# Breast milk for preterm babies

## More than a meal

EFCNI european foundation for the care of newborn infants

## Dear Parents,

Congratulations on the birth of your child. As parents, you might be concerned because your baby was born too early. However, preterm birth is a worldwide phenomenon and there has been a lot of research into preterm babies and preterm baby care over the last decades, contributing to the doctors' and nurses' experince at your hospital. This also includes the field of nutrition.

Breastfeeding is best for every newborn. You may wonder whether it is even possible to breastfeed a preterm baby and whether you will have enough milk for your baby. If your baby was born very early, you can express your breast milk and your baby will receive your milk – enriched if necessary – through a tube. Later on, if your baby can coordinate sucking, swallowing and breathing, your little one will learn how to breastfeed. Many hospitals have experienced lactation specialists or knowledgeable nurses who can support you.

This booklet is intended to serve as a guide and inform you about the many benefits of breast milk because breastfeeding is more than just a way to feed your baby. You will also receive support in the form of practical tips from a mother of a baby born preterm, as well as expert advice for your time in hospital and beyond. You may want to share this booklet with your partner, family members and close friends, so they are better aware of the new challenges you are facing and understand how important their help and encouragement is.

We would like to take this opportunity to thank Medela for its commitment and support in the production of this booklet.

We hope that you will find lots of useful and helpful advice when you browse through this guide.

Silke Mader
Chairwoman of the Executive Board and co-founder of EFCNI

# Contents

For the sake of readability, masculine and feminine grammatical genders will not be used in this brochure. All personal pronouns apply to both genders.

This brochure is intended as a guide but cannot and should not be a substitute for in-depth discussion with your doctor, nurse, midwife or lactation specialist, as they will be aware of your baby's individual situation. Please make a note of any questions you may have on the subjects covered in this brochure for your healthcare professional to answer at your next visit.

# Sarah's story

*Silke Mader*

*This story is based on an interview with Silke Krüger and reflects her personal impressions and experiences after becoming mum to Sarah, born at 25 weeks.*

# A difficult start

I remember very well when our daughter Sarah was born at 25 weeks, weighing 437 grams (just under 1lb) and measuring 28 centimetres (11 inches) in length. I arrived at the hospital with suspected HELLP syndrome (preeclampsia, colloquially referred to as pregnancy poisoning) and the doctors made no secret of the fact that there would be a risk to both me and the baby during birth. I immediately underwent emergency surgery and had serious internal bleeding which was very difficult to stop. My husband was suddenly in a situation where he had to fear for two lives at the same time: his baby's and his wife's. It was only later that I realised what a narrow escape I had had and how difficult it must have been for my husband and my family when I was lying unconscious in intensive care for three days.

In the beginning I had no idea what had happened. My husband gave me a great deal of support during the first few days – and afterwards, too. He tried to fill in the blanks by telling me what he had experienced while I had been unconscious. The first time I went to see our baby, was a shocking experience. I had imagined that Sarah would look completely different – not like a preterm baby. I was afraid, of course. "How will my child survive?" I thought. "Will she survive at all? Will we be able to cope with all this?" Sometimes my husband and I felt so powerless that we didn't know how we were going to get through the next day. Sarah was covered with tubes. She was so tiny and yet so completely full of the will to live.
Although we received a lot of support from the hospital and our family and friends, we were completely overwhelmed by the situation. After all, we had no idea what it meant to have a preterm baby. We didn't know what we were in for. We simply weren't prepared for this kind of situation.

For me, it was particularly hard to come to terms with the fact that I hadn't seen our baby during the first four days of her life. The first few times I went to see her I was taken to the intensive care unit in a wheelchair, still in pain from the surgery. I was allowed to lay my hand on Sarah and I was advised to talk to her. I can still see myself today, sitting powerless in front of an incubator. The baby lying in front of me, completely motionless, was meant to be my daughter, Sarah. I could barely cope with all this and I was too weak after my surgery to stay for a long time. But I tried to communicate to Sarah that I would be there for her, no matter what.

## An emotional rollercoaster

The next few months were shaped by a lot of highs and lows. My husband and I were at the hospital every day. We would arrive in the morning and stay until the evening. That was our daily routine for months. "What must it be like for parents who have other children at home to look after?" I wondered. It was a recurring question that I couldn't answer. Things were especially difficult for us when Sarah's oxygen level fell over and over again, or when she had setbacks in her development. But we focused on the positive experiences. The most beautiful moment was when our daughter was allowed to lie on my chest for the first time – so-called 'kangarooing'. We both enjoyed this time together and at last I could really feel my daughter. Further very special moments were for example the first breastfeed and when she breathed without a breathing aid for the first time.

However, we were constantly plagued by setbacks. Sarah caught infections, had digestive problems, and her blood oxygen level decreased. Her oxygen level often fell while she was feeding, which was extremely stressful for us. At the hospital they explained that this was completely normal, since babies don't acquire the swallowing reflex until later, so I should keep a close eye on Sarah when I was feeding her. Preterm babies are not simply smaller than term born babies – they are born immature and so they go through certain stages of development outside their mother's body. I kept reminding myself of this, but it was still very difficult for me.

## Expert advice and support

My family, in particular, supported me through this emotionally difficult time, and the enormous amount of care I received from the nursing staff and the neonatologists at the hospital was also a great help. Just before I was discharged from hospital, I felt very at home there, almost as if I was part of a family caring for my daughter. We spent more than four months at the hospital and were able to build very strong mutual trust with the NICU team, for which we are still very grateful today.

Looking back, it was especially important for me that I was advised immediately after birth that it was possible to breastfeed my baby. "How am I supposed to breastfeed Sarah?" I thought at first. "How is it supposed to work when she is still so small?" However, thanks to the expert support I received from the lactation specialists at the hospital, I was very quickly able to express breast milk, which Sarah was initially given through a tube. The feeling that I was able to give my baby something so important was very special. But I also knew that if I didn't have any breast milk there were other ways to ensure that Sarah

was well fed, and this was a great comfort to me. During my first attempts to breastfeed, in particular, the lactation specialists were on hand to help me deal with any uncertainty or fears – as the mum of a preterm baby, you often feel helpless and you are very stressed after all the highs and lows. Thanks to the personal support I received from these specialists, and their incredible patience and care, I was finally able to leave the hospital breastfeeding exclusively.

## Taking our baby home

After four months it was over at last, and we were able to take Sarah home. On the one hand, it was a wonderful feeling because it meant that Sarah was stable enough to go home and we could look after her ourselves. But, of course, it also meant that we were now on our own. We were the only ones responsible for our baby and we couldn't ask a nurse or a doctor for any more advice if she didn't feed or if she screamed for some inexplicable reason. But we are really pleased with how Sarah is developing and we are very proud that we came through everything so well. While I was breastfeeding I often had minor problems, which meant that I sometimes had to express milk and we fed it to Sarah from a bottle. At home, I continued to express milk for more than five months and I am happy that I had the opportunity to feed my daughter breast milk.

# Advice for parents of preterm babies

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## What is preterm birth?

While a normal pregnancy lasts between 37 and 42 weeks, preterm babies are born before the end of the 37th (completed) week of pregnancy. Most pregnancies are only shortened by a few weeks. However, in exceptional cases, a baby can be born as much as 16 weeks early, which means in the 24th week of pregnancy. Preterm babies are not at all unusual: an estimated 15 million babies worldwide are born early every year. This means that roughly one in ten children is born preterm. Of the 5 million babies born in Europe every year, about 500,000 are born too soon, but only a small proportion are extremely preterm and born weighing less than 1,500 grams (around 3lb 5oz).

Having a preterm baby may not be what you planned, but it is a special moment and an opportunity to welcome a new, cherished child to your family. Your new family member will need all the extra love and support that you, as parents and family, can provide.

## My baby is in an intensive care unit – what should I expect?

Each pregnancy and situation will be unique and different, and so will be each preterm baby. Preterm babies are not necessarily ill. However, they are not yet prepared for an independent life outside their mother's womb. Depending on the week of birth a baby will need extra help and support.

Babies born too early will require support for their organ systems which are still immature. Experience has shown that babies – particularly preterm ones – cannot simply be treated like smaller adults. That is why neonatal intensive care units (NICU) are designed to cope with the specific needs of these tiny patients and their families. The smallest and most immature babies, in particular, need warmth, humidity, help in fending off infections, special nutrition and sometimes breathing support. But above all, preterm babies need rest and gentle, respectful handling by the doctors and nurses looking after them. These babies also need to have their parents – especially their mothers – very close to them. Modern medicine allows us to support immature physical functions very well. However, an intensive care unit and an incubator can never replace the care provided by parents, the feeling of security and protection, in particular during a time when the baby's brain, which is still very immature, develops rapidly. That is why, in recent years, neonatal intensive care units have increasingly opened up to you: the parents and families of preterm babies. The care teams need you to spend as much time with your baby as possible, to provide your baby with a feeling of security, familiarity and stability. These are all things that a highly technical intensive care unit cannot provide on its own.

Get to know your little baby from the very first day; Only the parents can recognise a baby's strengths and weaknesses and give the baby confidence and security. The care teams encourage you to care for your little one, have skin-to-skin contact and be the most important people in your baby's world. No matter how small your baby is, your baby belongs with you, first and foremost.

## What is all the equipment for?

When you enter a neonatal intensive care unit (NICU) for the first time, it might feel quite unfamiliar. Becoming parents, you probably didn't envision spending time in the NICU. Your team of specialists will tell you about the equipment, medication and care procedures. The nurses will help you to care for your baby and settle into your new surroundings. Give yourself time and you might get used to the unfamiliar environment more quickly than you expected. The NICU team will help you with this. Above all, always remember that this baby is your son or your daughter who needs your loving touch and care. Speak softly to your baby and begin to discover your baby's personality, preferences and needs.

In most cases, giving birth to a preterm baby is not a sudden or unanticipated event. Parents often still have time to talk to hospital staff and perhaps have a short tour of the NICU. Experience shows that this can really help to alleviate fears and uncertainty, or even remove them completely. It is not uncommon that, before a very preterm baby is born it is possible to prepare the lungs medically for an early birth.

Nevertheless, most preterm babies will have to be treated in the intensive care unit for a while because their immature physical development means that they need medical support.

During this time, you might experience an emotional rollercoaster as parents. At times your baby will develop very quickly and at other times there could be setbacks. The support of family and loved ones is really important during this time. It can be difficult to juggle the needs of your new baby, other children, work and life. Both you and your baby will come into contact with a lot of people who are looking after you.

Your medical team and the nurses will work with you to make sure that all of your baby's needs are met. You will learn to understand small signs and recognise when your baby is hungry or needs to sleep. With time you will understand your baby's communication and see your baby becoming more alert and interested. You will see how your baby reacts with pleasure and comfort when placed directly against your skin. Your baby will begin to explore the world with you. You will be the experts on your baby.

Remember: this is your baby and your baby needs you – the parents – to be as close as possible, for as long as possible. A team of experts will support you as a family to manage this experience.

Embrace a partnership on equal terms and let the care team give your baby the best possible start in life.

## Tips

- Try not to let the environment of the NICU prevent you from being close to your baby. Remember that the doctors, nurses and other staff want to help you bond with your baby.
- Never be embarrassed or shy when caring for your baby. The healthcare team will be delighted to see you holding, cherishing, or singing and reading to your little one.

# Understanding your preterm baby

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## What does a preterm baby look like?

Preterm babies differ in several aspects from their term born peers. These differences can vary according to how early your baby was born. The most significant features are the following:

## Skin

At birth, very preterm babies are often red in colour and their skin is moist, thin and translucent. Very quickly, the skin's outer layer forms and the skin becomes dry and opaque, just like the skin of full-term babies. However, the skin barrier of preterm babies remains less effective than that of their full-term counterparts. That is why they are placed in warm, humid incubators which protect them from water and heat loss by evaporation through the skin.

When babies are born, their skin is coated with a creamy substance called the ***vernix caseosa*** which they produce during pregnancy. This fine, white, greasy layer protects their skin from the amniotic fluid.

## Hair

Between 19 and 21 weeks, the hair follicle is fully formed and the baby's hair becomes visible. Preterm babies are also sometimes covered in fine, downy hair known as ***lanugo***.

## Senses

The immature systems of preterm babies lead to an exaggerated sense of pain and discomfort. Nerve endings that communicate pain to the baby's brain are not yet fully developed or completely surrounded by the covering that is present in older, term babies. This means that preterm babies often feel pain more acutely. Other kinds of touch, such as stroking the head or back or rubbing a foot or hand, may be uncomfortable for the baby.

## Fingernails and toenails

A baby's fingernails and toenails develop at a very early stage and completely cover the nail bed from the fifth month.

## Eyelids

The eyelids of the foetus are sealed until around 24 weeks. From the time their eyes open, preterm babies will start to see things as long as the light is very gentle. But their sight is still developing. At 30 weeks their pupils contract when exposed to light, this pupillary light reflex is fully developed around week 35. At 32 weeks they develop a reflex, shutting their eyes in bright light. At this stage their pupils are larger than in full-term babies. At 37 weeks, preterm babies will spontaneously and actively turn their eyes and head towards a soft light. Their vision is still fuzzy, and they cannot distinguish colours or see details, but they can make out human faces and will be able to tell their parents' faces apart from other objects. Around six months from the full-term date, babies can generally see as well as adults.


Remember that preterm babies like gentle but firm touch.
These actions are comforting to your baby:

- Hold your baby's tiny hand firmly in yours while you talk to your little one.
- Don't rub your baby's back, but put your hand firmly on your baby's head and around the feet.
- Hold your baby in the kangaroo position, gently but firmly against your chest.
- Watch your baby's response, and you'll see that touch of this kind is calming, restful and leads to increased oxygen levels.

## The lungs

Babies do not use their lungs in the womb, since the placenta provides oxygen for their blood. However, from time to time, they do make 'breathing' movements that allow their muscles to be exercised. Before birth, the lungs are full of ***amniotic fluid*** (the fluid in the womb), which will be rapidly absorbed and replaced by air at the moment of delivery.

Between 24 and 36 weeks, the baby's lungs are still developing. During this period parts of the lungs are formed (the small ***bronchi*** and the ***alveoli***). What is more, their lungs do not produce ***surfactant*** efficiently until 34 weeks – this is the substance that stops the ***alveoli*** from collapsing when breathing out. Since very preterm babies have very immature lungs, they can have difficulty breathing.

## The digestive tract

When they are in the womb, babies receive nutrients and oxygen via the placenta. However, during the final three months of the pregnancy babies swallow around 750 ml (about 25,36 fl.oz) of ***amniotic fluid*** every day. This prepares them for food consumption outside the womb and also helps develop the digestive tract.

Preterm babies still have a very immature digestive tract when they are born: functions such as intestinal movements, the secretion of protective digestive substances and the digestion and absorption of food all operate at a lower level than in a term baby. This is why it is important to feed preterm babies carefully and why these babies may require an ***intravenous drip*** in order to ensure their nutritional needs are met during the first few weeks. Nevertheless, even babies who need ***intravenous*** feeding still benefit from small amounts of breast milk as it helps the gut to mature. Breast milk is the most suitable food because of the many protective bioactive substances it contains.

## The heart

A baby's heart beats from the end of the first month of pregnancy. It normally pumps blood to the lungs and to the body. As the lungs are not used in the womb, the blood has to bypass the lungs via two structures: the ***foramen ovale*** (an opening in the heart) and the ***ductus arteriosus*** (a vessel connecting the aorta and the pulmonary artery). Typically, these two structures close spontaneously at birth, allowing the blood to get oxygen from the lungs. In babies born early the ***ductus arteriosus*** does not always close spontaneously and may require time and medical treatment.

## The brain

In the last trimester of pregnancy, not only do babies' brains increase in size, but the entire organisational structure of the brain also develops. This usually occurs in the calm darkness of the womb, where babies' lives are regulated by maternal hormones and there are no external intrusions. The situation will be very different in the neonatal intensive care unit (NICU). It is important to pay particular attention to babies' reactions and ensure that they are protected. The NICU can be a stressful environment, given the noise, light, medical procedures that may sometimes be painful and the fact that babies can be physically separated from their parents.

The time required to pass through the different developmental stages will vary from one baby to another. The individual proceedings will become evident for the baby in terms of the capacity to wake up, interact and feed. A baby's gestational age (week of pregnancy at birth) and the medical care provided will, of course, affect this progression.

## How aware and responsive are preterm babies?

The earlier a baby is born, the shorter (and more difficult to spot) their moments of wakefulness will be. Gradually, within an appropriate environment, a preterm baby will stay awake for longer periods of time. Parents should be very careful to catch these longer moments and respond to their baby's desire to interact or breastfeed.

## Getting to know your baby's behaviour

Your baby can't talk, of course, but you can read your baby's body language. For example, your baby will show stress through uncoordinated movements, arms or legs stretched straight, fingers splayed, a change in colour, more rapid breathing or by going floppy. You will be able to see that your baby is comfortable when your baby's heart rate and blood oxygen levels are stable, the face is relaxed or when your baby makes little sucking movements. The nurses – and you as parents – can adjust your baby's care according to what signs your baby displays.

Very soon your baby will try to develop techniques to feel stable and secure. It is important to recognise these techniques in order to provide support. Your baby might want help gripping, bringing the hands up to the mouth or face, learning to push with the feet, sucking and putting the hands or feet together. Gradually, your baby will manage to do these things independently. Observing your baby in this way will help the care team to support you when you start breastfeeding.

Depending on how early your baby is born, your baby might not be able to coordinate sucking, swallowing and breathing. Here are the various stages your baby will go through:

- Your baby suckles without pausing for breathing.
- Your baby alternates between periods of sucking, swallowing and breathing.
- Your baby coordinates sucking with breathing over periods that gradually get longer.
- Your baby coordinates all of this while communicating with you at the same time.

The first breastfeeds will be attempted when your baby develops a need for sucking and your baby's physical condition (the heart rate, among other things) is stable. At the beginning, your baby will just lick and mouth your nipple. Then your baby will direct the attention to it and will gradually develop sucking skills. This will all at once stimulate your milk supply even if your baby is not drinking a considerable amount of milk.

It is important to observe your baby's breathing in order to see where your baby is in terms of development and to let your baby rest so that your little one can remain physically stable. You should make sure that your baby is always in a comfortable position. For a preterm baby the preferred position is curled up, like in the foetal position in the womb. You can support your baby using a small baby nest, but also with your hands and arms. Helping your baby to curl up (for example, by wrapping your baby in a soft blanket), will allow your baby to remain in a stable physical condition during the feed and conserve energy for feeding.

It is important to concentrate on spending quality time with your baby rather than focusing on providing a certain amount of milk. A baby who is kept stable, even without taking much milk, will be more inclined to come back to try another feed.

Equally, before genuine feeds take place, you can provide moments of positive oral experiences such as the hands accessing the mouth, non-feeding suckling and drops of ***colostrum*** and breast milk. This will help to develop your baby's future feeding ability.

Be patient, learning to feed is difficult and sometimes lenghty process that requires a certain neurologic capacity and hence, should never be enforced.


**In particular, you can help your baby to feed by:**

- Taking an active part in the feed, even if your baby is still being fed through a tube, giving your baby a suitable environment (skin- to-skin or skin-to-breast) while helping to stay in a curled-up position.
- Letting your baby suck without feeding and offering a finger, cuddly toy or soft blanket to hold on to.
- Letting your baby take rests when showing signs of disorientation and tiredness.
- Being continually present and helping to identify the moments when your baby is available so that you can quickly offer a feed when your baby might be interested in a feed rather than waiting until they are very hungry.
- Attempts to drink are exhausting and require your baby's full attention. Avoid any form of distraction.
- If your baby is being tube-fed always try to provide the possibility to suck at the same time with a dummy, your finger or a swab soaked in breast milk.

# Your role as parents and family

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## The importance of parents in the NICU

Your baby's attachment to you – the parents – begins before birth. Even when born too soon, your baby recognises family members' voices and the mother's scent immediately. Very soon your baby also perceives faces. Your baby is even used to your family's daily rhythm and perceives you as a secure base and a 'safe harbour'. Of course, you as parents will have already start bonding with your baby during the pregnancy. Skin-to-skin contact is the best way to strenghten the bond between parents and baby. It is possible to share such moments of closeness even in the neonatal intensive care unit (NICU).

## Kangaroo mother care (KMC)

It is a good idea to commence with kangaroo mother care immediately or soon after birth, and continue as much as possible afterwards (continuously day and night if you are able and willing). This is also possible within a few days when your baby is born extremely preterm, provided your baby is stable, for periods of one to two hours. But if a baby is very sensitive this may have to wait until they are stable enough.

Skin-to-skin contact helps your baby stay warm, calm and stable. Special clothing facilitates long periods of KMC, while you rest and sleep. According to the UN Convention on the Rights of the Child, parent-child separation should not occur.[1] The parents' right to unrestricted presence (day and night) in the NICU should be the norm and they should always be made to feel welcome. You should have access to a bed or comfortable armchair near the incubator, and sufficient privacy. However, depending on how the NICU is set up, this may not possible everywhere. You should talk to the staff in your baby's unit about what is possible.

[1] *Art. 9 UN Convention on the Rights of the Child*

## How to interact with your baby

Your baby loves feeling your still hand on the body (babies born too early like this more than stroking and patting), listening to your voice and seeing your face. Even very preterm babies can answer by making soft sounds when they hear their parent's voice. Whenever your baby is awake or waking up, try talking or singing, let your baby hold your finger, or see your face. Even very preterm babies communicate: they can show that they like or don't like something, that they feel insecure, that they are waking up or that they are tired and want to sleep.

By observing things such as your baby's facial expression, movements, posture, breathing and skin colour, you will soon find it easy to work out what your baby is telling you. It may be helpful to observe your baby together with a nurse and discuss what you can do to make your baby more comfortable. Gentle baby massage is a nice way to interact with your baby when your little one is approaching term age and is ready for this type of contact.

## How to comfort your baby

Your baby loves feeling your still hand on the body (babies born too early like this more You can help your baby to relax, calm down and go to sleep by holding your still hands around them. This is also helpful during stressful or painful caregiving procedures. The ideal position for carrying out such procedures is when your baby is in the kangaroo position on you or your partner; this actually reduces pain and discomfort. Giving your baby a small volume of sugar solution or breast milk in the mouth via a syringe also alleviates pain. Other ways of comforting your baby are offering a dummy to suck and helping your baby to keep it in the mouth, letting your baby hold one of your fingers and talking or singing to your child in a soft voice.

## Caring for your baby

Soon after your baby's birth you can start to feed your baby, wash your baby, change nappies and change the placement of the saturation probe. Some parents manage to do all of this the day their baby is born. They don't usually start bathing their baby until their baby is mature enough to enjoy a bath and doesn't get cold as easily. In more and more intensive care units, parents take over most of the caregiving, while nurses perform the medical and technical tasks. Discuss with your baby's care team how you can take over your baby's care at a pace that suits you. Many parents find that the sooner they do so, the better, because they then feel confident in their parental role before their baby is ready to go home.

### Tips

- Hearing your voice will make your baby feel better: bring a book and read softly to your baby – this may start your conversation with your baby in an unfamiliar environment.
- Sing or hum to your baby – the vibration of the humming while your baby is skin–to-skin is comforting to your child and supports the heart rate, breathing and weight gain.
- Watch your baby's response to your voice and touch – it will motivate you to be with your baby day after day.
- Sleep with a soft hat or piece of fabric (100% cotton and washable at high temperatures) and then bring it to the unit to be placed with your baby – babies have a strong sense of smell, so this will be a comfort to your child.
- Have your baby sleep with a small piece of fabric or hat and take it home with you when you are not with your baby. In this way, you will be together until you take your baby home. It often helps the mother's milk supply if she keeps the item with her while she pumps.

## How to maintain your milk supply

Feeding is central to your role as a parent. It is recommended that mothers start to express milk within one hour or two after birth, if possible, and continue to do so about eight times per day – as often as you would breastfeed a healthy term newborn. Combining double pumping with gentle breast massage may help you to express larger volumes. Breast milk has special benefits for preterm babies and ill babies: it contributes to their development and reduces the risk of infections. Many babies need to be tube-fed initially, but are ready for breastfeeding when they breathe on their own with stability as the only criterion (oxygen via nasal prongs is no obstacle). Babies are able to suck and swallow milk from 28 weeks and many preterm babies are fully breastfed at 34-35 weeks or even earlier. Cup-feeding can start from around 29 weeks, whereas bottle feeding generally requires a higher level of maturity.

Once your baby starts to take some milk at the breast, you should no longer feed fixed volumes at fixed intervals. Instead, you will breastfeed when your baby shows signs of interest and give the additional milk needed by tube, cup or bottle, so that your baby gets enough milk to grow. The staff will help you decide how much additional milk should be given each day. As long as your breastfed baby needs supplementary feeding by another feeding method, it is important to express milk continually to maintain a sufficient milk supply to keep up with your baby's requirements.

## Tips

- Ask the care team for assistance with the feeds.
- Ask to hold your baby in the kangaroo position during a feed.
- You can hold the small syringe of milk while holding your baby.
- Ask whether your baby can be held to the breast to begin suckling during the feed.
- Provide a dummy while your baby is being fed to start non-nutritive sucking.
- Be present for as many feeds as you can. Your baby will be comfortable and secure.
- Always watch your baby closely during any feeding session to read the cues and make sure your baby remains calm and in control.
- Eat balanced and sufficiently and make sure to stay hydrated.

# The value of human milk

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## High nutritional needs for growth and development

In the last three months of pregnancy, a baby's brain grows and develops rapidly. During this period a baby's brain more than doubles in size and weight. Since preterm babies miss out on this important period in the womb, they have high nutritional needs for growth and development.

Breastfeeding can be a challenge if a baby is very small. Tolerating large amounts of milk being fed by tube can be difficult for preterm babies because of the immaturity of their stomach and gut. Several factors can affect their feeding tolerance, such as ***intestinal motility***, feeding volume, use of medications, medical conditions and the type of milk.

## Types of milk and milk quality

There are three options to feed a preterm baby in the neonatal intensive care unit (NICU): the first is with human milk, the other with donor milk and the third with preterm formula. Both breast milk and preterm formula are fortified with more energy, protein and minerals than formula for babies born at term, in order to meet the higher requirements of preterm babies. Like most formulas, preterm formulas are based on cow's milk. Breast milk is the best form of nutrition for a baby. Studies have shown its benefits in both term and preterm babies. Breast milk is more than just a mixture of ***macronutrients*** (protein, fat and carbohydrates) and ***micronutrients*** (vitamins and minerals). It also contains numerous beneficial elements that boost a baby's immune system and provide protection against infections. Preventing infections such as diarrhoea and ear infections is another important health benefit of breastfeeding to name only a few. If a mother doesn't have enough of her own breast milk, supplementing with donor milk from a milk bank is another option for the baby.

In the last trimester of pregnancy, babies receive antibodies via the placenta. These antibodies protect babies against viruses and bacteria that their mothers have come into contact with. When babies are born preterm the beneficial transfer of antibodies across the placenta is no longer possible.

However, as a mother, you can still provide your baby with antibodies through breast milk. The milk you produce in the first day or two after giving birth (***colostrum***) has the highest concentration of antibodies.

***Components of breast milk***

- Antibodies
- Hormones
- Anti-Viruses
- Anti-Allergies
- Anti-Parasites
- Growth Factors
- Enzymes
- Fat
- Vitamins
- Minerals
- DHA / ARA*
- Protein
- Carbohydrates
- Water

These antibodies will help to protect your baby. Eventually, over time, your baby will begin to develop the own immunity but until then, breast milk will do this job. If you expose your baby to breast milk through feeds or even by swabbing your baby's mouth with this milk, your baby's own immunity can be activated.

Moreover, feeding your baby with breast milk protects your little one from infections, for example, decreasing the chances of developing ***necrotising enterocolitis*** (intestinal disease, sometimes referred to as NEC). ***Colostrum*** in the early days will also help your baby's intestines to grow and mature, preparing your baby for larger feeds. Breast milk helps to prevent or reduce allergies and inflammation. In addition to its immunological benefits, breast milk is also important for brain growth. It contains special fatty acids that help your baby's brain to develop properly. Even in later life, children who received breast milk as preterm babies still have higher intelligence scores than children who never received breast milk. Furthermore, fatty acids are important for the development of normal visual acuity in preterm babies. Protecting the eyes is essential, as preterm babies are still developing and growing. Breast milk is a very important substance for your baby and protects against many of the complications that can occur when a baby is born preterm.

* *Docosahexaenoic Acid / Arachidonic Acid*

## What is CMV?

If a mother suffers from an infection such as Cytomegalovirus (CMV), this also needs to be taken into account in relation to breastfeeding. CMV is a virus that can affect preterm babies. This virus can be found in the breast milk of mothers who had been tested positive for CMV during pregnancy. Very preterm babies – usually babies born at 28 weeks or less – can be susceptible to this virus. Very few babies actually fall ill, but it can happen. Parents should discuss their options and their baby's risk level with their doctor to decide whether they should opt for not treated or pasteurised breast milk or formula. Whatever is best for both the baby and the family.

## The composition of preterm breast milk

Milk composition varies greatly from woman to woman and also changes over time. The gestational age (pregnancy week) of the baby at birth also plays a role. The milk produced by the mother of a preterm baby will differ from that of a mother who delivered at term. For the first three weeks after a preterm birth, breast milk will contain more protein and fat than term milk. However, after a few weeks the content of the milk resembles mature 'term' milk. It then becomes difficult to meet all the nutritional requirements, so experts often recommend that mothers of preterm babies fortify their breast milk with specially-designed fortifiers. This way, the baby gets the benefits of breast milk whilst also receiving enough nutrients to grow well.

## Immune factors

Breast milk is an incredible thing; it is like medicine for your baby that only you can give. Your milk contains a large number of active components that help to protect your baby and allow your baby to develop their own ability to fight infection.

**Cytokines** are anti-inflammatory substances that protect your baby from infectious organisms. They also act as 'messengers', signalling to infection-fighting cells when needed.

**Lysozyme** breaks open the cell wall and outer membranes of several microorganisms, including parasitic host cells, a process called lysis. It has a strong influence on the type of bacteria that inhabit the intestinal tract.

**Lactoferrin** binds to iron, so bacteria that need it to grow cannot get it. Lactoferrin can also bind to bacteria and break them down.

**Secretory Immunoglobulin A (IgA)** protects against microbial infections. As a mother, you produce specific IgA in response to germs that your baby is exposed to. It is very high during the first days following birth, when colostrum is the primary milk. Preterm milk contains IgA for a longer period of time to help your baby.

## Additional benefits of breast milk

Overweight in childhood (also called childhood obesity) is a global health concern. Breast-feeding may reduce the risk of overweight and obesity. Moreover, breast milk can lower the risk of type 2 diabetes and high blood pressure in later life. Preterm babies are also at higher risk of developing ***metabolic syndrome*** also known as Reaven's syndrome (a disorder affecting energy utilisation and storage) and human milk seems to reduce this risk as well.

Another advantage of breastfeeding is skin-to-skin contact. This gives both, mother and baby, a feeling of physical closeness and may reduce frequently observed depression during the months following a preterm birth.

There are also advantages for lactating mothers. Mothers who breastfeed have a lower risk of heart disease, osteoporosis, breast cancer, ovarian cancer and type 2 diabetes. However, women may not be able to breastfeed or provide their milk under certain circumstances. For example, this might be because they are taking certain medications or are too unwell. Breastfeeding should be supported, according to WHO recommendations, up to 6 months of age and as long it feels comfortable for both, the mother and the baby.

## Tips

- **For mums:** be confident in your body's ability to produce milk for your baby. Be with your baby, provide skin-to-skin contact and pump milk for your baby or breastfeed if your baby is ready.
- **For partners:** support your partner; assist her as she is providing for your baby. You can provide skin-to-skin contact and be an active caregiver for your baby.

# Providing your baby with breast milk

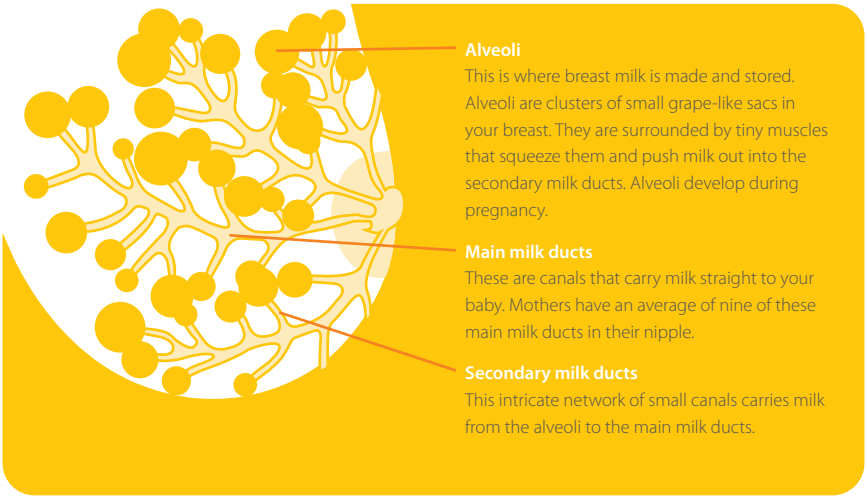
*Dr Skadi Springer*
*Paediatrician, neonatologist and certified Lactation Consultant (IBCLC), Leipzig*

Breast milk is the best food for every newborn baby. Babies born too early have specific needs that also affect feeding. A mother's body knows about these specific needs: her milk is easy to digest, has a special composition, prevents infection and promotes immunity. This means that breast milk can benefit the baby and actively supports the baby's rapid growth and development.

## Breast milk: food for body and soul

Nevertheless, it certainly isn't easy for mothers to keep on pumping milk for weeks and months on end if the baby can't yet drink from the breast. That's why it is important to ensure that mother and baby are not kept apart any longer than necessary. Kangaroo care also helps the mother's body to continue to produce milk

## What you need to know about milk production




During pregnancy, the hormones ***oestrogen, progesterone, placental lactogen*** and ***prolactin*** cause the mammary glands to develop. The mammary gland is a complex organ and is designed to produce breast milk. The ability to produce breast milk is independent of the size and shape of the mother's breast. Even mothers of multiples (who are often preterm babies) can produce a sufficient amount of milk for their babies.

Mothers can produce milk from the 16th week of pregnancy. Before giving birth, however, their hormones inhibit the milk production. At birth, the hormonal environment changes.

***Colostrum*** is the first breast milk available after birth. This first milk is extremely beneficial for your baby thanks to its great infection-fighting and immunity-building properties. It is important for your baby to receive this ***colostrum***; breastfeeding or breast expression should begin as soon as possible so that this valuable milk can be given to your baby.

Mothers, including those who have given birth to a preterm baby, will feel the physical 'coming-in' of more plentiful milk about 40 hours after delivery. Sometimes this can be delayed depending on the type of delivery and the medical condition of the mother. Consistent pumping or feeding is very important to promote this development.

For a successful start to breastfeeding, it is important to stimulate the breast as soon as possible after birth and as soon as you feel able to do so. The first three hours after birth are the best time to do this, but even if, for some reason, you cannot begin in this timespan, begin as soon as you can – your breast milk will be the best your baby can get, no matter when it is produced. As time passes, your ability to provide all the necessary milk can decrease. Ask the nursing staff to help you to set up an expression routine to stimulate your mammary glands regularly to mimic the natural feeding rhythm. A simulated sucking stimulus from a breast pump also causes the pituitary gland to release ***prolactin***, the milk production hormone.

Your milk production is especially important in the first days of your baby's life. Even tiny amounts of ***colostrum*** and early milk are very important for the health and development of your baby. Do not be discouraged if you only produce small amounts of milk. This is to be expected in the first day or so until the milk‚comes in'. Even small amounts of breast milk are beneficial for your baby. Every drop is precious.

If you have produced 350 (about 11.83 oz) to 500 millilitres (about 16.9 oz) of breast milk per day after about seven to ten days, it is very likely that there will be an adequate supply to feed your baby, i.e. enough to feed your baby an exclusive breast milk diet upon discharge from the hospital. Stimulation with an electric pump is recommended to initiate and maintain the milk production. Pump every few hours as if you were feeding your baby.

Modern electric breast pumps are available at most maternity hospitals. There are now also breast pumps with a special programme for initiation in pump-dependent mothers. This technology mimics the normal sucking pattern of a baby in the first few days. It helps to achieve an adequate milk supply.

# How to express breast milk

After the birth of a baby, the immunologically valuable first milk (the ***colostrum***) is initially produced in small quantities. ***Colostrum*** is rich in components that help babies to develop and to enhance their immune system. Seek guidance on how to collect these valuable droplets in a small sterile syringe by massaging your breasts or by using a breast pump. Even the smallest amounts of colostrum are welcome, because they make a crucial contribution, in the first few days of life, to helping your baby's intestines to mature ('minimal enteral feeding'). It is said that whereas surfactant is required for the development of the lungs in preterm babies, colostrum is needed for the intestines.

## Electric double pumping

This involves using a hospital-grade electric pump and kit that allows mothers to express milk from both breasts simultaneously. This not only saves time, but results in effective emptying (more milk and more cream) of the breasts for mothers who are unable to fully breastfeed their babies. Electric pumps are well suited to the needs of mothers who want to develop their milk supplies and need to pump every day.

## Manual pump

A manual pump is a good means of expressing milk since it is lightweight, portable and only requires personal effort – no batteries or electricity are required. Manual pumps are easy to use, but they are best for mothers who are not pumping on a daily basis. A mother will need to squeeze the pump to extract the milk, so if she is pumping round the clock, it can be quite tiring. Mothers may consider a manual pump for times when they will not be able to bring an electric pump with them or if they are without electricity.

## Hand expression

Did you know that you can express and collect your milk without a pump? Learning to use hand expression – using your hand to pump your milk into a clean container and then storing it – is easy enough. You can express your milk whenever you need to without a pump or electricity. While hand expression may take a bit longer, it is an effective way to remove milk. Ask your lactation specialist to teach you how to do it.

Lactation specialists have unanimously agreed on the fact that in order to consistently stimulate your breasts and promote milk expression and a more plentiful milk supply, it is important to pump. Pump about every two to three hours at least, once at night, at least eight to twelve times in a 24-hour period, for at least 15 minutes, just as if you were feeding your baby. This is important because it helps you to obtain the required amount of milk and it also prepares the breasts for the entire breastfeeding experience. As your milk supply becomes more plentiful, you will be able to see what pumping duration suits you.

Your breasts are made to provide increasing amounts of milk. With your baby growing their increasing demand on milk will at once stimulate your lactation supply. This preparation happens in the first seven to ten days following birth. Therefore, it is very important to pump now:

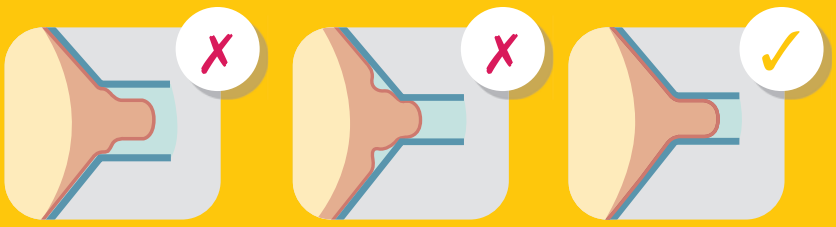
Using a double pump is the best support to express more milk. Double pumping will save you time and result in effective emptying of the breasts (more milk with higher cream content); it also increases the amount of ***prolactin***, the hormone that produces milk. If you have a single pump, pump one breast and then the other. Family members can support you by helping to prepare the pumping supplies, preparing a comfortable spot for you to pump or bringing you a drink to enjoy while pumping.

If you practise kangaroo care with your baby before and even during expression, this will help you to produce more milk. Don't despair if the milk flows slowly at first, or hardly flows at all. Just remember that by pumping milk, even in small amounts or droplets, you are giving something to your baby that nobody else can give. There is also evidence that using breast massage during expression helps to produce more milk and higher fat. Ask questions and get help and support from your baby's healthcare team. Ask for a lactation specialist; explanations and instructions are particularly useful in the early stages. Ask your family to support you, too. Remember that you, as parents, are the most important people in your baby's life and you are doing a great job.

## What about hygiene?

Sterile bottles, pump parts and breast shields are available for you at the hospital. Some pumps come in different sizes. Seek advice about which suitable breast shield is the right size for you.

## How to find the right breast shield fit:



## Signs that the fit of the breast shield is right:

- The nipple moves freely in the tunnel.
- There is minimal or no areolar tissue being pulled into the tunnel.
- A gentle, rhythmical motion can be seen in the breast with each cycle of the pump.
- The mother feels the breast emptying all over.
- The mother's nipples are pain-free.
- The customised selection prevents you from developing sore nipples and may play an important part in your ability to express milk.

Your baby must only receive hygienically untainted breast milk. Cleanliness is very important when you are handling your supplies and obtaining milk. Before expressing, you should always wash your hands thoroughly with liquid soap. Washing for at least 15-30 seconds is very important to keep harmful bacteria out of your baby's milk. There is no need to wash your breasts prior to pumping. Daily hygiene when showering or bathing is important but further washing is not necessary. Just be sure to clean your breasts when you bathe. Do not use drying soaps or cleansers. Your breast milk does not need to be checked routinely for bacteria if you are being carefully supervised when extracting and handling your breast milk. For this purpose, ask for the hospital's leaflet. If you have any doubts about the hygiene levels of your milk, your baby's tolerance of your milk or your baby's weight gain, just ask your health care team. The team caring for your baby are experienced and knowledgeable and will work with you in partnership to provide the best for your baby.

## How to clean the pump sets

The manufacturer's instructions for cleaning should be included with the pump and should be followed carefully. It is extremely important to clean the pump after each and every use. Bacteria and other germs can be very harmful to a preterm baby. Make sure that the sink and any equipment you use to clean the parts are also clean.

If you did not receive any instructions on cleaning:

- Rinse all individual components in cold water.
- Use a small bottle brush to clean all parts.
- Wash with detergent.
- Rinse clean.
- Boil for three minutes (all parts should be covered with water) or
- Treat in a steamer or
- Treat in the microwave in a special steam bag.
- Then store the cleaned equipment wrapped in a freshly ironed, dust-free cloth.

## How to store and transport breast milk

Most hospitals provide sterile expressing sets. If possible, express your milk into the bottles your baby is fed from. Whenever you transfer milk from one container to another, you run the risk of contaminating it with germs. In addition, breast milk should be as fresh as possible when it is fed to your baby.

Freshly expressed breast milk can be stored:

- For up to 48 hours in the refrigerator (1-4°C/ 33 – 39,2 F)
- For up to three months for use with preterm/low birth-weight babies (deep-frozen at -18°C / - 64,4 F)

During transportation (from home and also on the hospital premises), the cold chain must never be interrupted. Transport the bottles upright in a cool bag, with cooling elements in between them. If the milk has been stored at room temperature for longer than one hour, it must not be used for feeding preterm babies or babies in the intensive care.*

## Breast milk storage and processing

**Room temperature**
use within 1 hour

**Refrigerate**
use within 48 hours

**Freeze**
optimal:
use within 3 months

**Thaw to fridge temperature**
use within 24 hours

**Guidelines for storage and processing of breast milk or donor milk may vary slightly from clinic to clinic.*

## What to do if you have too much milk – or not enough

If you have expressed so much that you have a surplus of milk and you have exhausted your storage capacity in the freezer, ask about the nearest human milk bank. Many countries have human milk banks that provide donor milk for babies whose mothers cannot provide breast milk or cannot provide enough. Milk donors are selected in a similar way to blood donors. If you have any questions, ask to speak to a lactation specialist; they can help you with options and decisions.

If you do not have enough breast milk, you should ensure you get the opportunity to express more often and still have a rest. It helps to alleviate stress if you organise support for yourself (including domestic help, where appropriate). It is recommended that you express more often instead of expressing for longer periods. Placing warm compresses around your breasts for about 10 minutes before expressing will intensify blood circulation, promote the release of milk, and can help to increase the amount of milk. Hands-on massage while pumping can also support breast milk expression. Think of your baby at the same time: look at a picture or express right beside the incubator. Listening to some relaxing music or meditation may also help. Kangaroo care with your baby will help to support your goal of providing more breast milk. If your breast milk is not sufficient, supplementing it with donor milk from a human milk bank is the next best option for your baby.

## Breast milk for preterm babies

Breastfeeding your baby after being discharged from hospital may require a lot of effort and patience when things seem difficult. Always ask for practical support and expert advice. The close and loving contact you experience while breastfeeding your baby helps to process what you have gone through and intensify your bond with your little one.

### Tips

- Providing milk for your baby is an extra-ordinary experience and one of the best things you can do for your child.
- Allow family and friends to assist you with household chores or help with your other children to give you some time to relax and pump. Your nearest and dearest may be very happy to help in any way they can during this time. Just let them know how they can help you best.
- Consistency and timing are important when providing milk by pumping. Try to make time for it every two to three hours. Use reminders such as alerts or specific apps for your smartphone.
- Talk to the staff at the hospital and your family and friends so that they can support you during this time.

# Feeding stages

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*and Willemijn Corpeleijn*

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## What is parenteral and enteral feeding?

When babies are in the womb their mothers supply them with all the necessary nutrients to grow and develop, via the umbilical cord. After birth, babies obtain their food by mouth and the nutrients are absorbed in the intestines. Term babies drink milk from the breast or from a bottle. In contrast, preterm babies are usually unable to drink unaided in the first weeks or months after birth. This is because their nervous system has not yet matured enough. In order to drink effectively, sucking, swallowing and breathing need to be co-ordinated. It is only at between 28 and 32 weeks of gestation that the nervous system is mature enough for babies to start suck-feeding. For this reason, preterm babies may be given a nasogastric tube in the first few weeks or months of life: in this way milk can be administered and transported directly to the baby's stomach. This type of nutrition is called ***enteral nutrition***.

Nutrition that is given via an intravenous catheter is called ***parenteral nutrition***. The intestines of a preterm baby may not tolerate ***enteral nutrition*** very well immediately after birth. During the first days of life very small amounts of milk are administered via the nasogastric tube – usually no more than a few millilitres (ounces). In this way the intestines can get used to feeds. The younger babies are at birth, the more immature their intestines are. This means it can take several days or even weeks before a baby can tolerate sufficient amounts of ***enteral feeding***. Since preterm babies need enough nutrients to grow, parenteral nutrition is usually given directly into their veins until their intestines can tolerate larger amounts of ***enteral nutrition***.

***Enteral nutrition*** for a preterm baby can comprise expressed breast milk from the baby's own mother, donor milk or preterm formula. Receiving their own mother's expressed breast milk provides preterm babies with significant advantages: it is better tolerated than formula and it lowers their chances of getting infections. As breast milk may not contain enough energy and proteins to meet the specific needs of some preterm babies, extra proteins, energy, vitamins and minerals are added through the use of breast milk fortifiers.

## Training your baby to breastfeed: the first steps

Your breast milk is the best nutrition your baby can get, even though it will probably have to be fed via nasogastric tube for the first weeks or months after birth.

Once your baby's condition has stabilised, you can hold your baby directly against your skin. Skin-to-skin contact is very pleasant for you and your baby and this is the first step towards breastfeeding. During the skin-to-skin contact your baby will only be wearing a nappy and will be held closely against your bare breast. The baby's mouth should be at the same level as your nipple. At first your baby will just sleep against your breast, but you will find that over time your child will become more active. Your baby will feel, hear and smell you and may eventually start licking and mouthing your nipple. As a response, your breast may start leaking a little milk. If this is not the case, you can massage your breast so that a drop of milk leaks from your breast. Your baby can start tasting your milk at own pace. The additional benefits of skin-to-skin contact include seeing your baby, making eye contact when your baby is awake and keeping your baby warm. You will also notice the baby's heartbeat becoming steadier and blood oxygen levels will become more stable. The older your baby gets, the more active your baby will become when being held against your breast.

After your baby has smelled and licked your nipple your baby will open the mouth and latch onto the nipple, then take a first sip. If you have full breasts or a powerful let-down reflex, you may consider expressing your milk (temporarily) before letting your baby latch onto your breast. This will ensue that your baby doesn't receive too much milk at once.

Non-nutritive sucking is seen in babies from 28 weeks old. Nasal ***CPAP (continuous positive airway pressure)*** is not a barrier for skin-to-skin contact to the nipple.

The first sip will, over time, be followed by a short burst of sucks. These bursts will become longer and longer so that your baby will drink more milk.

Some hospitals work with a so-called 'early feeding scale'. This is a list of scores showing whether your baby is ready to learn to drink. In other hospitals a specialist will come by to see whether your baby is ready to take a first sip. It is important to remember that your child sets the pace. This means that your child will show you when it is time for the next step.

Sometimes a preterm baby temporarily needs extra help to learn how to breastfeed, for example, by means of a nipple shield. You can also learn some methods that will get your milk to flow a little more easily. Your nurse or lactation specialist can help you with this.

As long as your baby is not yet able to take a complete feed from the breast, the feed will be supplemented so that your baby can grow sufficiently. Your baby might still have a nasogastric tube, allowing the rest of the milk to be administered through the tube.

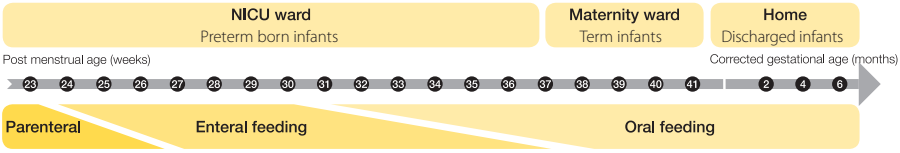
When your baby reaches the original due date you will notice that your little one will drink more strongly from the breast and will start to take an entire feed. The average age for a baby being fully breastfed is 36 weeks of gestation, but remember that every baby is unique and different and that it may take a couple of weeks longer, depending on your baby's condition.

## Progression of feeding stages

Feeds for preterm babies go through different stages that may overlap. Each baby's feeding experience will be different.

- **Parenteral feeding:**
  Some or all nutrition is provided through an intravenous catheter.
- **Tube (enteral) feeding:**
  The baby is fed by a small tube through the nose or mouth directly to the baby's gut.
- **Oral feeding:**
  When the baby is able to suck and swallow, the baby can be fed at the breast or milk/formula can be offered in a cup or bottle.

This figure shows the general progression of the feeding stages:



## Alternative feeding methods

Your baby might want to feed when you are not at the hospital. In this case you can choose from several different feeding methods. Your baby can be fed via a tube, a cup, a finger-feeder or a bottle. Nurses or lactation specialists will also explain the different feeding methods and their benefits, so you and your baby's nurses can choose a method that best suits you and your baby. If your baby is not able to breastfeed exclusively when leaving the hospital, it is important to draw up a clear plan with your baby's nurses as to how you can work towards full breastfeeding at home, if this is what you plan. Pumping and breastfeeding can be learned. It is important that you receive all the support you need. Please don't hesitate to ask for help.

## How to prepare the milk (thawing/warming and fortification)

Breast milk that has been frozen can be thawed slowly in a refrigerator. After the milk has thawed it can be used for 24 hours. Breast milk that has been thawed should not be re-frozen. Breast milk can be warmed using specially designed bottle-warmers. It is important to warm the milk at a low temperature in order to avoid damaging the active ingredients in the milk, as these ingredients prevent your baby from catching infections. Avoid the use of warm water baths to warm your milk: this can cause contamination from bacteria that are present in the water. Never defrost or warm your milk in the microwave. The 'hot spots' in the microwave will destroy the breast milk's valuable biologically active ingredients. The care team can tell you all about their preferred methods of warming expressed breast milk.

Expressed breast milk that does not meet the high energy requirements of some babies that are born early may need to be fortified. The care team will add extra protein, energy, vitamins and minerals to the breast milk – 'breast milk fortification' – before the milk is given to the baby. The baby's doctor will decide and inform the parents whether the breast milk needs to be fortified.

## Nutrients, fortifiers and fortification

Preterm babies have increased needs when it comes to nutrition:

- Preterm babies did not receive the necessary time in the womb to grow and develop.
- Organs like the brain, lungs, intestines and kidneys are still developing and need extra energy.
- Growing bones need extra calcium and phosphorous as well as other minerals.
- Extra protein helps the developing brain and helps the baby to grow in length as well as weight.
- Proteins in breast milk are compatible with the baby's sensitive intestinal lining.
- Colostrum helps the intestines to mature.


**Fortifiers are usually needed for preterm babies:**

- Talk to your doctors and nurses about the need for fortifiers, your baby's growth and how long they might be used to cover your child's nutritional needs.

# Learning to breastfeed

*Frequently Asked Questions*

## Question: When a mum is learning to breastfeed her preterm baby, are there any special positions she can use?

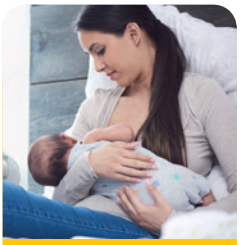
Answer: She can use whatever position is comfortable. However, it is important to be able sustain the position for quite a while, if necessary. For this reason there are special chairs for mums to relax in. One type is designed for the mum to lie a little flatter and give kangaroo care, and the other is more upright. When sitting upright , the feet must be placed flat on the floor and the back should be supported, bringing the baby to breast level.

New mums are often encouraged to use an underarm or 'rugby' hold as this provides a good view of the baby and both the mum and baby are well supported. Another popular and comfortable position, especially with mums of preterms or after a Cesarean section, is the laid-back breastfeeding position, also known as biological nurturing.

If a baby has a cleft lip or palate or is unable to create an adequate vacuum, then the dancer hold (named after the laktation experts Sarah Coulter Danner and Professor E. R. Cerutti) is excellent for supporting the baby's jaw and face.

Please keep in mind that there is no right or wrong way to feed your baby. However, many mothers find that certain breastfeeding positions and 'holds' can help them have a more comfortable and efficient nursing session. It is worth spending some time figuring out what works best for you and your baby. A midwife or lactation consultant can give advice and support.

**Here are three of the most common breastfeeding positions:**



*Craddle Hold*

*Cross-Craddle Hold*

*Clutch Hold*

**Here are some key points to ensure that the baby is in the optimum position for latching on:**

- Is the nose at the same level as the nipple?
- Is the head free to tilt?
- Are the ear, shoulder and hip in line?
- Is the baby close in to you and is the position sustainable?

If these are all OK, then you can bring the baby to the breast, leading with your baby's chin, with a wide open mouth and the tongue down. In a preterm baby the tongue often remains at the roof of the mouth, but by extending the head, the tongue will come down.

The nurse or lactation specialist always explains and teaches all these options, so you are able to make an informed choice.

## What about mums with twins?

Again, they can choose whatever position is comfortable. Mums of twins can learn how to breastfeed two babies at the same time, the so called 'tandem feeding', but this takes practice especially since twins don't usually develop at the same pace, so it might be difficult to coordinate tandem feeding. Tandem feeding two children of a different age, for example a toddler and a baby, can be challenging as well. A lactation specialist will help with this.

## How does a mum know whether she is doing it right?

When assessing a breastfeed it is helpful to check for the seven signs of a good breastfeed from the UNICEF Baby Friendly Hospital Initiative.

Wide open mouth, chin to breast and nose free, bottom lip turned out, more areola visible above than below, full rounded cheeks, slow rhythmical suckling and swallowing, and, of course, no sustained pain. It can be difficult for the mum to see all this, but she can listen for the swallowing after three to five sucks, which is a positive indication.

Over time, other signs of success will be steady weight gain and regular wet and dirty nappies.

It is important to have a feeding plan to assess when babies are able to sustain their own nutrition – this could include allowing no longer than four hours between feeds and weighing the baby before and after a breastfeed. The care team should ensure that the plan is individualised and fully explained to the mum.

## What are the main challenges for a mum breastfeeding a preterm baby?

The main challenges are maintaining lactation and managing one's own expectations but also from the partner, family and society as such. Early expression is important and the mum needs access to a hospital-grade pump if possible. She should also be shown how to hand express. A pumping log will help her and the nursing staff to keep track of her pumping regime. Every day, there will ideally be an increase in output and she needs to be encouraged along the way. Every bit of milk provided is "liquid gold"; every drop is important for her baby.

Providing she receives support in getting the baby positioned correctly at the breast and is using the correct size of breast shield, she is unlikely to encounter any problems such as sore or cracked nipples.

## Who else can support the mum when she is learning to breastfeed her preterm baby?

Family are so important and providing them with information to highlight the real advantages of breast milk can make a big difference to the mum. Other health care professionals can also support her. In particular, speech therapists and physiotherapists can provide exercises to encourage muscle development, which is important for the creation of a vacuum.

## Can babies with special needs such as Down's syndrome, a cleft lip or palate, or a heart defect still breastfeed?

Mums can certainly give them breast milk and should in fact be encouraged to do so. Babies with neurological difficulties may need extra support for breastfeeding, but this will be addressed by the lactation specialist. Breastfeeding a baby with special needs can help with the bonding process and at the same time provides the optimum feeding experience.

# Going home

*Professor Kerstin Hedberg Nyqvist*
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## When is your baby ready to go home?

Guidelines differ from hospital to hospital. It may be around the time your baby was due for term delivery, or some hospitals may practice 'early discharge' from about 34 weeks, with parents performing the baby's care activities at home with support from the unit. This may occur when your baby needs tube-feeding or phototherapy after discharge. The usual criteria for early discharge are that treatment of apnoea of prematurity has been discontinued, your baby continually gained weight, is not showing any signs of illness and maintains a normal temperature skin-to-skin or with clothes and bedding. Of course, it is also important that parents feel prepared to take over responsibility for their baby and that parents remain in supervised regular contact with the neonatal intensive care unit (NICU). Some NICUs offer home visits, while other units rely more on telephone contact or video communication with the parents. After having been discharged, babies participate in a follow-up programme. Some babies come home with additional oxygen or ventilator treatment, with family support provided by the hospital. Parents of preterm babies are usually taught to perform cardiopulmonary resuscitation just in case their baby stops breathing.

## How to take your baby home

Your baby should be taken home by car or taxi, in a baby car seat. You can buy special preterm baby car seats or inlays for car seats – you can ask the care team if you need any advice on this. It is important that the baby's head is in the right position so it is easy for the baby to breathe. The head must be supported on both sides and the torso must also be supported so that the baby does not end up slumped in the seat and can breathe well. Besides a safe car seat it is really important to keep an eye on your baby during the journey.

## What to expect when you get home

Your baby may still be preterm and need skin-to-skin contact as well as to sleep a lot. At first your baby may be sensitive to certain movements or sounds in their environment, especially during feeds. But as time goes by this will change. Your baby will have longer periods of alertness and may get bored just lying in the cot. Crying is not just a sign of hunger: by observing your baby's body language and facial expressions you'll be able to see when your baby is waking up and wants to interact and play with you, have the nappy changed or have a feed. Babies have a rich language for expressing different feelings and desires: for example, when they are interested in interaction, want to be entertained,

and want to be engaged in activities, when they are exhausted and need to rest, when they find the environment interesting and want to explore it or when they find the environment stressful and want some peace and quiet. Many babies like being carried in a sling; they can see what their mum or dad is doing and what is going on around them, indoors and outdoors. Now that your baby no longer necessarily needs skin-to-skin contact to stay warm, you can enjoy closeness and relax with your baby, reclining with your baby on top of you, fully clothed, in the kangaroo position.

## Feeding patterns

When babies reach term age (around 37 weeks) they begin to show clearer signs of hunger and wake up often enough to feed and receive sufficient nutrition. Preterm babies often prefer to drink little and often, but babies' feeding patterns vary considerably, depending on the individual baby. In the first weeks, average breastfeeding patterns, in term as well as preterm babies, generally range from about eight times per day or more. There may be periods during the day when the baby feeds several times per hour. Babies who are breastfed exclusively need to be fed during the night, too. Babies who are bottle-fed may also like to feed when they show signs of wanting to suck, not necessarily according to the clock.

## Taking your baby out and about

The kind of care your baby needs at home after discharge depends on your baby's current level of maturity and medical history. It is fine to take your baby out in a buggy when your little one is big or mature enough to maintain normal body temperature. But you need to be careful when the outdoor temperature is below freezing or when it is windy. In hot weather, make sure that the buggy stays in the shade.

Initially, preterm and sensitive babies should not be taken to crowded places such as department stores or open-access preschools, or taken on public transport. This is to avoid infections, especially at times of the year when there is a high incidence of colds. This is particularly important if there is a rotavirus or influenza epidemic. Also avoid going to 'open surgery' hours at your child health centre or doctor's surgery.

## How to prevent cot death (Sudden Infant Death Syndrome, SIDS)

At home you must always lie your baby on the back to sleep in order to prevent cot death. A baby sleeping bag in the appropriate size is also a must. An additional preventive measure

is to have your baby sleeping in your bedroom, preferably in a cot at arm's length from your bed – not in a separate room. Breastfed babies are at lower risk of SIDS.

Some parents like to have their baby in their bed (so called co-sleeping). If you wish to do so, it is imperative to take certain measures to prevent fatal accidents. You must for instance take precautions in order to prevent overheating or choking hazard. It is important that the bed is firm enough (i.e. no water bed or sofa), that there is free space around the baby, that the baby's head is aligned with your head and not covered and that the bedding is not too warm – this prevents overheating. Make sure your baby cannot fall out of the bed. Other people sharing the bed must be adults, non-smokers (they must not use any nicotine products at all), and should avoid taking any medications that can affect their consciousness. Moreover, they should not drink alcohol or take illicit drugs.

Additionally, pillows, quilts, comforters, sheepskins, stuffed toys, bumper pads, plastic sheets, plastic bags, strings, cords and ropes must be kept out of the baby's bed. Parents and all other caregivers should keep the home free of cigarette smoke. This includes the baby's sleeping area as well as any car used to transport the baby.


- Get a baby sleeping bag and get your baby acustomed to sleeping on the back in a sleeping bag before discharge.
- Practise using your baby's car seat before you take your baby home. Understanding how the car seat works will prevent and reduce stress on the day you go home.
- Have a conversation with the grandparents and other family members about preventing SIDS, how to put your baby to sleep and how to use the car seat. Ensuring that everyone is in agreement before your baby goes home will be helpful.
- Explain to family and friends that preterm babies are different to term-born babies. Make sure they understand that the rules for interacting with preterm babies are stricter: anyone handling your baby should wash their hands before touching the baby and refrain from smoking. Anyone who has a cold should avoid visiting the baby until they are well again.

# Further information and links

*This list offers an overview of information and services and does not claim to be complete*

## Breastfeeding and lactation

**Academy of Breastfeeding Medicine**
www.bfmed.org

**Cochrane Neonatal Review Group – CNRG**
www.neonatal.cochrane.org

**International Baby Food Action Network**
www.ibfan.org

**International Breastfeeding Journal**
www.internationalbreastfeedingjournal.com

**UNICEF**
www.unicef.org/programme/breastfeeding

**World Health Organisation**
www.who.int/topics/breastfeeding

## Australia

**Australian College of Midwives**
www.midwives.org.au

**Australian College of Neonatal Nurses**
www.acnn.org.au

**Lactation Consultants of Australia and New Zealand**
www.lcanz.org

**Perinatal Society of Australia and New Zealand**
www.psanz.com.au

**The Australian Breastfeeding Association**
www.breastfeeding.asn.au

## Canada

**Breastfeeding Canada**
http://breastfeedingcanada.ca

**Canadian Breastfeeding Foundation**
www.canadianbreastfeedingfoundation.org

## Ireland

**Association of Lactation Consultants in Ireland**
www.alcireland.ie

## New Zealand

**New Zealand Lactation Consultant Association**
www.nzlca.org.nz

## UK

**Association of Breastfeeding Mothers**
http://abm.me.uk

**Breastfeeding Network**
www.breastfeedingnetwork.org.uk

## USA

**Breastfeeding USA**
https://breastfeedingusa.org

**March of Dimes**
https://www.marchofdimes.org/baby/feeding-your-baby.aspx

**United States Breastfeeding Committee**
www.usbreastfeeding.org

**United States Lactation Consultant Association**
http://uslca.org

## Midwives

**European Midwives Association**
www.europeanmidwives.com

**International Confederation of Midwives - ICM**
www.internationalmidwives.org

## Preterm birth

**European Foundation for the Care of Newborn Infants**
www.efcni.org

In almost every country there are national and local organisations that support parents of preterm children.

## Parent organisations

### Africa

**African Foundation for Premature Babies & Neonatal Care (AFPNC)**
Contact: info@afpncvoice.org
Web: *www.afpncvoice.org*

### Australia

**Austprem**
Contact: austprem@austprem.org.au
Web: *www.austprem.org.au*

**Life's Little Treasures Foundation**
Contact: contact_us@lifeslittletreasures.org.au
Web: *www.lifeslittletreasures.org.au*

**L'il Aussie Prems Foundation**
Contact: contactus@lilaussieprems.com.au
Web: *www.lilaussieprems.com.au*

**Miracle Babies Foundation**
Contact: info@miraclebabies.org.au
Web: *www.miraclebabies.org.au*

## Canada

**Canadian Premature Babies Foundation**
**Fondation Bébés Prématurés Canadiens**
Contact: katharina.staub@bluewin.ch
Web: *www.cpbf-fbpc.org*

**Multiple Births Canada / Preterm Birth Network**
Contact: pretermbirth@multiplebirthscanada.org
Web: *http://multiplebirthscanada.org*

## Ireland

**Irish Neonatal Health Alliance (INHA)**
Contact: info@inha.ie
Web: *www.inha.ie*

**Irish Premature Babies**
Contact: info@irishprematurebabies.com
Web: *www.irishprematurebabies.com*

## New Zealand

**The Neonatal Trust**
Contact: contactus@neonataltrust.org.nz
Web: *www.neonataltrust.org.nz*

## UK

**Tiny Life**
Contact: info@tinylife.org.uk
Web: *http://tinylife.org.uk/*

**Tommy's**
Contact: mailbox@tommys.org
Web: *www.tommys.org*

## USA

**National Perinatal Association**
Contact: klove@nationalperinatal.org
Web: *www.nationalperinatal.org*

**NICU Parent Network**
Contact: connect@nicuparentnetwork.org
Web: *www.nicuparentnetwork.org*

Thank you!

AGG
Arbeitsgemeinschaft für Geburtshilfe und Pränatalmedizin in der DGGG e.V.

International Association of Infant Massage
IAIM

BabyCare

Berufsverband
KINDER KRANKEN PFLEGE
Österreich

B.F.G.

BUNTER KREIS
BUNDESVERBAND

bvkj.
Berufsverband der
Kinder- und Jugendärzte e.V.

KINDER IN BEST HÄNDEN
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BeKD e.V.

CANADIAN ASSOCIATION OF
NeonatalNurses

COINN
Council of International Neonatal Nurses

DGBM e.V.
Berührung mit Respekt

Deutsche Gesellschaft für
Gynäkologie und Geburtshilfe e.V.

DEUTSCHE GESELLSCHAFT
FÜR PERINATALE MEDIZIN

DGPGM
Deutsche Gesellschaft für Pränatal- und Geburtsmedizin

DSKN
Deutsche Stiftung
Kranke Neugeborene

Erich Saling-Institut für Perinatale Medizin e.V.

European Society
for Paediatric Research

EUROPEAN ASSOCIATION OF
PERINATAL MEDICINE

European Board & College of Obstetrics and Gynaecology

GNPI

HARLEKIN
Hart & Kin-Nachsorge in Bayern

iHAN

FACULTY OF
PAEDIATRICS
ROYAL COLLEGE OF
PHYSICIANS OF IRELAND

NEONATAL
NURSES
ASSOCIATION

ÖGKJ
ÖSTERREICHISCHE GESELLSCHAFT
FÜR KINDER- UND JUGENDHEILKUNDE

ÖSTERREICHISCHES
HEBAMMENGREMIUM

SAFE®

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Förderung von Vorsorge und Früherkennung

UENPS
Union of European
Neonatal & Perinatal
Societies

# The editors

***Professor Mary Fewtrell*** is trained in paediatrics and has worked in infant and child nutrition research for the past 22 years. She is currently Professor of Paediatric Nutrition and Honorary Consultant Paediatrician at UCL Institute of Child Health, London, UK and Chair of the ESPGHAN Nutrition Committee. Her research interests include the programming of health outcomes by early nutrition and also practical aspects of infant nutrition.

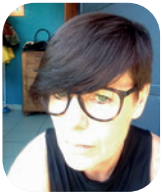
***Thomas Kühn*** studied medicine and was trained in paediatrics and neonatology at the Humboldt-University and the Free University Berlin. He is also a Certified Lactation Consultant (IBCLC). Since 1991 Kühn has worked as a neonatologist at the "VIVANTES Department of Paediatrics Berlin-Neukölln", and holds the position of Assistant Medical Director at the Centre for Perinatology. In 2006, Kühn became CEO of the "NEOTRAINER" teaching and consulting company www.neotrainer.de

***Silke Mader*** is the Chairwoman of the Executive Board and co-founder of EFCNI. She chaired the German national association for preterm babies for many years. Silke Mader is a mother of preterm twins, born in the 25th week of pregnancy, one of whom died. She is co-editor of several prestigious scientific and political publications on maternal and paediatric health and preterm birth. Silke Mader was awarded the "Prix Courage" and is a laureate of the Medal for Particular Services to Bavaria in a United Europe and the Bavarian State Medal for Services concerning Health and Long-term Care. She is Honorary Lecturer at the School of Nursing and Midwifery, Queen's University Belfast, Northern Ireland. Silke Mader is an Ashoka Fellow since 2015.

***Nicole Thiele*** is Vice Chair of the Executive Board at EFCNI. After many years in various international organisations, she has been active since 2010 in promoting preventive action, treatment and care of neonates and effective follow-up and continuing care with EFCNI. Nicole Thiele is a Fellow of the European Patients' Academy (EUPATI), has a diploma as European Secretary/ESA and holds a university degree in Economics, Management and Business Administration. She is (Co-)Author of several scientific and political publications. Her commitment comes from her family experiencing the consequences of an extremely preterm birth nearly 50 years ago, in the early days of modern neonatology.

# The authors

*Willemijn Corpeleijn* (M.D.) was involved in the foundation of the first human milk bank in the Netherlands. Furthermore, she is doing scientific research on the effects of donor milk in premature infants. Recently she has started working as a resident in the paediatric unit at the Academic Medical Centre Amsterdam.



*Delphine Druart* started working as a registered paediatric nurse at the neonatal centre of Saint-Pierre University Hospital in Brussels after graduating from nursing school at the University of Brussels in 1992. She gained her NIDCAP professional degree in 2003 and her certificate as NIDCAP trainer in 2007. In the last 4 years, she has been working for the Belgian health authorities to promote developmental care at a national level. Actually, she works as developmental specialist in the NICU at the St Pierre University hospital in Brussels and for the Brussels NIDCAP training centre.

*Professor Hans van Goudoever* is professor of Paediatrics at the University of Amsterdam and chairman of the Department of Paediatrics of the Emma Children's Hospital, UMC and VU University Medical Center in Amsterdam, The Netherlands. From 1998 until 2000 he held a post-doctorate position at the laboratory of the late Peter Reeds, Baylor College of Medicine, Children's Nutrition Research Center, Houston, Texas. He served as Head of Neonatology at Sophia Children's Hospital, Erasmus MC, Rotterdam, before moving to Amsterdam in 2010. He was a board member of the International Paediatric Research Foundation, council member of ESPR and ESPGHAN and chairman of the ESPHGAN Committee on Nutrition.

He has a particular interest in neonatal nutrition, gastro-enterology, and metabolism. He published over 300 peer reviewed papers and received many grants, both national and international (including FP-7 EU funding). In 2011, he founded the Dutch Human Milk Bank.

*Frédérique Haacker-Beukhof* is a paediatric, intensive care neonatology nurse and lactation consultant (IBCLC). She has worked on a level III NICU in Amsterdam, the Netherlands for many years. In 2016 she started her own company combining the care for parents and their excessively crying babies and mother-child dyads who are experiencing breastfeeding challenges. She is also a trained baby consultant and lecturer for both professionals and parents on a wide variety of newborn related topics. She still works in a peripheral hospital as a clinical lactation consultant.

*Stefanie Kouwenhoven* works as a dietician and researcher at the Department of Paediatrics of the VU University Medical Centre in Amsterdam, the Netherlands. She is involved in the Dutch Human Milk Bank and related clinical studies. In 2013 she started a PhD. She is particularly interested in the effect of early nutrition on body composition, metabolic syndrome and the risk of becoming overweight in later life.

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*Silke Krüger* graduated from high school in 2003 and started an apprenticeship as a travel agent at a major tour operator. Since 2008 she had been working as an assistant to the management of a major IT company. She is currently on maternity leave. Silke Krüger is also a mother of a preterm baby, born at 25 weeks.

*Dr Skadi Springer* is trained in paediatrics and neonatology. She worked as a neonatologist and was chair of the milk bank at the University Hospital Leipzig, Germany. Since 2004 she has been working in her own paediatric office in Leipzig, Germany with a focus on neonatology and lactation counselling. She is also a Certified Lactation Consultant (IBCLC) and member of several national and international societies, such as the National Breastfeeding Committee, the Academy of Breastfeeding Medicine and the European Milk Bank Association.

*Dr Marie Tackoen* graduated in medicine in 1999 and was trained in paediatrics in 2004 at the Free University of Brussels. Two years of her research focused on the immunity of the foetus and the newborn infant, conducted at the Institute of Medical Immunology at Gosselies. She is now head of the Department of Neonatology at the University Hospital Centre Saint-Pierre.

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**About EFCNI**

The European Foundation for the Care of Newborn Infants (EFCNI) is the first pan-European organisation and network to represent the interests of preterm and newborn infants and their families. It brings together parents, healthcare experts from different disciplines, and scientists with the common goal of improving long-term health of preterm and newborn children by ensuring the best possible prevention, treatment, care, and support.

For more information, visit us at: **www.efcni.org**

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