

"Just a Few Weeks Early"--Overcoming Breastfeeding Challenges in Late-Preterm Infants

Marianne Neifert, MD, MTS, FAAP

**Dr. Mom Presentations, LLC and
Clinical Professor of Pediatrics
University of Colorado Denver School of Medicine**

**NWA 2016 Nutrition Education and
Breastfeeding Promotion Conference**

Saturday, September 10, 2016

Learning Objectives

1. Explain how physiologic immaturity in apparently healthy late-preterm infants contributes to newborn complications, including breastfeeding-related morbidities.
2. Describe specific lactation technologies used to protect the mother's milk supply and ensure that the late-preterm infant is adequately nourished.
3. Discuss practical strategies to help mothers of late-preterm infants successfully transition from using lactation technologies to exclusive breastfeeding.

Definitions of Preterm Births

- ❑ **Late preterm** (previously called "near term"), born between 34 and 36 weeks of pregnancy
- ❑ **Moderately preterm**, born between 32 and 34 weeks of pregnancy
- ❑ **Very preterm**, born at less than 32 weeks of pregnancy
- ❑ **Extremely preterm**, born at or before 25 weeks of pregnancy

"Late-Preterm" Infants: A Population at Risk

- Infants born 34^{0/7} through 36^{6/7} weeks' gestation are less physiologically and metabolically mature than term infants and are at higher risk of morbidity and mortality than term infants.
- Late-preterm infants (LPIs) represent more than 70% of all preterm births (<37 weeks). The proportion of all US births that were late preterm increased from 7.3% in 1990 to 9.1% in 2005, or > 375,000 births annually.

Engle, W. Tomashek, K., Wallman, C. and the Committee on Fetus and Newborn *Pediatr* 120:1390-1401, 2007 (Reaffirmed, May 2010)

"Late-Preterm" Infants: A Population at Risk

- The AAP (and NICHD) recommended a change in terminology from "near term" to "late-preterm" to emphasize that these infants are physiologically immature and have special health care needs compared to full term infants (37-41 weeks).
- LPIs are at greater risk of morbidity and mortality—both during the birth hospitalization and after discharge—than are infants born at term.

Pediatr 120:1390-1401, 2007

"Imposter Babies"

- ❑ LPIs have been called "imposter" babies because they often masquerade as full-term infants, and many are discharged within 48 hours after birth.
- ❑ LPIs often are of "normal" birth weight; have comparable APGAR scores to full term infants; are *not* admitted to the NICU; may appear as small, cute full term infants.
- ❑ Experienced pediatrician in rural Missouri: "These are the babies that turned my hair grey!"

“Late-Preterm” Infants: A Population at Risk

Examples of Increased Neonatal Morbidity and Mortality Among Late-Preterm Infants:

- Temperature instability
- Respiratory distress and apnea
- Hypoglycemia
- Jaundice
- Feeding Problems
- Suspected sepsis
- Longer hospital stays
- Increased neonatal mortality rate (0-27 days)

Pediatr 120:1390-1401, 2007

“Late-Preterm” Infants: A Population at Risk

At 35 weeks gestation, the infant weighs only about 60% of its weight at term. Compared to term infants, late-preterm infants may be at increased risk for the following long-term health consequences:

- Cerebral palsy
- Speech disorders
- Developmental delays
- Learning and behavioral problems

Pediatr 120:1390-1401, 2007

“Late-Preterm” Infants: A Population at Risk

Possible explanations for the rise in births of LPIs:

- Increased use of reproductive technologies, resulting in more multiple births
- More women giving birth at an older age
- Advances in obstetric practice, with earlier detection of at-risk fetuses
- Increased rates of labor induction and cesarean birth

Pediatr 120:1390-1401, 2007

Timing of Elective Repeat Cesarean Delivery and Neonatal Outcomes

- In a large, multi-center study in the U.S., more than 1/3 of elective repeat cesarean deliveries at term were performed before 39 weeks gestation.
- Compared with deliveries at 39 weeks, births at 37 and 38 weeks were associated with a significantly increased risk of adverse events, including: respiratory complications, treated hypoglycemia, newborn sepsis, admission to the neonatal ICU, and hospitalization for 5 days or more.

Tita, et al. N Engl J Med 2009; 360:111-20.

Nonmedically Indicated Early-Term Deliveries

- Because there are greater reported rates of morbidity and mortality among neonates and infants delivered during the early-term period compared with those delivered at 39 weeks and 40 weeks of gestation, a non-medically indicated early-term delivery is not appropriate.
- Implementation of a policy to decrease the rate of non-medically indicated deliveries before 39 weeks has been found to both decrease the numbers of these deliveries and improve neonatal outcomes.

Committee Opinon. No. 561. ACOG. Obstet Gynecol. 2013; 121:911-5

Definition of Term Pregnancy

Committee Opinion No. 579. ACOG. Obstet Gynecol. 2013;122:1139-40

ACOG and the Society for Maternal Fetal Medicine have endorsed new, more precise definitions of the 37- to 42-week period to reflect the increased health risks to babies born before 39 weeks.

Babies born in weeks 37 and 38 are now considered **early term**.

Babies born in weeks 39 and 40 are called **full term**.

Babies born in week 41 are called **late term**.

Babies born beginning in week 42 are called **post-term**.

Recent Trends in Late Preterm and Early Term Birth Rates

- ❑ Late-preterm and early term births are of growing public health concern, and US clinicians have been urged to reduce elective deliveries before 39 weeks.
- ❑ This study included singleton live births (US and 5 other high-income countries) during 2006-2014.
- ❑ Late preterm birth rates significantly decreased in the U.S. from 6.8% in 2006 to 5.7% in 2014.
- ❑ Early term births significantly decreased in the U.S. from 30.2% in 2006 to 24.4% in 2014.
- ❑ These findings reflect the success of perinatal quality collaboratives to reduce elective deliveries before 39 weeks.

JAMA Pediatr. 2016; 316(4):410-419.

The Paradox of Breastfeeding-Related Morbidity Among Late-Preterm Infants

- ❑ Although breastfeeding is vigorously promoted for its compelling health benefits, a disturbing “late-preterm breastfeeding paradox” exists:
- ❑ LPIs are at greater risk for breastfeeding-associated re-hospitalization and poor breastfeeding establishment compared to term newborns.
- ❑ Rehospitalization, often related to jaundice and poor feeding, is nearly twice as common among breastfed LPIs compared to breastfed term or non-breastfed LPIs. Current support is ineffective!

JV Radtke. J Obstet Gynecol Neonatal Nurs. 2011; 40(1):9-24

Breastfeeding Outcomes Among Late-Preterm and Early Term Infants

- ❑ LPIs were significantly less likely to initiate breastfeeding w/in 1 hr of birth or be discharged exclusively breastfeeding, when compared to 37 wk GA infants. As GA decreases, so does the chances of breastfeeding success.
- ❑ In a study of early readmission of healthy newborns after hospital discharge, both LPIs (34-36 wks) and early term (37-38 wks) newborns were more likely to be readmitted than term babies. Feeding problems and jaundice were the 2 most common diagnoses associated with readmission, usually w/in 1 to 2 wks of discharge.

Ayton, et al. International Breastfeeding J. 2012;7:16

Young, et al. Pediatr 2013;131:e1538-e1544

Reduced Breastfeeding Rates in Firstborn Late Preterm and Early Term Infants

- ❑ In this large prospective study of first-time mothers and newborns, gestational age was significantly associated with breastfeeding at 1 month postpartum.
- ❑ Late preterm infants (63.8%) and early term infants (72.6%) were significantly less likely to be breastfeeding at 1 month than infants born at term or post term infants (76.5%).
- ❑ Late preterm and early term infants are populations at risk for shortened breastfeeding duration and warrant additional breastfeeding support and education.

Hackman, et al. Breastfeeding Medicine. 2016; 11(3):119-125

Reduced Breastfeeding Rates in Firstborn Late Preterm and Early Term Infants

- ❑ Gestational age impacted time to first breastfeeding: 54% of late preterm and 40.8% of early term infants (compared to 36.4% of term + infants) were not breastfed during the first “Golden Hour,” which may partially explain the lower rates of breastfeeding at 1 month.
- ❑ In addition, the mothers of early term newborns who were no longer breastfeeding at 1 month were more likely to report latching problems than mothers of term infants.

Breastfeeding Medicine. 2016; 11(3):119-125

Common Perinatal Challenges Potentially Affecting Lactation in Mothers of (LPIs)

- ❑ Pregnancy-induced hypertension
- ❑ Delayed lactogenesis
- ❑ Cesarean birth
- ❑ Infection
- ❑ Multiple births
- ❑ Medications
- ❑ Diabetes
- ❑ Older age

Breastfeeding Challenges in Late-Preterm Infants (34, 35, and 36 weeks)

Late-Preterm Infants typically:

- Are sleepier, fewer alert-awake periods
- Have poor muscle tone and less stamina
- Have weak intraoral suction pressures
- Have difficulty attaching to the breast
- Have immature suck-swallow-breathe cycles
- Are unable to extract enough milk to maintain the mother's milk supply. Meier P, et al. *Clin Perinatol* 2013; 40:688

Breastfeeding may appear successful in the hospital, but not be sustained after discharge.

Pediatr 120:1390-1401, 2007

LPIs Cared for in the Maternity Setting Should *Not* Be Considered Healthy Term Infants

- Most LPIs are kept with their mothers in the maternity area, where lactation care is driven by the Baby-Friendly Hospital Initiative's (BFHI) guidelines for establishing breastfeeding for term, healthy babies.
- However, LPIs are *not* healthy, term infants. They lack adequate fat and glycogen stores, making it likely that they will need supplemental milk in the 1st 48 hours of breastfeeding. They are sleepy and lack the stamina for frequent, lengthy feedings. Parents need information and a feeding plan tailored specifically to LPIs.

Meier P, et al. *Clin Perinatol* 2013; 40:688

Endocrine Control of Lactation Neuroendocrine Reflex Arcs

- **Milk Production** - Prolactin is a key lactogenic hormone, stimulating initial alveolar milk production. Prolactin surges with each feeding, and remains elevated throughout lactation.
- **Milk Ejection Reflex** - Oxytocin contracts the myoepithelial cells that surround the alveolar glands, forcing milk from the alveoli into the ducts, where it is removed by the infant. The MER is essential for an infant to obtain adequate milk.

Hale & Hartmann. *Textbook of Lactation*. Hale Publish., 2007, 99-101
Kent. *J Midwifery Womens Health*. 2007;52:564-570

Autocrine Control of Lactation

The influence of local factors acting in the breast

- It is not just the level of maternal hormones, but the efficiency of milk removal, that regulates the volume of milk produced in each breast.
- If a woman nurses from one breast only, the other unsuckled breast soon stops producing milk, even though both are exposed to lactogenic hormones.
- Thus, the amount of milk produced in each breast over the long term largely depends on how thoroughly and how often milk is drained by active nursing or pumping.

Hale & Hartmann. *Textbook of Lactation*. Hale Publish., 2007, 99-101
Kent. *J Midwifery Womens Health*. 2007;52:564-570

The Role of Milk Removal in Ongoing Milk Production

- While an infant may occasionally drain the breast, on average, the baby drinks about 67% of the available milk at a feeding.
- The amount of milk that continues to be produced depends on the amount of milk that is removed from the breasts.
- **Full breasts will slow down milk production.**
- When the **breasts are well drained, the rate of milk production increases.**

How Breastfeeding Works. Kent. *J Midwifery Womens Health*. 2007;52:564-570

Breastfeeding Management for Late-Preterm and Other At-risk Newborns

Two key objectives:

- Ensure that the infant is adequately nourished
- Protect the mother's milk supply

Specific Lactation Technologies:

- Breast Pumps
- Nipple shields
- Infant test-weighing procedure
- Use of some bottle-feedings

Meier P, et al. *Clin Perinatol*. 2013; 40:689-705

Breastfeeding Strategies for LPIs

- If the infant is clinically stable, begin immediate and ongoing skin-to-skin contact and assist with early breastfeeding.
- Use breastfeeding positions that provide head support for the infant, such as the football or cross cradle holds.
- Breastfeed when the infant is able to sustain periods of wakefulness. Feed by bottle when baby is too sleepy to breastfeed and when offering supplemental milk.

Meier P, et al. *Clin Perinatol.* 2013; 40:688

Lactation Technology #1: Use of a Breast Pump

- Unless the LPI can breastfeed effectively (awake and actively sucking) for at least 15 minutes, each of 8 times daily during the maternity stay, the mother will need to regularly use a hospital-grade electric breast pump to ensure that she establishes an abundant milk supply and obtains expressed milk with which to supplement the infant.
- Additional amounts of donor human milk or formula temporarily may be necessary due to medical concerns related to hypoglycemia, hypothermia, or hyperbilirubinemia.

Meier P, et al. *Clin Perinatol* 2013; 40:688

Lactation Technology #1: Use of a Breast Pump

- Mothers need to understand that regular, effective milk removal is essential to maintaining an adequate milk supply when her LPI does not nurse effectively.
- Creating and maintaining an abundant milk supply makes it easier for the LPI to obtain milk, despite his immature sucking patterns. Having a surplus of milk allows baby to obtain enough milk by breastfeeding.
- Once her baby is taking all feedings at the breast and is gaining weight appropriately, the mother can cautiously decrease her post-feeding pumping.

Meier P, et al. *Clin Perinatol* 2013; 40:688

Increasing Milk Volumes Produced by Mothers of Premature Infants

- A study among mothers of premature infants in the Stanford NICU found that women's milk production could be significantly increased by having mothers perform hand expression of colostrum and "hands-on pumping" of transitional and mature milk.

J. Morton, et al *J of Perinatology.* 2009. 29:757-764

- To see the study techniques: <http://newborns.stanford.edu/Breastfeeding/index.html>
- The DVD can be purchased at: www.breastmilkssolutions.com

"Prevention Pumping" or "Insurance Pumping"

- Whenever an infant nurses ineffectively, both infant well-being and maternal milk supply can be placed in jeopardy.
- "Prevention pumping"—removing milk remaining after the infant nurses—will protect a mother's milk supply until her infant is able to drain her breasts well.
- The milk a mother expresses can be used to supplement her infant, as necessary.
- Remember that breastfeeding problems are easier to overcome when the mother has a generous milk supply and the infant is thriving.



Got Options!

Given a generous milk supply and a healthy, thriving baby, chances are excellent that an infant will learn to breastfeed effectively.

Lactation Technology #2: Use of a Nipple Shield

- The nipple shield is a valuable temporary tool for increasing milk transfer by LPIs who have weak suction pressures that cause the infant to slip off the nipple and fall asleep early in the feeding.

Meier P, et al. *Clin Perinatol.* 2013; 40:688

- A study in premature infants found that infants **drink significantly more milk when breastfeeding with a nipple shield** than without it. The nipple shield facilitates milk transfer during feeding, provided the mother has a normal supply.

Meier, P, et al. *J Hum Lact.* 2000;16(2):106-114

Lactation Technology #3. Test-Weighing

- The test-weighing procedure takes the guesswork out of “getting enough,” so that extra milk is provided only when necessary.
- In-home test-weighing helps parents correlate their own assessment of the quality of the feeding with the infant’s actual milk intake. It also allows parents to monitor their baby’s progress in taking more milk at each breast each week.
- Mothers typically can discontinue the use of the rental scale after the infant is breastfeeding effectively and pumping has been gradually tapered.

Meier P, et al. *Clin Perinatol.* 2013; 40:688

Infant Feeding Test-Weighing Procedure

The difference between the post-feed and the pre-feed weight of the identically clothed infant represents the volume of milk consumed by the baby during the feeding.

Post-feed infant weight

Minus

Pre-feed infant weight

Equals

Volume of milk consumed

1 gram weight change = 1 milliliter milk
Approximately 30 grams = 1 ounce of milk

Infant Feeding Test-Weighing Procedure

- Use electronic balance accurate to **2 grams**
- Baby must be **identically clothed** for pre-feed and post-feed weights.
- **Do not change diaper** during test-weighing procedure.
- Consider interval in hours since the breasts were last drained.

Between 2 - 3 weeks and 3 months, thriving breastfed infants drink about 700 ml (23 oz.) per day—approximately 1 oz. per hour

Lactation Technology #4. Bottle-Feeding

- Even when mothers have an adequate milk supply, few LPIs will be able to obtain full feedings by breastfeeding alone. Most will temporarily require some bottle supplementation of expressed milk after breastfeeding.
- As LPIs mature, they are able to take more milk from the breast, allowing Mom to decrease the frequency and amount of supplemental milk given by bottle.
- As an alternative, the infant can receive extra milk at the breast with a supplemental nursing system and nipple shield.

Meier P, et al. *Clin Perinatol* 2013; 40:688

“Triple Feeding” for LPIs and Other At-Risk Newborns

- Breastfeed (may need to limit to only a few mins, so baby is able to take essential supplemental milk). Start feeding as soon as the infant shows wakeful signs.
- Pump both breasts for 10 – 15 mins. after nursing, using a highly effective, double electric breast pump.
- Supplement the infant with expressed milk, as needed. Use donor milk/formula as required.
- To allow Mom more sleep at night, a designated helper can feed the baby previously expressed milk by bottle, while Mom pumps and returns to sleep.
- As baby breastfeeds more effectively, s/he can receive fewer and smaller bottle feedings of pumped milk.

Discontinuing Lactation Technologies

- The cessation of lactation technologies typically occurs b/w 40 and 42 weeks post-conceptional age.
- As the LPI is able to breastfeed more effectively, s/he may be able to take some daily feedings without the nipple shield, or may need the shield only for the latter part of some feedings.
- Similarly, as the LPI matures and takes increasingly more milk with breastfeeding, s/he will require fewer supplemental feedings and smaller total daily volumes of expressed milk.

Meier P, et al. *Clin Perinatol* 2013; 40:688

Discontinuing Lactation Technologies

- Once an infant is taking all feedings from the breast without a nipple shield and is growing appropriately, the mother can gradually taper her post-feeding pumping, while continuing to use the scale to monitor her infant's milk intake and weight gain.
- Typically, mothers discontinue using the in-home rental scale after their LPI is breastfeeding effectively and efficiently, and they no longer need the pump to maintain adequate milk production. Some mothers continue to perform daily naked weights for a week or two before finally relinquishing the scale.

Meier P, et al. *Clin Perinatol* 2013; 40:688

The Experience of Breastfeeding the Late Preterm Infant: A Qualitative Study

Methods: Structured telephone interviews with 44 mothers of LPIs.

Major Themes:

- Breastfeeding was a beautiful bonding experience
- I failed to meet my expectations ("I am sad. I wanted to breastfeed for two years. I feel like a failure.")
- Medical and physical struggle ("a hard but good experience. It was a lot to handle at once.")
- Would do it all again ("Next time I would rather breastfeed than just pump")

Kair, LR, et al. *Breastfeeding Medicine*. 2015 10(2):102-106

ABM Clinical Protocol # 10: Breastfeeding the Late Preterm Infant (34 0/7) to 36 6/7 Weeks Gestation)

- **Principles of Care**
- **Inpatient:** Implementation of Principles of Care
Initial Steps Ongoing Care Discharge Planning
- **Outpatient:** Implementation of Principles of Care
Initial Visit Problem Solving Follow-Up

Breastfeeding Medicine. 2011;6(3):151-156
<http://www.bfmed.org/Media/Files/Protocols/Protocol%2010%20Revised%20English%206.11.pdf>

Key References

- **Meier PP**, Furman LM, Degenhardt M. Increased lactation risk for late preterm infants and mothers: evidence and management strategies to protect breastfeeding. *J Midwifery Womens Health* 2007; 52(6):579-87.
- **Meier PP**. Breastfeeding your late preterm infant. McHenry (IL): Medela, Inc; 2010.
- **Meier P**, Patel AL, Wright K and Engstrom JL. Management of Breastfeeding During and After the Maternity Hospitalization for Late Preterm Infants. *Clinics in Perinatology* 2013 40(4):689-705.

Key References

- Hackman NM, Alligood-Percoco N, Martin A, Zhu J, and Kjerulff KH. Reduced Breastfeeding Rates in Firstborn Late Preterm and Early Term Infants. *Breastfeeding Medicine*. 2016; 11(3):19-25.
- Ayton J, Hansen E, Quinn S, and Nelson M. Factors Associated with Initiation and Exclusive Breastfeeding at Hospital Discharge: Late Preterm Compared to 37 Week Gestation Mother and Infant Cohort. *International Breastfeeding J*. 2012; 7:16.
- Young PC, Korgenski K, and Buchi K. Early Readmission of Newborns in a Large Health Care System. *Pediatrics*. May 2013, 131 (5) e1538-e1544.