
JOURNAL FOR NICU & MATERNITY CARE
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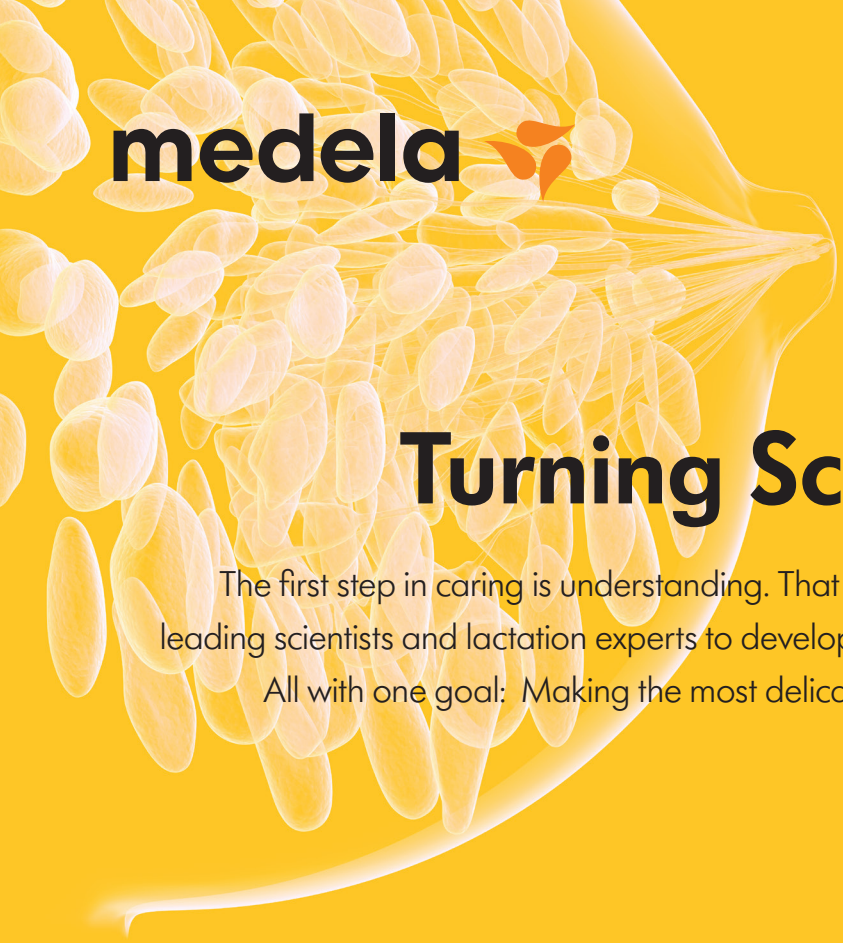
medela
Turning Science into Care



Turning Science into care

The first step in caring is understanding. That is why we believe in close collaborations with leading scientists and lactation experts to develop products that go beyond form and function. All with one goal: Making the most delicate form of care simple, intuitive, and effective.

We understand the needs of new parents and the professionals who dedicate themselves to their care. In fact, we have been caring for moms, babies, patients and healthcare professionals for so long, we've turned it into a science.

Medela is deeply committed to research and continuously invests in basic and exploratory studies to improve health outcomes. Since 1961, we have partnered with healthcare professionals and renowned human milk experts from around the world to advance research and develop evidence-based practices. This investment has not only set industry standards, but also forms the scientific foundation for product innovation and clinical practice.

One of Medela's cornerstone collaborations is with The University of Western Australia (UWA), established in 1996. This partnership has yielded groundbreaking discoveries in mammary gland function, milk synthesis, and removal. Today, Professor Donna Geddes leads the Medela-UWA research collaboration, a comprehensive research program exploring the intricate aspects of breastfeeding, human lactation, and infant feeding. Our engagement with clinicians and parents in the NICU allows us to identify gaps in care, and by hearing directly from healthcare professionals about their equipment needs, we ensure they can focus on delivering exceptional patient care.

It is with these deep insights that we continue to innovate products to nurture and improve health outcomes. By analyzing the lactating breast and infant suckling, for instance, we developed our patented 2-Phase Expression® Technology which mimics a baby's natural nursing rhythm to build and maintain breast milk supply, and we formulated the Symphony PLUS® Breast Pump with the unique Initiation Technology® to activate and increase milk supply. Using 3D scans from thousands of lactating breasts, we found the optimal opening angle for our breast shields and developed our anatomically-shaped hands-free cups to increase comfort and milk removal. We want to innovate solutions, not just products. Turning science into simple, intuitive, and effective care to heal, nurture health, and build bonds.

"Through advancing research, observing natural behavior and ' listening to our customers, we turn science into care, nurturing health for generations."

Michael Larsson, Chairman

Content

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Lactation support is a *medical*

With her ground-breaking new insights about milk biomarkers, Dr. Rebecca Hoban makes an engaging case for a more proactive approach in lactation support.

Dr. Rebecca Hoban is a Staff Neonatologist and Director of Breastfeeding Medicine at the University of Washington/Seattle Children's Hospital in Seattle, USA and an Associate Professor of Paediatrics at the University of Washington. Her current projects include improving mother's milk provision in the NICU and milk biomarkers to predict lactation success.

Why is it so important to diagnose lactation difficulties early on?

What we saw in our studies at Rush University Medical Center was that most mothers of very low birth weight babies met their lactation goals initially and provided milk for the first days, but then rates just plummeted in the next weeks to months. We know that mothers of these very premature babies have many risk factors for lactation, starting from not being able to complete the pregnancy so their breasts are not fully developed yet. They might deliver by C-section and themselves have pre-existing health conditions, which is why they are delivering early in the first place. They have also not had the chance to learn about lactation and make an informed decision. All of these things directly impact lactation outcomes. The lactation problems that make human milk feeding rates drop at six months do not happen at six months. Rather something is happening during the first days that is setting these mums up to not meet their lactation goals. So diagnosing lactation difficulties early on can guide early intervention during that very time-limited window to impact long-term lactation; this important phase of "breast programming".

How can we diagnose these challenges for lactation early?

Currently we have very few options to diagnose pump-dependent mothers who struggle. Our recognition of low volumes is only retrospective and by that time milk volumes have already failed to increase. Traditionally we ask mums "Has your milk come in? Do you feel a change in your breasts?". This is a problematic measure though because obese mums, for instance, may be less likely to experience this feeling. So it is not a very good marker as far as secretory activation goes. You might argue that you can instead rely on early pumped volume – track the volumes of pumped milk or do infant test weights – but this is also problematic because it does not actually measure what is happening in the breast. If there is too little milk – is it because Mum is not extracting enough or because she is not making enough? We simply cannot tell. I have been focusing on human milk biomarkers as a direct measure of what is happening in the breast in real time.

Please tell us more about how this biomarker driven approach works.

When we are looking at biomarkers, we are actually measuring the closure of the tight junctions in the mammary epithelium. Once the inhibition of progesterone is removed, it is prolactin that catalyzes the closure of these tight junctions. This closure prevents milk components from leaking out of the gland and is the crucial first step for long-term lactation. Sodium is a key biomarker here. As the tight junctions close, milk sodium plummets really quickly and milk volumes go up. Our studies have clearly shown how milk sodium immediately increases when the number of daily pumping sessions decreases – and already by the next day, milk volumes drop. Moreover, we found

emergency!

Many mothers have multiple risk factors for lactation, which all then interact, resulting in a population that is going to be challenged from the beginning.

"We need personalized, data-driven, real-time lactation care that can predict concerns even before they become obvious.

Biomarkers can give us this window to the future and help us identify who needs support very early on."

that by measuring milk sodium levels, we could already tell within three days post-partum, who was going to come to volume (produce >500 ml daily by two weeks)! And a previous study of ours has shown that coming to volume by two weeks is the strongest predictor of own mother's milk feeding at NICU discharge. So by day 3 we have a window into the future of who is going to be providing milk months later! And this means we have an opportunity to proactively intervene!

Wow, this sounds like the future of lactation!

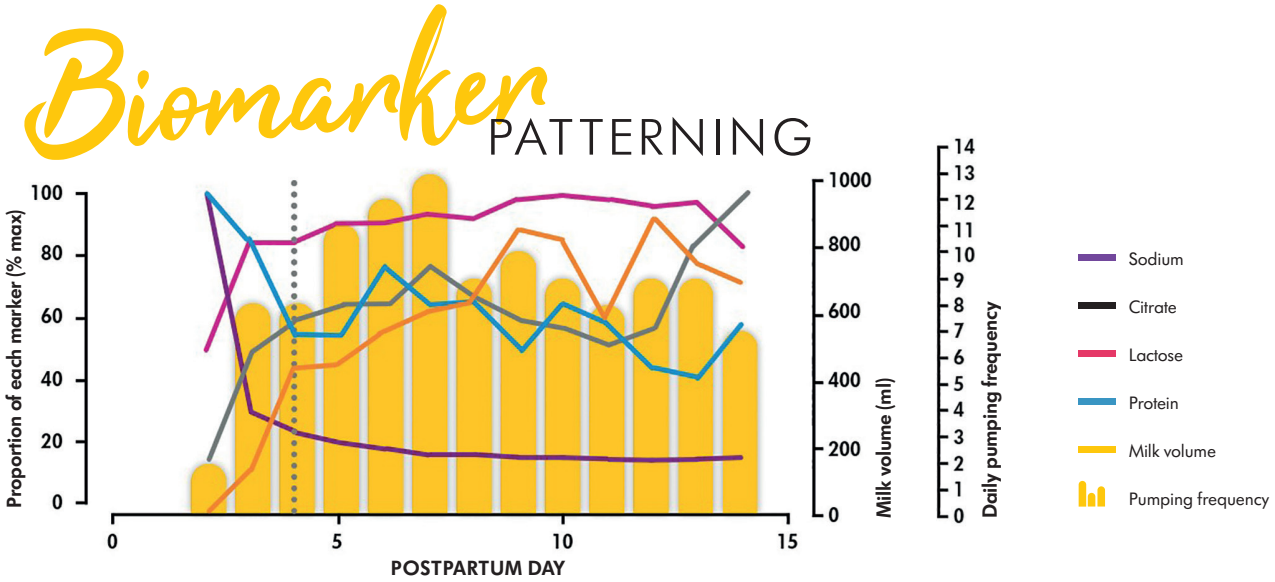
It could be. We currently have funding from the Canadian government to look further into this with a pilot. Measuring sodium levels is so easy, Mum can do it herself and it could have such a big impact. We need personalized, data-driven, real-time lactation care that can predict concerns even before they become obvious. This way clinicians could intervene immediately when there is still the potential to safeguard a mum's lactation journey. We could give individualized "pumping prescriptions", so to speak. More frequent pumping in those critical first days is most likely to boost prolactin, achieve effective initiation and normalize the biomarkers. Based on one human milk biomarker, sodium, this timely intervention could be possible!

In your experience, which other factors can influence coming to volume?

You need both stimulation and milk removal for coming to volume. Prolactin is a very critical player here. It catalyses the important closure of the tight junctions and it also upregulates genes that help mothers make more milk-making cells and also prevents the death of these.

So how do we make more prolactin?

Prolactin is released with suckling or suction and it is released much more in the first few weeks of lactation than it is months later. So frequent and effective pumping from the start is really critical for pump-dependent mothers. Yet there are still hospitals today advising mums to hand express in the first three days instead of pumping with a double electric pump – and this drives me crazy because we have the data to prove that pumping is so much more effective! In a study by Lussier and collaborators published in 2015[1], mothers of very low birth weight infants were randomized to an electric pump or hand expression in the first week. The mothers that were given the pump made twice as much milk in the first week! Even after the first week, when the mothers who were told to hand express first were also given a pump, they never caught up. Even at one month those mothers were making significantly less milk than the mums who started off with pumping. They missed that critical window for breast programming and this is a time we can never get back.



First day with normal sodium, citrate, protein and lactose

Hoban R et al. Breastfeed Med. 2018; 13(5):352–360.

COMPARING THE EFFECTIVE INFANT FEED TO *Expression Methods*

	Vacuum	Tactile compression	Colostrum collection	Effectively activate milk-making cells	Reduced risk of delayed secretory activation
	✓	✓	✓	✓	✓
	✓	✗	✓*	✓	✓
	✗	✓	✓	✗	✗

*Tiny volumes of colostrum are sometimes difficult to recover, which can lead to wastage

You use the term "breast programming". What do you mean exactly?

It is important that we, as well as the families, are aware that our goal in these first days and weeks is not to make milk for the newborn at that particular time. Our goal is to have enough milk later on, when they are four months or six months old. Preterm infants eat almost nothing in the first days depending on how sick they are, so you have to be very careful with the question "Is there enough milk?" The baby might only be eating 8 ml a day – but that does not mean the mother is making enough milk to secure long-term lactation and have enough milk when that 500 g baby is 4 kg. The preterm baby will eventually need as much milk as a term baby and we have to make sure this milk supply is available when that day comes. This is why all mothers have to program their breasts regardless of the newborn's current intake. So the question " Is there enough milk?" is not the right question to ask. The question we should be asking is: "Has the mother come to volume?" To do this, pumping often, even at night, is just as critical as pumping early.

What is your recommendation to wards?

We need to really stress the importance of early, frequent and effective breast stimulation in mothers with preterm infants. We know these mums need to start pumping with a double electric pump with Initiation technology within the first six hours of delivery. And this does not happen magically, we need to start these conversations before delivery! Ideally mums should be pumping at least eight times a day as well as having skin-to-skin contact with their babies. As far as this window of the first six hours goes, there is a very good study by Leslie Parker[2] that randomized mothers to start either within these first six hours or after and the group that started pumping within

Mothers need to know: They are not pumping to make a lot of milk in the here and now. They are doing it to program the breast so they have enough supply later.

1 Lussier MM et al. Daily breastmilk volume in mothers of very low birth weight neonates: a repeated-measures randomized trial of hand expression versus electric breast pump expression. Breastfeed Med. 2015; 10(6):312–317. **2** Parker LA et al. Association of timing of initiation of breastmilk expression on milk volume and timing of lactogenesis stage II among mothers of very low-birth-weight infants. Breastfeed Med. 2015; 10(2):84–91. **3** Parker LA et al. Timing of milk expression following delivery in mothers delivering preterm very low birth weight infants: A randomized trial. J Perinatol. 2020; 40(8):1236-1245. **4** Mercado K et al. What Is the Impact of NICU-Dedicated Lactation Consultants? An Evidence-Based Practice Brief. Adv Neonatal Care. 2019; 19(5):383–393.

the 6-hour-window made twice as much milk during the first week compared to those starting later. That is the difference of an exclusive mother's milk diet or not in some cases! Interestingly, pump-dependent mothers who started a bit later within that 6-hour time frame actually made more milk in the first three days and at six weeks than those who started within the first hour.[3] The study came to the conclusion that the stress of pumping as soon as possible might backfire and that allowing mothers some hours to recover actually led to them pumping more frequently in the first days and allowed them to make more milk.[3]

HOW CAN WE ACHIEVE EFFECTIVE MILK REMOVAL?

The term infant's suckling is the gold standard: It should have good suction, there is some compression involved and these together release prolactin and oxytocin. The electric pump provides suction but no compression – while hand expression compresses but does not suck. So it is only the pump that releases prolactin. And if you remember the benefits of prolactin I mentioned earlier, it is critical for the feedback loop of making more milk. So if you don´t have a baby that is adequately latching and removing milk and you don't use a pump, you will simply not be able to establish a good enough milk supply. A double electric, hospital-grade pump with Initiation technology should be the standard of care for mothers who are pump dependent for their lactation initiation. – And, by the way, that also includes mothers of moderately or late preterm babies or even early term babies or infants of diabetic mothers who cannot sufficiently remove milk. We have to make sure they pump after the baby has been at the breast to fully support breast programming. Hand expression is simply not enough to establish lactation and it should never be used alone in at-risk or pump-dependent mothers.

HOW CAN WE MAKE SURE MOTHERS GET ALL THIS INFORMATION?

In our NICU we have a very proactive approach: The goal is for all mothers to see a lactation consultant within 24 hours of birth. There are studies, as the one by Mercado and collaborators,[4] showing just how beneficial this can be: When lactation consultants are involved, higher proportions of NICU babies will be fed milk of their own mother and those feeding rates at discharge are a lot higher. We also emphasize a lot of bedside nursing education. The bedside nurses see families throughout the day so they are a really critical form of communication. We also give all mothers a quick checklist and a colostrum kit when we first pick up the newborns. This way we make sure Mum has the first important instructions right away. It is so important that we share the science! We need proactive lactation support! We need a sense of urgency! We need to educate nurses, we need to educate our fellow physicians, we need to educate parents, so families can choose and meet their lactation goals – rather than their milk supply choosing for them.

If someone was to create a pill tomorrow that could protect against NEC, diabetes, allergies, cancer and so much more, people would probably pay a billion dollars to get it. But we have it already! It is called mother´s milk! It is magical medicine and we need to make sure every baby can get it.

DR. REBECCA HOBAN RECOMMENDS

Pump up the volume!

CHECKLIST FOR MOTHERS

- ✔ Start pumping within 6 hours of delivery with a (hospital grade) double electric pump with Initiation technology
- ✔ Rent or purchase a double electric pump for home use
- ✔ Pump every 2-3 hours - at least 8x daily
- ✔ Wake at least once at night to pump
- ✔ Ask to speak to the lactation consultant in the post-partum ward ASAP
- ✔ Don´t worry if you don´t get anything, or only drops when you pump – this is normal, keep going!
- ✔ When you get to the NICU, speak to your baby´s nurse or a lactation consultant

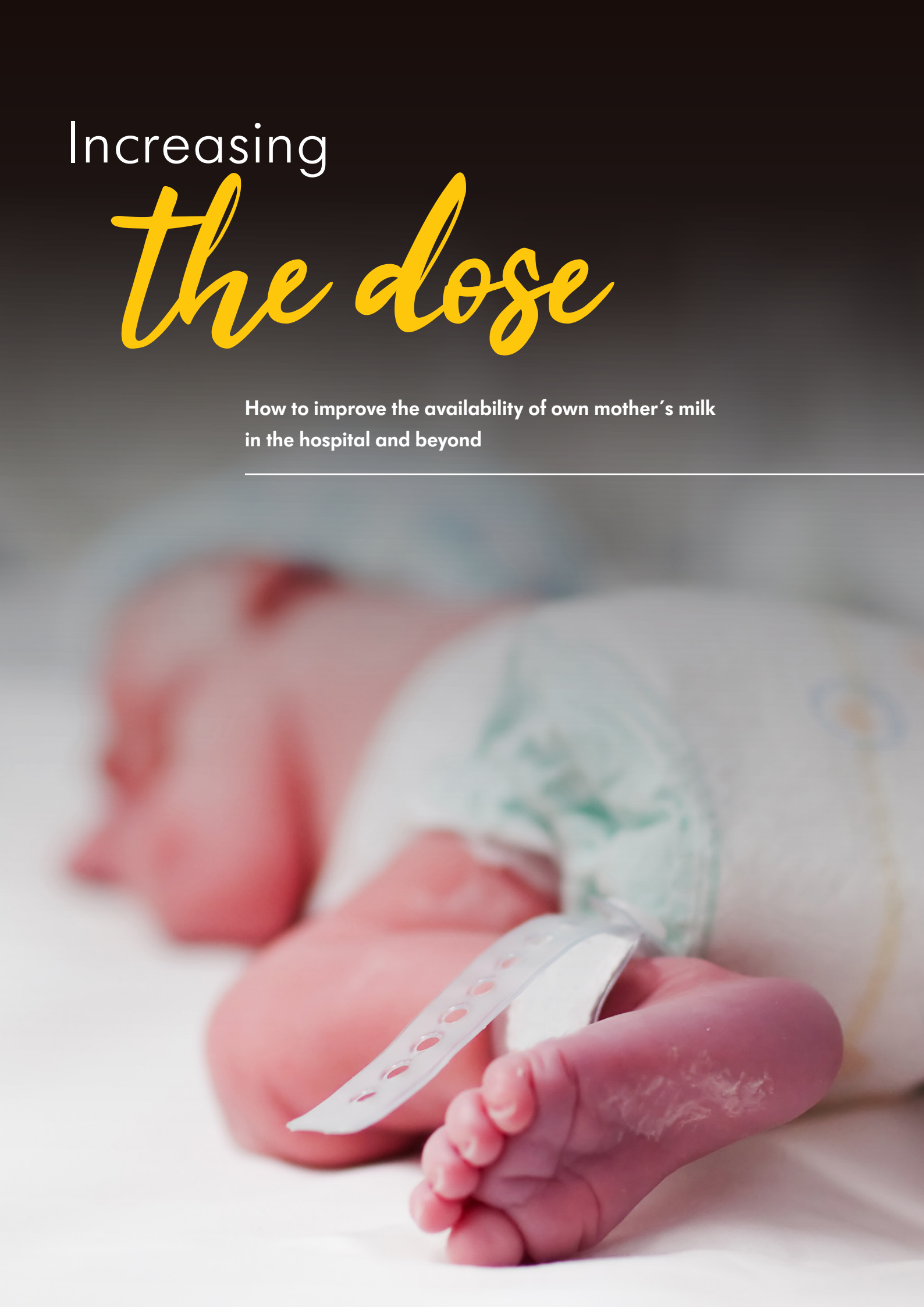
Share the science!

CHECKLIST FOR HEALTH CARE PROVIDERS

- ✔ Early (if possible, prenatal) counseling of families on the importance of milk of the own mother and early skin-to-skin contact.
- ✔ Early, frequent, effective expression with a (hospital-grade) double electric pump with Initiation technology. Hand expression alone should not be used routinely during the critical window of lactation initiation with pump dependency
- ✔ Proactive lactation support.
  1. Practical education of what is normal; lactation consults should be standard
  2. Close monitoring of pumping + daily volumes in first 2 weeks
  3. Consider checking biomarkers (milk sodium levels) as a means to diagnose and guide lactation challenges

Increasing *the dose*

How to improve the availability of own mother´s milk in the hospital and beyond



High dose and long exposure to own mother's milk significantly impacts the subsequent health outcomes of infants.[1,2] This is especially true for children born prematurely and/or with health issues – yet often timely availability of that healthy dose of liquid gold is not a given. The good news: Research shows that standardised interventions and implementation of evidence-based care make all the difference here and lead to optimal results.
6 indicators to take into account to get the mother's lactation – and the provision of own mother's milk to the infant – right from the start.

I INFORMED DECISION

Supporting the feeding of their vulnerable infant with own mother's milk (OMM) is a decision, parents must consciously make. However, an informed decision can only be made when mothers and families have access to standardised, reliable information to guide their choices. Parents should therefore be provided with consistent, evidence-based information around lactation and infant feeding from as early as possible. When mothers are informed and understand that their milk is an essential medical intervention, that no one else can provide to their infant, they almost always decide to express milk. In addition, mothers consistently report stronger commitment if they understand the evidence-based value of their milk.[3-8]

NICU families in particular often experience a state of shock, despair and helplessness. Discussions with medical staff regarding the critical value of OMM can change their outlook to one of hope and a new sense of purpose. In a study at Rush University Medical Center in the US, after being guided through the information, 98% of mothers chose to pump – although 50% had intended to feed formula before.[3] Most recently, Prof. Sven Wellmann at KUNO Klinik St. Hedwig, Krankenhaus Barmherzige Brüder in Regensburg /Germany, found equally impressive results in a similar study (see page 12/13).

GET IT **RIGHT**

- ✔ **Provide parents with early information** on the importance and benefits of OMM.
- ✔ **Educate all professionals and make sure communication is consistent** across all departments to avoid confusion.

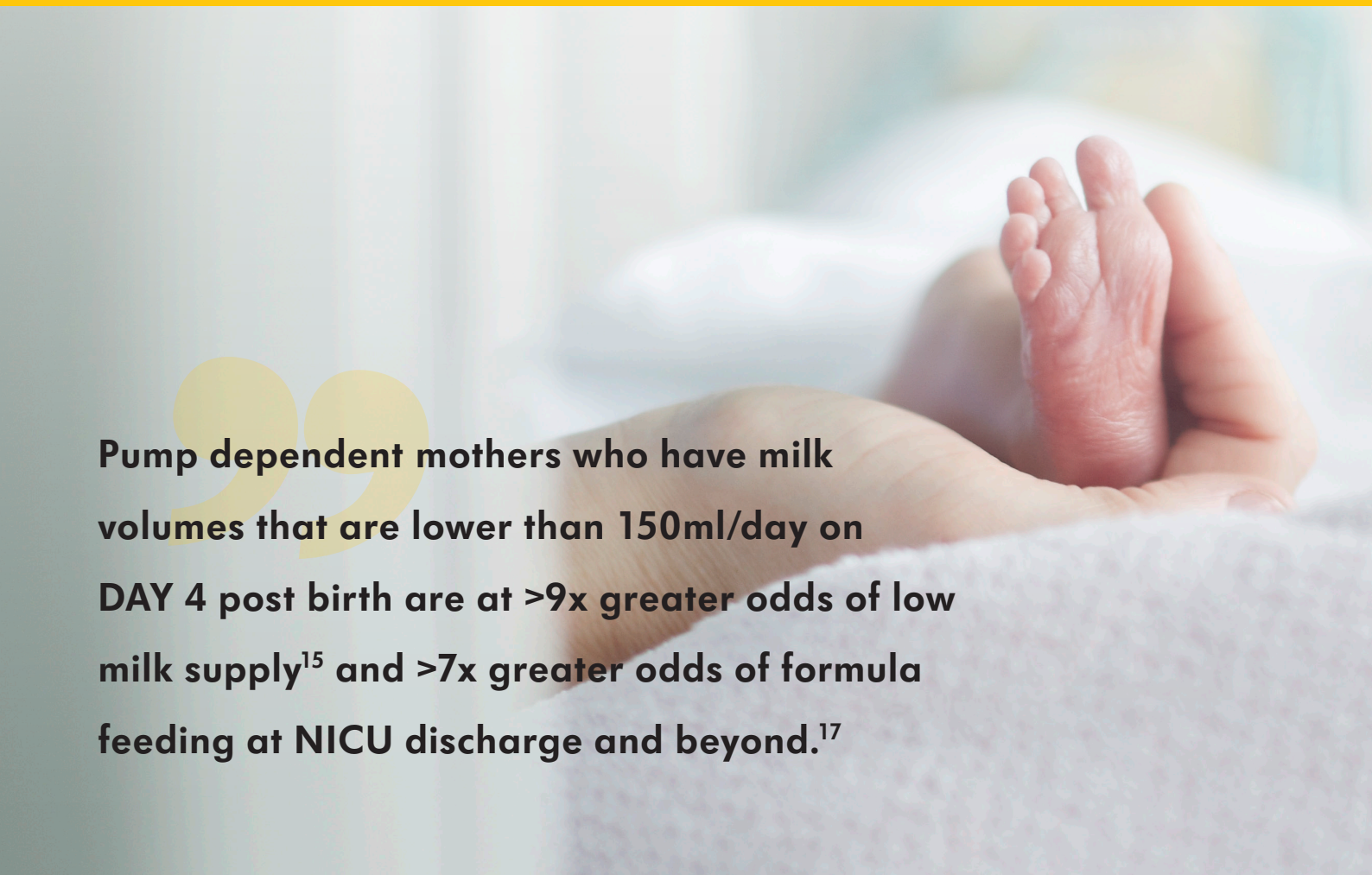
II TIME TO FIRST EXPRESSION

Early breast stimulation is proven to have a positive impact on future milk supply and subsequent feeding outcomes. According to WHO guidelines, skin-to-skin and breastfeeding should happen within the first hour of birth.[9] If breastfeeding is not (yet) possible or effective, the breast should be stimulated by double pumping with an electric pump, ideally within the first three hours of birth, no later than six hours.This timely activation of a mother's milk supply is critical, as it is a one-time event that is either achieved to its full potential – or not. Without appropriate – proactive! – lactation support, mothers of vulnerable infants who cannot yet stimulate the breast effectively, are at high risk for delayed secretory activation (milk 'coming in') and sub-optimal milk production. On the other hand, mothers who cannot breastfeed but use a double electric pump for stimulation and pump early are more likely to continue pumping at six weeks – and they are more likely to still be breastfeeding/expressing at discharge.[4,10-14]

In short:
The early initiation of pumping means more OMM for infants in the long-term.

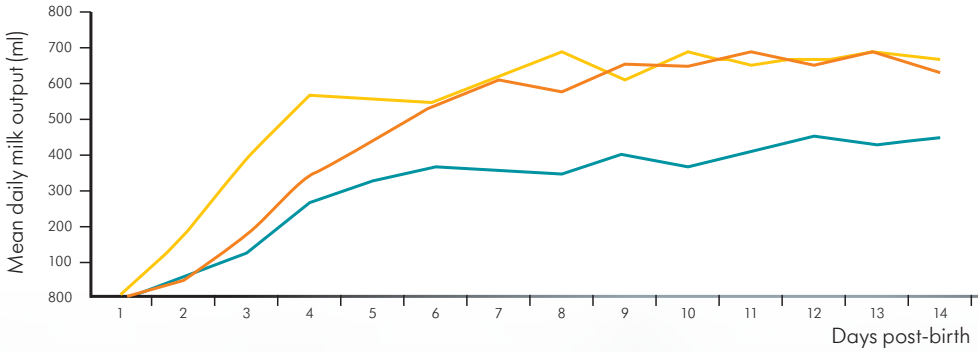
GET IT **RIGHT**

- ✔ **Facilitate early double expression (ideally still in the delivery suite!)** with a double electric hospital pump with initiation technology.
- ✔ **Help the mother find the right breast shield size** and assemble her pump sets.
- ✔ **Assist her** with her first expressions.
  For support you can access step-by-step instructions in several languages via the Medela Symphony Hub at medela.com/symphony-hub
- ✔ **Make sure to set appropriate expectations** and check in with her regularly.



Pump dependent mothers who have milk volumes that are lower than 150ml/day on DAY 4 post birth are at >9x greater odds of low milk supply[15] and >7x greater odds of formula feeding at NICU discharge and beyond.[17]

The impact of Symphony's INITIATE program



Neville MC et al. Am J Clin Nutr. 1988; 48(6):1375–1386
Meier PP et al. J Perinatol. 2012; 32(2):103–110

III FREQUENT EXPRESSION

Frequent expression is of great importance during the first 14 days after birth to initiate and build adequate milk volumes for future milk supply. The hormonal changes after birth play a crucial role: In the first days after birth, the fall in progesterone and the rise in prolactin as well as breast stimulation are the physiological triggers for the onset of significant milk production (milk 'coming in') between 24 and 72 hours. When the infant is not able to breastfeed, mothers should be supported to express at least eight or more times in 24 hours, including once during the night to make use of the additional increase in prolactin secretion during that time.[10] When milk is removed frequently, the breasts are drained effectively to build an adequate milk supply by day 14. In turn, if milk removal is infrequent in this early post-birth period, a delay in the onset of milk coming in can occur and milk volumes are highly likely to remain permanently lower than required.[15,16]

GET IT **RIGHT**

- ✔ **Make sure the mother has access** to a pump and accessories whenever she needs them.
- ✔ **Provide mothers with a pumping log** to track daily sessions and milk volumes.
- ✔ **Provide clear guidance.** Specify at least one pump session between 00:00 and 07:00 a.m. (no break longer than five hours!)

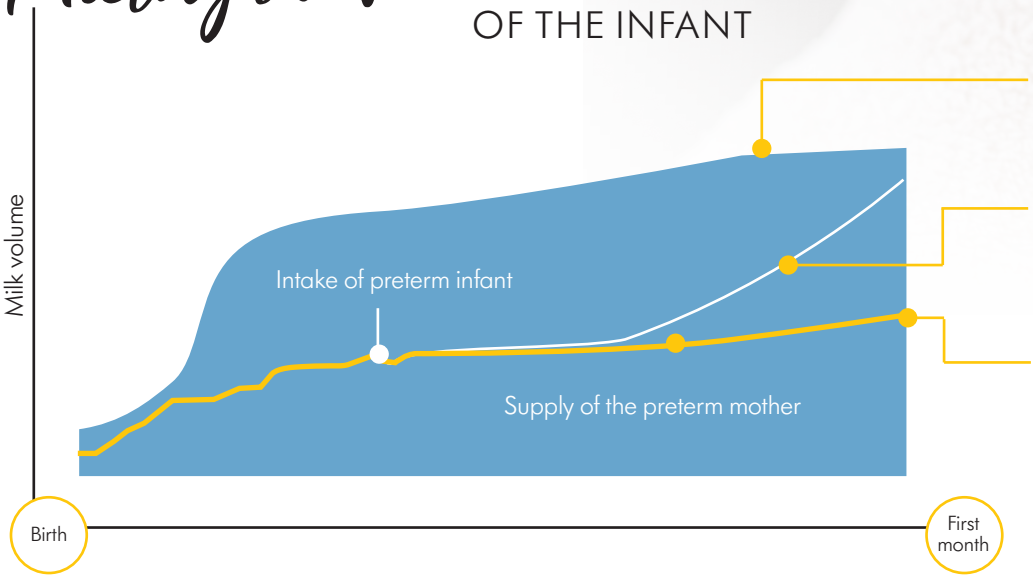
IV TIME TO MILK COMING IN

As stated before, any delay in milk coming in is linked to risks of low milk volumes and a shortened duration of lactation.[18,19] Milk coming in normally occurs between 24 - 72 hours after birth.[20] Subjectively, mothers report this event with a feeling of breast fullness, tender breasts and emotional tearfulness. Objectively, in pump-dependent mothers, this is the time they first achieve a total expressed volume of ≥ 20 ml in one pumping session. Milk coming in beyond 72 hours is defined as delayed onset of lactation.[20] In fact, mothers with delayed onset of milk coming in have 60% higher odds of stopping breastfeeding at four weeks.[18] Furthermore, low milk volumes on day 4 are associated with an eight times higher chance of low milk supply at six weeks.[15]

GET IT **RIGHT**

- ✔ **Identify mothers with risk factors** for delayed secretory activation, so your education and lactation support can be proactive and targeted.
- ✔ **Make sure of early activation of pumping,** as well as frequent pumping, if breastfeeding is not effective.
- ✔ **Track pump volumes!**

Meeting the future needs OF THE INFANT



Average milk volume intake in healthy, term infants matches their mothers' supply.

Preterm infants will eventually require the availability of a "full-term" supply, but at a later point in time.

When a mother's milk supply is established to only meet the current needs of her preterm infant, then achieving future 'full-term' milk supply will be difficult.

RISK FACTORS FOR DELAYED LACTATION:

Antenatal	Postnatal:
Maternal obesity[21,22,24]	Unplanned C-section[29]
Diabetes[23,26]	Stressful or prolonged labour/birth; psychological stress/pain[30-33]
Breast surgery[25]	Postpartum haemorrhage [23,34]
Primiparity [23,26,28]	Preterm or late preterm infant[23,35]
Induction of labour[27,28]	Mother – infant separation[36]
Planned C-Section[29]	Delayed first breastfeeding episode[37]
	Supplementation within the first 48 hours[23,28]
	Low frequency of breastfeeding and/or expressing [38,39]
	Retained placenta products[40]

COMING TO VOLUME

Coming to volume is defined as a total daily milk volume of > 500 ml by day 14 post birth.[41,42] It indicates that milk supply is on track to meet the infant's long-term needs: Coming to volume by day 14 is the strongest predictor of feeding OMM at NICU discharge. Building milk supply in the first 14 days takes advantage of the high levels of milk-production hormones[43]. That is also why one month post birth, it is more difficult to increase milk supply significantly.[41,44] Once the mother has come to volume, she should be assisted to achieve 700 ml or more daily to meet the daily intake needs of a healthy term-born infant.

GET IT **RIGHT**

- ✔ **Always encourage double pumping.** It helps obtain up to 18% more milk with a higher fat content, in half the time.
- ✔ **Track daily milk volumes** so you may intervene immediately if problems arise.
- ✔ **Check regularly if the breast shields fit.** Comfort is important for a good milk flow.
- ✔ **Always adjust the pump to the highest comfortable vacuum level** to help remove more milk in less time.

VI DOSE OF OWN MOTHER´S MILK

The dose of own mother's milk means the proportion (%) or amount (mL/kg/day) of oral feeds that is comprised entirely of OMM. OMM is a medical intervention in the NICU and works in a dose-response manner for prematurely born infants. Higher doses of own mother's milk (and the avoidance of bovine formula) are low-cost interventions that reduce the risk of many morbitities such as NEC and sepsis and are also shown to shorten the length of the hospital stay.[4, 45-53] What is important, is to always track the volume of each dose of own mother's milk fed to the infant. Ideally, feeding logs should specify the relative composition and volume of each feed: How much was OMM, how much donor human milk (DHM) and how much formula. Donor milk should always be the preferred substitute for OMM, if available. (To this end, also read our interview on page 2 about milk banks!)

GET IT **RIGHT**

- ✔ **Revise feeding policies and procedures** and ensure staff are informed.
- ✔ **Ensure early and frequent milk expression.** Don't forget to track!
- ✔ **Facilitate the use of DHM as a bridge** to avoid bovine formula if the availability of OMM is delayed.
- ✔ **Stipulate that feeding logs define the relative composition and volume of each feed:** OMM:DHM:Formula. Aim for all NICU infants to receive: 100% human milk (OMM/DHM) for the first 14 days and >50 ml/kg/day OMM (average daily dose) in the first 28 days.

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The necessary standards are well documented: the training of healthcare staff, information for parents, the availability of breast pumps, early Double Pumping, the administration of colostrum. But: It only counts for the patient if we consistently implement these measures!

Prof. Sven Wellmann, Head of Neonatology at KUNO Klinik St Hedwig, Krankenhaus Barmherzige Brüder, Regensburg, Germany

EVALUATE – EDUCATE – MEASURE

You want to start a quality improvement program and audit your lactation practices? We've got you covered! Find more background information and useful tools here:

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Best cases in lactation

CHALLENGES, SUCCESS STORIES AND INSIGHTS

Turning the science of lactation into practical care for the benefit of mothers and infants is the challenge dedicated healthcare professionals face and conquer every day. So instead of just giving you our take on how to leverage research findings for improving your everyday protocols and outcomes, we decided to hand over to the clinical experts: Read on as they share their best practices on how to successfully turn science into care. From early colostrum administration to long-term breastfeeding success in late preterm infants. Prepare to be inspired!

Dr. Rosalina Barroso, Head of the Neonatal Intensive Care Unit at Prof. Doutor Fernando Fonseca Hospital in Portugal, on successfully implementing new practices through the Medela NICU QI initiative.

A roadmap

TO INCREASE THE DOSE OF OWN MOTHER'S MILK IN OUR NICU

What was your driver to start working with the NICU QI toolkit?

We went through the NICU scorecard and recognized the gaps in lactation data that we had as well as an opportunity to improve the dose of own mother's milk for our most vulnerable infants. There is a wealth of evidence showing that own mother's milk feeding for preterm and very low birthweight infants reduces the risk of many complications of prematurity and their associated costs, greatly improving the infant's health. What we developed with Medela's NICU lactation QI toolkit was the roadmap to actually increase the dose of own mother's milk in our NICU.

What did it take to implement it?
I think that team work is essential to implement such a program. We made sure we had the buy-in from labour & delivery, the obstetrics department and the NICU. And we have a very motivated team. Then, education is critical to ensure all staff members are aware of their roles and can provide consistent information to the families on the value of own mother's milk and how to build an adequate milk supply. To that end, it is important to plan training sessions when new staff joins.

What were the barriers you met with?
One of the barriers we discovered early on was that not only pumping within 3 hours of delivery was a challenge, but also the time between that first expression in the delivery room and the second expression in the obstetric department. We attributed this gap to the fact that the mother was moving between two departments. To address this, we included a nurse from the delivery room and one from the obstetrics department in our core QI team so they could be practice change drivers within their own departments. We also realised the difficulty many mothers had to recognize the importance of pumping often in the first days, as they were not obtaining significant volumes of milk. Also, mothers had a tendency to not record their pumping sessions thus leading to incomplete data. In order to manage maternal expectations in the first days postpartum, we then paid special attention to the communication around pumping in these days. We explained the importance of having pumping records as these allow us to closely monitor lactation and intervene appropriately when necessary. Another barrier we have in Portugal is that prescriptions and reimbursement for lactation care and equipment are not available. However, mothers who lack pumping equipment at home can only pump when they come to the NICU to see their baby. The resulting reduction in the number of pumping sessions will have a negative effect on maternal milk supply. What we did to overcome this, was to loan out Symphony pumps to mothers with very low economic resources.

How are you going to sustain this change in your hospital?
We find additional education sessions for the entire staff to refresh the scientific background as well as best practice are critical to ensure sustainability. We need to make sure that everybody is aware at all times of their roles and responsibilities to support initiation and OMM dosage.

Is there a next step for QI in your hospital? What will you focus on next?
Our focus is to continue to improve the dose of own mother´s milk for preterm babies and to study the relationship between own mother´s milk and morbidities. Also, we would like to certify our NICU as the first Portuguese baby friendly NICU.

Buccal colostrum

SHOULD ALWAYS BE THE FIRST FEED

Aniko Deierl, consultant neonatologist at the Imperial College NHS Healthcare Trust in London, and her team go for gold with their highly successful push for more colostrum availability in NICUs.

The "Colostrum Packs" Aniko Deierl and her team hand out stress, what a gift these first golden drops mean to the infant.

Colostrum is liquid gold and should always be the infants first feed, especially on NICU. This is the strategic aim we have been trying to drive home for three years now.
When we started this QI-project in 2020 and measured where we stood, only 10 – 20% of NICU babies <34 weeks gestation received colostrum in the first 24 hours. At that time, colostrum within 24 hours was not part of our outcome measures so the low numbers came as a bit of a surprise and despite our breast milk feeding rate at discharge of around 80%, which is higher than the national average.

SUSTAINABLE SUCCESSES

Our goal was to increase this number, aiming for a target of 80% of NICU babies (<34 weeks gestation) receiving colostrum in the first 24 hours within the next 12 months. The road there was not always easy, especially with the period with COVID which significantly negatively impacted the close relationship required for early colostrum expression with the mother. Still, we made significant progress: Numbers are variable each month, but for now, we are looking at 50 – 80% receiving colostrum within 24 hours of life. What we now realize is, that the sustainability of our success is the real challenge: We need to continue pushing to ensure that every day, every infant will have the opportunity to benefit from early colostrum. We must ensure that premature babies (<34 weeks) receive buccal colostrum within the first six hours of birth, ideally as a first feed, and that early lactation is well established so that mothers can come to optimum volume and infants can continue to benefit from their mother's own milk.

PUSHING THE LIQUID GOLD STANDARD

To achieve this goal, we implemented a new standard operating procedure and trained midwives and neonatal MDT team on it. We specifically purchased Medela Symphony breast pumps with INITIATE program for all our areas including the labour ward, so all mothers can start double pumping using the INITIATE program within two hours of delivery. We give bite-sized face-to-face training for midwives on our pumps regularly. We also make sure midwives give our new 'Liquid Gold Colostrum Packs' to mothers before or directly after delivery, including all accessories for double pumping, syringes, a pump quick card and colostrum information material. Neonatal doctors are instructed to include colostrum information when doing antenatal counselling and it is expected from the neonatal team to call the midwife and check that the first expression is happening within two hours when the baby is transferred to NICU. The sooner the neonatal nurses receive the collected colostrum, the earlier they can administer it orally.

Deciding Metrics:

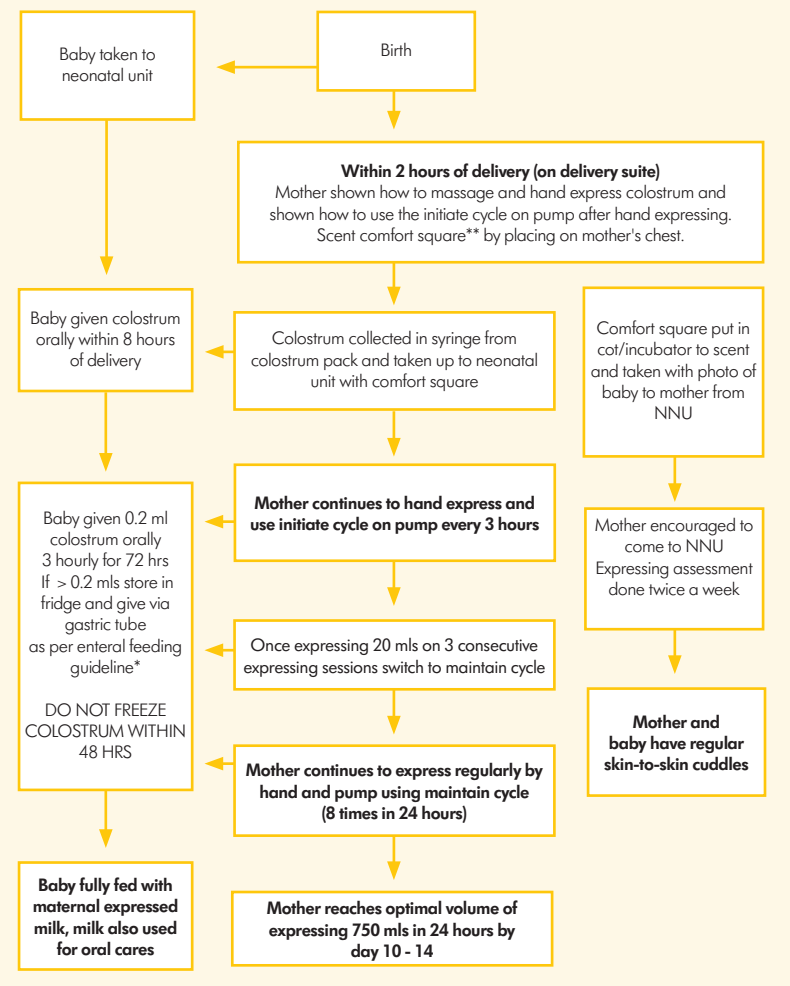
% babies receiving colostrum within 6 hours
% babies receiving colostrum within 24 hours
% babies receiving colostrum as a first feed
% babies receiving MEBM* on day 14
% babies receiving MEBM on discharge

IT'S NOT NUTRITION – IT'S GUT PRIMING!
It is safe to give colostrum in small volumes (0,2 – 0,3ml) even in ventilated babies as it is absorbed by the oral mucosa. Enteral feeding should not be delayed beyond eight hours of life, but the infant profits greatly if buccal colostrum is the first feed. Placing drops of mother's milk onto the infant's oral mucosa is not nutrition - it's gut priming! We also saw an association between early colostrum and higher proportion of exclusive breast milk at 7 and 14 days post birth."

OUR 4 PRIMARY DRIVERS

1) EDUCATION of the mother and the neonatal/ maternity staff on the benefits of colostrum (ante/ postnatally)
2) APPROPRIATE EQUIPMENT in all areas (labour ward, postnatal ward, NICU) to support early colostrum expression including our "Colostrum Packs" packs and Symphony breast pumps with Initiation Technology
3) SUPPORTING EARLY EXPRESSION of colostrum and early feeding of colostrum ideally within the first six hours of life
4) SUPPORTING LACTATION and the journey to suck feed during the NICU stay to achieve successful breastfeeding at the end

Standard operating procedure at the Imperial College London



* mother´s expressed breast milk
**knitted, textured squares that are used to pick up the mother´s scent, then are placed in the incubator with the infant

Two approaches

FOR IMPROVING BREASTFEEDING RATES AT

The best thing about dozens of lactation experts from all over Europe coming together is that all of them bring success stories along! Two examples that made waves at the 2023 Medela Symposium in Munich: for pushing the bar on exclusive breastfeeding rates at discharge in NICUs.

Dr. Manuel Cunha won the Medela best Abstract Awards at the 2023 European Symposium

The road to success is a combination of multidisciplinary commitment, personalization of care and systematization of practice

Dr. Manuel Cunha, Head of Department and Coordinator of Neonatology and Pediatrics unit at Cascais Hospital in Portugal, on how he managed to increase breastfeeding rates at discharge in the NICU by more than 30 percentage points in four years.

"In 2018, the indicator for exclusive breastfeeding at discharge for newborns under 35 weeks of gestation in our hospital was 39.8%. Clearly too low! As we set out to improve this quality indicator, all clinical practice was reviewed based on the best available evidence and the indications of the Portuguese Health General Direction, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF). As a result, we established an action plan with strategies directed to professionals, parents and newborns alike.

A new protocol for administration of colostrum in the oropharynx from the day of birth until feeding autonomy turned out to be a key factor. 40% of babies now received their first colostrum within the first 24 hours after birth. Initiatives to promote breastfeeding were implemented such as frequent and regular milk extraction – manual and with electric double pumping – as soon as possible after delivery, positive feedback to the mothers for every drop of milk they expressed, promotion of skin-to-skin contact, non-nutritive sucking and finger feeding as well as regular feedback to all team members of the results obtained.

We have also promoted systematic management of breast milk stocks through the MilkTrac® system already implemented in our hospital. The use of technology to support the operational process allowed us to improve process compliance and monitor key steps for the success of the project.

And the results are impressive indeed: By the end of our project, the quality indicator of exclusive breastfeeding at discharge had increased to 73.1 % in 2022! An outcome closely related to the quantity of milk babies receive at the end of the first week, which in turn is related to the time of the first collection. We attribute this success to the involvement of a multidisciplinary team and training in early colostrum collection and administration, as well as a personalised approach to care and systematisation of practice that offers all babies and families the same opportunities."

NICU DISCHARGE

We found informing mothers before delivery to be a real gamechanger. Especially in premature births, early support and training is crucial.

More than 70 % breastfeeding rate at discharge – the best case presentation of Prof. Miguel Sáenz de Pipaón Marcos, physician at the Neonatology Department of Hospital La Paz in Madrid in Spain, left workshop attendants in awe. Which begs the question: How did you achieve this, Doctor?

"First and foremost it was hard work – and a real team effort of doctors, midwives and nurses. We have formed a "Human Milk Working Group" that is co-chaired by a neonatologist and an obstetrician. The involvement of nurses and midwives from the very beginning is key. Together we have established a human milk protocol which is re-trained every four months through mandatory courses for all staff, to refresh and perpetuate knowledge. The lactation unit and nutrition team monitor the babies' intake of their own mother´s milk (OMM) – electronic systems filled out by the nurses are able to distinguish between the different types of milk: OMM, donor human milk or formula. We have monthly meetings across the different units where we look at the summarized data of multiple babies, and we also have weekly internal meetings on the neonatology ward where we discuss individual cases.

Generally, we found information before delivery to be a real gamechanger. Especially in premature births it is crucial to support and train the mothers as early as possible on how to express their milk. In our experience there is much more difficulty with mothers producing milk in unexpected preterm births. That is why we have appointed a neonatal nurse and a midwife as lactation consultants who are responsible for antenatal counselling. Our team has also designed information leaflets and we are currently designing QR codes to support mothers with written information, too.

Where possible, babies stay with their mothers immediately after birth. Very premature babies are cared for in single rooms with a bed for the mother or father. Mothers are encouraged to collect their colostrum as early as possible after birth. First by expressing by hand (within the first three hours), then by pumping (within six hours after birth). Collecting colostrum as early as possible and giving it to the infant immediately is a vital factor! In fact, colostrum is prescribed as "medication" by the attending physician to each infant immediately after admission to the NICU. We also work with the regional donor bank to use donor human milk as a bridge, as long as own mother's milk production is still building up. To come to volume, the mother is supported by midwives, nurses and lactation consultants all the way.

Prof. Miguel Sáenz de Pipaón Marcos believes in involving nurses and midwives to install a human milk protocol.

FOR MORE INSIGHTS
Wach our symposium recording in our digital Medela University.

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Motivating

COMMUNICATION MAKES THE DIFFERENCE

What are the prerequisites for long-term breastfeeding success in late preterm infants? Prof. Sven Wellmann found clear answers in a prospective intervention study in Germany.

Prof. Sven Wellmann, Head of Neonatology at KUNO Klinik St Hedwig, Krankenhaus Barmherzige Brüder, Regensburg, Germany

80 – 90% of all premature babies are born between 32 and 36 weeks of pregnancy as so-called moderate and late premature babies. At KUNO Klinik St. Hedwig, this affects around 300 children per year. Because they usually require little intensive care, this largest group of premature infants is often at risk of being overlooked in everyday clinical practice – yet they also urgently need support. These children miss four to eight crucial weeks of development in the womb – with not only short-term but also long-term consequences: The body weight and brain volume of premature babies born at 34 weeks' gestation are around 40% lower than those born at term and their organ maturation is incomplete.[1] Around every second newborn in this group is also affected by a respiratory adaptation disorder, especially children after a caesarean section due to the inadequate removal of fluid from the baby's lungs.[2,3] These moderate and late preterm infants have an average neurological outcome that is about 6% worse after 18 months[4] and an increased cardiometabolic and respiratory risk at the age of 3 –12 years.[5,6] We therefore asked ourselves the question: How can we best support these late preterm infants? What are the predictors of long-term breastfeeding success?

Training makes the difference

Our intervention: a large-scale training campaign for mothers as well as our staff throughout the gynaecological and paediatric wards. All parents received a standardised information pack before and after birth. We put up posters – in the waiting area for birth registration, in the delivery room, on the wards – we distributed flyers and showed training videos, all with a uniform corporate identity. We used Neo-Milk* as the sole source of information for parents and staff. We provided comprehensive training for midwives, nurses, doctors and all those who support mothers before and after birth. In order to ensure the availability of breast milk for all children and especially for premature infants, we also set up our own milk bank. The results

THE INTERVENTION

- **Comprehensive, early training campaign for (expectant) parents**
- **Comprehensive training of all staff (midwives, nurses, doctors)**
- **Implementation of a sole source of information (Neo-Milk*) with cross-ward visibility**
- **Establishment of a milk bank to ensure the availability of human milk for all children**

THE RESULT

26,5% **more infants were fed breast milk after the intervention compared to before!**

we measured were astonishing: 75% of the infants in this intervention group were fed with breast milk at the time of the German general check-up ("U4") at the age of 3–4 months. Before we started the intervention, this figure was only 48.5%. In addition, more than twice as many mothers in the intervention group had taken advantage of breastfeeding counselling.[2]

The experience of self-efficacy

This shows how essential it is that we reach mothers early and comprehensively with information on the importance of breast milk and breastfeeding and provide them with ongoing counselling as informed professionals. A decisive success factor in our study was, among other things, that the mother produces at least 500 ml/day of breast milk on day 14 after the birth. In addition, the mother's early experience of self-confidence and self-efficacy in relation to breastfeeding (measured 14 days after birth) was an independent predictor of breast milk feeding at 3–4 months of age. To achieve this, all recommendations must be implemented consistently: early information for the mother, early and regular expressing with a double pump, regular breastfeeding trials and consistent guidance by professionals with a standardised information platform.

Caesarean section remains a slowing factor

Caesarean section delivery remains a challenge: Our study was able to show that caesarean section delivery has a negative impact on breast milk feeding at the time of the "U4" check-up. Special attention needs to be paid to the breastfeeding routine of new mothers. We need all staff to understand how important breast milk is for moderate and late preterm infants. This is the only way we can create the conditions for long-term breastfeeding success.

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SYMPHONY® PLUS

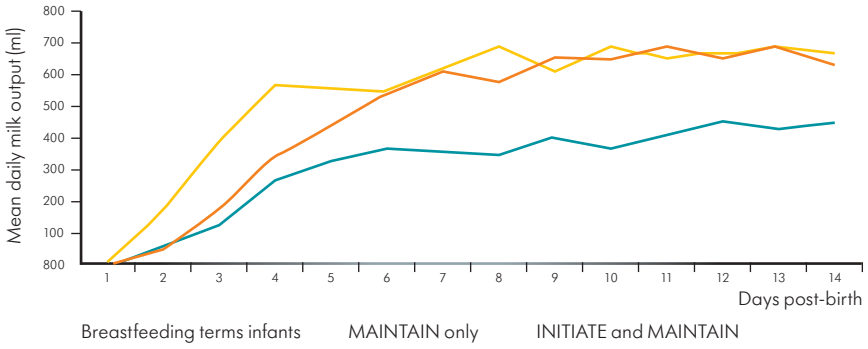
One pump - one unique combina

With its two research-based programs, the Symphony breast pump with the Symphony® PLUS card is the best choice for ensuring a good start and build-up when there are initial difficulties, and – if necessary – maintains the mother's milk supply in the long term.

During the first few days after their birth, infants suck differently from when lactation is established: Their sucking behaviour is still irregular and includes frequent pauses – a rhythm specially designed by nature to optimally stimulate lactation after birth. Symphony offers the INITIATE program to ensure the most accurate simulation of this triggering process for breastfeeding.

It mimics the sucking and pausing rhythm of the newborn infant during the first days of lactation. After secretory activation, the mother can then switch to the MAINTAIN program, which imitates the sucking rhythm of a healthy newborn infant during established lactation, based on the 2-Phase Expression technology: Initially, the infant stimulates the mother's breast by means of fast, short sucking cycles. Once the milk ejection reflex has been triggered and milk starts to flow, the baby changes to a more regular sucking pattern. The 2-Phase Expression technology precisely mimics this rhythm, enabling milk to be expressed more effectively.

However, it is the combination of these two programs that makes Symphony so unique: As part of a randomised clinical trial, researchers investigated the effectiveness of the INITIATE and MAINTAIN programs. The participants consisted of mothers of premature infants, all of whom needed a breast pump, and they were divided into two groups: One group used Symphony with the INITIATE program until secretory activation occurred, and then changed to the MAINTAIN program. The other group only used MAINTAIN.[1]



Neville MC et al. Am J Clin Nutr. 1988; 48(6):1375–1386
Meier PP et al. J Perinatol. 2012; 32(2):103–110

The results

Compared with mothers using MAINTAIN only, mothers using INITIATE followed by MAINTAIN:[1]

- Achieved significantly higher daily milk volumes over the first two weeks.
- Were more likely to achieve a supply greater than 500 ml (16.9 fl oz) per day by the end of the second week.
- Expressed volumes after using INITIATE followed by MAINTAIN that were similar to those consumed by a term-born infant from days six to 14 after birth.[1,2]

How to set Symphony, step-by-step

tion of programs

Mothers who used INITIATE reached secretory activation[4] 1.2 days faster

BENEFITS OF DOUBLE PUMPING

As well as being quicker – a big plus for busy healthcare professionals and mothers – research shows that double pumping at established lactation obtains 18 % more milk on average, compared to single pumping each breast in turn.[3] And the milk expressed had a higher energy content, too.[3]

INITIATE program

INITIATING LACTATION

AFTER BIRTH

≥8x in 24h

Pumping session = 15 mins
Stimulation phases, expression phases and pauses

When to switch from **INITIATE** to **MAINTAIN**?

1. Once **20 mL or more** is expressed from **both breasts combined,** during one pumping session

or

2. When physiological markers of milk 'coming in'* become apparent
*feeling of breast fullness

or

3. Day 6 — **Switch to** the **MAINTAIN program** no later than day 6

MAINTAIN program

BUILDING AND MAINTAINING LACTATION

≥8x in 24h

Pumping session ≥ 15 mins
2-Phase Expression (stimulation and expression phase)

1 Meier PP et al. J Perinatol. 2012; 32(2):103–110; **2** Neville MC et al. Am J Clin Nutr. 1988; 48(6):1375–1386 **3** Prime DK et al. Breastfeed Med. 2012; 7(6):442–447. **4** Post EDM et al. J Perinatol. 2016; 36(1):47–51.

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