
- Hold the rim of the cup to the baby's upper lip and tip it slightly so that the milk just reaches the baby's mouth; the baby will then start lapping the milk with the tongue
- Tip the cup so that the milk just reaches the baby's lips and allows the baby to take the milk
- Keep the cup tilted so that the milk just reaches the baby's mouth; let the baby control the pace at which the milk is taken
- Try to estimate the amount of milk that has been spilt (e.g., trickling down the baby's chin or cheek) and give the baby that much more

Remember:
Pouring milk into a baby's mouth can cause aspiration.

Show the mother how to feed by cup, spoon, or other appropriate device

Bottles are easily contaminated and should not be used. Artificial nipples/teats do not conform to a baby's mouth the same way as a mother's nipple. A baby can rapidly become accustomed to a way of sucking from an artificial nipple which, when applied to the breast, can cause the mother pain and be less effective in removing the breastmilk.

A baby can learn to feed from a small cup or glass, spoon, or other appropriate feeding device. These are all easier to clean than a bottle. In health facilities, tube feeding may occasionally be required.

Cup feeding

When a LBW baby is fed by cup, he or she initially "laps" the milk with the tongue. This action does not interfere later with attachment when the baby is ready to feed at the breast. Box 5 provides guidelines for cup feeding.

Spoon feeding

Spoon feeding is safe, but many people find it more difficult than using a cup. For babies with breathing problems, spoon feeding may be the best approach until the breathing problem has lessened. Preterm babies can have breathing problems because of immature lungs. LBW babies born at term may have breathing problems from other causes, such as a severe infection (pneumonia) or meconium aspiration. Care should be taken not to pour the milk from the spoon into the baby's mouth. The baby should be allowed to sip the milk from the spoon, or *very* small amounts can be put into the baby's mouth.

Other feeding devices

In India, a *paladai* is traditionally used for feeding babies. The paladai looks like a very small cup with one side extended out into a narrow channel. The mother holds the baby as for cup feeding, placing the narrow channel on the baby's lips. The paladai is completely open like a cup, so it is easy to keep clean. Similar devices may be found in other countries. Large amounts of milk should not be poured into the mouth of a LBW or sick baby.

Counsel the mother on ways to encourage her baby to breastfeed

When the baby is able to start breastfeeding (whether immediately at birth or after having been fed expressed breastmilk for some time), the baby is often not able to breastfeed for long periods or vigorously. During this transitional period when the baby is learning to breastfeed, the mother can express breastmilk and then put the baby to the breast. The hand expression will more effectively remove milk from the breast than the baby's weak suckling.

Both the expression and suckling will, however, stimulate continued milk production. Suckling from the expressed breast will also provide the baby with the fat-rich hind milk. However, if the baby tires very quickly and is not able to take enough milk by suckling, expressed milk should be fed by cup.

Emphasize the importance of maintaining good breast health

Feeding a LBW baby is challenging without having to deal with breast problems. When the breast becomes engorged or the nipples cracked, a mother can easily become discouraged. Engorgement can lead to mastitis and breast abscess. At the outset, the health care provider should emphasize techniques that can prevent these problems such as good attachment, frequent breastfeeding, or breastmilk expression. If the breasts are very full, the health worker can help the mother hand express some of the first milk to soften the nipple and the area around the nipple. This reduces the pressure and makes it easier for the baby to attach. Removing milk by expression also relieves engorgement. It is essential to continue expressing breastmilk regularly even if the baby is not able to drink all the milk.

Monitor weight gain and feeding practices

The amount of breastmilk needed by the LBW newborn in the first week depends on the baby's birthweight.¹ Small babies should ideally be weighed daily. Initially the weight is recorded to assess fluid intake and subsequently to check growth. For the first few days of life, babies lose weight (sometimes this weight loss reaches about 10 percent of the birthweight). With adequate intake, a baby should have regained his or her birthweight by the 7th to 14th day of life. For some LBW preterm babies, it may take longer. The daily weight gain should be at least 10 to 15 grams per kilogram body weight per day. Accurate and precise weighing scales are needed to assess daily weight changes. Spring balance scales are usually not adequate; but if they are the only type of scale available, it is better to weigh the infant only once a week.

Remember: As long as milk continues to be removed from the breast, more milk will be produced.

¹ Starting with 60 ml of breastmilk per kg (birthweight), the amount should be increased by 20 ml of breastmilk per kg (birthweight) per day. From the eighth day onwards, the baby needs 200 ml of breastmilk per kg (body weight) per 24 hours until the baby weighs 2000 g.

Provide micronutrient supplements as needed

For the baby: Iron stores, normally transferred to an infant in the last weeks of pregnancy, are sufficient for the infant's needs for the first six months of life. Hence, most infants do not need iron supplementation until they are six months old. Pre-term infants, however, do not get the iron transfer, so they have low stores. For this reason, preterm infants need iron supplementation from 6-8 weeks of age until their first birthday. It is also recommended that term LBW infants receive iron supplementation beginning between 6–8 weeks of age. Depending on how preterm the baby is, supplementation with other nutrients (including other minerals and vitamins) may be indicated.

For the mother: In areas where vitamin A deficiency is common, the current international policy, now under review, is for breastfeeding women to take a high-dose (200,000 I.U.) vitamin A supplement soon after delivery or within six weeks postpartum. This will help build up vitamin A stores and improve the vitamin A content of breastmilk.

Teach families to recognize problems early and act promptly

LBW babies are more prone to illness. When sick, they should be breastfed frequently. Families should seek care from an appropriate provider when a baby shows any of the following danger signs: poor feeding or poor weight gain, lethargy or irritability, breathing problems, fever or hypothermia, trembling or convulsions, and jaundice.

Supporting Actions

Actions to reduce the risk of delivering a LBW baby should start long before conception. Women who were born with low birthweight and/or were poorly nourished as an infant, child, and adult are more likely to give birth to LBW babies than those adequately nourished from conception and throughout their childhood and reproductive years.

Many women come in contact with health workers during pregnancy, so this time offers an opportunity to counsel them on the practices listed below that can reduce the risk of delivering a LBW baby. To enact these recommendations, women need family support and provision of health services.

- **Increased food intake during pregnancy.** Most pregnant women need one or more extra servings of the staple food each day.
- **Adequate vitamin and mineral intake.** Deficiencies in zinc, iron, vitamin A, folic acid, vitamin B₆, vitamin B₁₂, vitamin D, calcium, and magnesium might increase the risk of low birthweight and preterm births. A varied diet, appropriate supplements, and fortified foods are recommended. Iron folate supplements are needed by all pregnant women to prevent anemia, which contributes to LBW. Prevention and treatment of hookworm infection can improve iron status.
- **Reduced work load.** An excessive work load consumes energy that otherwise could support fetal growth and maternal health.
- **Treatment of reproductive and urinary tract infections.** Reproductive and urinary tract infections increase the risk of preterm labor and delivery.
- **Protection against malaria.** Malaria, especially during the first and second pregnancies, contributes to low birthweight. Pregnant women in malaria endemic areas should be protected from infection by using insecticide-treated bednets and should be given intermittent preventive treatment according to national protocols.
- **Smoking cessation.** Mothers who smoke during pregnancy and those who are exposed to tobacco smoke (passive smoking) have a higher risk of giving birth to LBW and preterm babies.

Health sector interventions

The health sector can prepare staff and facilities to care for LBW babies through training, referral protocols, guidelines, and monitoring and evaluation. A review of pre- and in-service curricula may indicate the need for updating on the appropriate management of LBW babies. Guidelines should describe how to handle LBW babies born in or brought to the facility, including monitoring LBW babies to demonstrate improvement and detect problems. Neonatal/perinatal audits and periodic evaluations of a facility's performance in the management of LBW babies can help pinpoint and resolve problems, and establishment of facility and community-based support groups can foster two-way referral.

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Facts for Feeding - Feeding Low Birthweight Babies is a publication by LINKAGES: Breastfeeding, LAM, Related Complementary Feeding, and Maternal Nutrition Program, and was made possible through support provided to the Academy for Educational Development (AED) by the Bureau for Global Health of the United States Agency for International Development (USAID), under the terms of Cooperative Agreement No. HRN-A-00-97-00007-00. Dr. Elisabeth Sommerfelt provided technical assistance for the development of this publication. The opinions expressed herein are those of the author(s) and do not necessarily reflect the views of USAID or AED.

March 2006

