The Role of the Pediatrician in Extended Breastfeeding of the Preterm Infant

Pediatricians generally assume care for the preterm infant only after the infant is discharged from the neonatal intensive care nursery or the hospital. Many of these infants have not fully made the transition from breast milk feedings to breastfeeding. Failing to do so before or shortly after discharge contributes to the high rate of abandonment of maternal efforts to breastfeed.1-4 As many of the benefits of breast milk are influenced by dose and duration of human milk feeds,5-7 these vulnerable infants rarely receive the full complement of protection provided by extended breast milk feedings, not to mention the benefits of feeding at the breast.

Although experienced in supporting breastfeeding of term infants, pediatricians frequently have limited knowledge about managing breastfeeding of preterm infants. To reduce post-discharge termination rates, pediatricians are finding creative ways to collaborate with hospital staff to improve the quality, consistency, and continuity of breastfeeding support.

Dr. Morton is clinical professor of pediatrics and director of breastfeeding medicine, Stanford University, Division of Neonatal and Developmental Medicine, Palo Alto, California. Address reprint requests to Jane A. Morton, MD, Stanford University, Division of Neonatal and Developmental Medicine, 750 Welch Road, Suite 315, Palo Alto, CA 94304.

Dr. Morton has no industry relationships to disclose.

An increasing number of pediatric patients are born prematurely. During the past two decades, preterm births have risen from 9.5% in 1980 to 11.6% in 2000, despite public health measures to reduce prematurity.8,9 Estimates project in vitro fertilization accounts for 18% of the low birth weight population.10 Low birth weight and prematurity are the most important determinants of neonatal mortality, as well as infant and childhood morbidity.11,12 Preterm and low birth weight survivors remain particularly vulnerable throughout their life.
Optimal early nutrition is critical to their long-term health and neurodevelopmental growth. Based on a growing body of research, the American Academy of Pediatrics strongly recommends fortified human milk as the preferred feeding for preterm infants. At no other time in the age spectrum is the statement “formula is just as good” more erroneous.

To ensure that low birth weight and preterm infants fully realize the short- and long-term benefits of breast milk, a concerted approach to breastfeeding is needed. However, the purview of managing the mother-infant dyad frequently is unclear. Complications such as mastitis breastfeeding as a major health concern. Pediatricians may provide a unique level of consistency, continuity, and unequivocal commitment to the mother’s goals to take home a healthy, breastfeeding infant. Their visits can include timely recommendations of specific resources tailored to the appropriate educational level and needs of the mother. Informed and involved regarding specific predischarge breastfeeding issues, pediatricians can assume a pivotal position in coordinating a seamless transition after preterm infants come home.

The most critical time for pediatricians to assume this position is at delivery. Initiate breastfeeding efforts only after their health care provider discussed the benefits of breast milk for preterm infants. In another large multi-racial study, women who were encouraged by their health care provider to breastfeed were more than four times as likely to initiate breastfeeding than women who did not receive encouragement.

Because many mothers have not chosen a pediatrician by the time they deliver, the first steps may be to collaborate with the neonatology staff in streamlining an early referral process or even revising hospital obstetrical protocols to identify and involve the pediatrician when delivery is imminent. Pediatricians may find the motives of mothers who decide to breastfeed the preterm infant (rather than may be referred to an obstetrician, the mother with low milk supply is referred to a lactation consultant, and poor infant growth is managed by the neonatologist during hospitalization. When discharged to the care of the pediatrician, preterm infants commonly fall well below the normal in utero growth curves and have little proficiency for breastfeeding.

At a time when the neonatal team may be concerned exclusively with acute medical issues, pediatricians, particularly if they have an established relationship with the family, may refocus attention on the education of the parents. Pediatricians can provide an essential link between the hospital and home. The presence of the primary care physician at this vulnerable time of decision making can influence the course of lactation. In one study, 40% of low-income women reported they decided to

**EDUCATIONAL OBJECTIVES**

1. Determine the variables that predict the best outcomes for breastfeeding at the time of discharge from the nursery.
2. Review the factors that lead to compromised breast milk production.
3. Develop effective strategies to transition the preterm infant from breast milk feedings to breastfeeding.
Contributing Factors to Insufficient Milk Production

PREGLANDULAR

Hormonal
Prolactin
- Retained placenta
- Pregnancy
- Sheehan syndrome
- Drugs (estrogen birth control pills, bromocriptine)

Oxytocin
- Distraction, stress, fatigue
- Drugs (alcohol, opiates)

Nutritional
Profound maternal malnutrition/dehydration

Systemic illness
Shock

GLANDULAR

Primary hypoplasia
Insufficient mammary glandular tissue
Unilateral or bilateral breast anomalies

Secondary dysplasia
post radiation fx
post breast surgery
post severe mastitis/abscess

POSTGLANDULAR

Maternal-infant separation
Delayed initiation
Insufficient frequency

Ineffective emptying
Obstructive outflow
Engorgement/edema
Plugged duct

Impaired transfer
Poor latch
Dysfunctional suck
Underpowered or ineffective pump

Given the high incidence of postpartum complications, the recovery for these mothers may seem to preclude early initiation of pumping. Assistance from the nursing staff with pumping, combined with attention to mothers’ comfort needs may minimize the unfortunate delay experienced by many mothers.

To move beyond the advocacy role, the effective pediatrician needs to be knowledgeable about pump-induced and dependent lactation and about the steps to transition the recovering infant to feeding at the breast. Impaired milk production and failure to transition the infant to feeding at the breast successfully are two major limitations to extended breastfeeding. This article focuses on these limitations and offers pragmatic strategies for pediatricians to address these limitations.

VARIABLES ASSOCIATED WITH BREASTFEEDING OUTCOMES

Despite the protective benefits of breast milk (see Landers, page 298), the majority of very low birth weight infants do not go home receiving their mother’s milk. In a report from 124 newborn intensive care units that included approximately 43,000 preterm infants, 50% were not receiving any breast milk at the time of discharge. For those infants who are fed breast milk, their mothers are more likely to discontinue efforts to breastfeed if they fail to transition their infants to the breast soon after discharge. In a prospective study, mothers most likely to continue to provide breast milk at 12 months were those exclusively breastfeeding at 1 month post-discharge.

The most important variables associated with being discharged from the hospital on any breast milk are higher level of education, older maternal age, white race, marital status, and site of care. Rates varied significantly depending on the culture in the specific neonatal intensive care unit.

In virtually all of the sites designated as high use of breast milk compared to low use of breast milk, physicians openly expressed support for breast milk use rather than being silent or taking no position. Nurses not only facilitated use of breast milk, but also helped maximize breast milk supply. Maternity nurses, instead of avoiding guidance regarding breast milk production, conveyed the need for and expectation of mothers to provide breast milk, while guiding them through the process of establishing production. Particularly in sites where policies or staff attitudes are unsupportive, pediatricians may fill a significant void.

Before assessing the support provided by a particular facility, pediatricians must consider how hospital practices and policies can limit extended breastfeeding by compromising milk production and failing to transition the infant from breast milk feeding to breastfeeding.

Compromised Milk Production

Causes for impaired milk secretion can be conceptualized as preglandular, glandular, or postglandular. Preglandular causes include an unfavorable hormonal profile such as low prolactin levels or receptors (eg, retained placenta, pregnancy, estrogen-containing birth control pills, or nicotine use) or impaired oxytocin release (eg, opiate or alcohol use). Glandular causes include surgical procedures such as reduction mammoplasty, fibrosis related to a prior history of severe mastitis, radiation therapy, or possibly insufficient mammary glandular development.

Postglandular causes include any reason for ineffective or infrequent milk removal beginning on the first postpartum day and include maternal and infant conditions. Postglandular causes of impaired lactogenesis are most common and are frequently preventable. Strategies targeted at reducing these causes are particularly useful. Specifically, a delay in initiating pumping and ineffective emp-
tying are two usually preventable contributors to impaired production.

**Delayed Initiation of Pumping**

In mothers of term and preterm infants, a delay in initiating frequent and effective breastfeeding or pumping may result in impaired production.29,30 Similarly, reliance on the less effective, weak suck of a preterm infant with a gestational age of 37 weeks or less may negatively impact milk production.31

Failure of early removal of colostrum from the breast is associated with a poor prognosis for successful lactation in some women who intend to breastfeed.32 Although speculative, this problem may result from the accumulation of a substance in the mammary alveolus that inhibits lactogenesis, even in the face of appropriate hormonal changes after birth.33

Controlled clinical studies support the importance of early pumping. In a prospective observational study of 87 mothers who intended to breastfeed their preterm infants (mean gestational age = 28 weeks), only 34% were still lactating after a corrected age of 40 weeks (term) and 14% were eventually able to breastfeed.34 After controlling for maternal age, race, marital status, and maternal education, three behavioral factors were independently associated with lactation beyond term: (1) initiation of breast pumping before 6 hours postpartum; (2) pumping milk more than 5 times per day; and (3) intimate contact with the infant (kangaroo care).

Mothers may anticipate a plateau phenomenon at 2 weeks. A randomized, longitudinal study examined milk production in 39 mothers with 50 preterm infants (mean gestational age, 27 weeks).34 By 9 weeks after birth, 31% of the mothers were no longer lactating. Of those who were, daily pumped milk volumes plateaued by 2 weeks. Production was inversely correlated with the time from birth to initiation of breast pumping and positively correlated with both frequency of pumping and kangaroo care.

The critical pumping period after birth coincides with a physically and emotionally complex period for these mothers, who may have serious medical complications. Typically, they feel unprepared, overwhelmed, and primarily concerned about their infant’s condition.

In addition, the technology-oriented culture of the neonatal intensive care unit may intimidate even the most sophisticated mother. The variety of specialists speak in different, often unfamiliar terms. Instead of recognizing her unique opportunity to protect, nurture, and nourish her baby, the new mother may believe she has abdicated this care.

Hospital routines and alienating practices (such as dismissing parents during rounds and referring to parents as “visitors”) also may further undermine the parents’ role as an integral part of the health care team. A mother’s recovery involves processing her fear, guilt, and remorse, and refocusing on her role as an empowered, informed, and involved mother of an infant with a very different beginning.35 Pediatricians familiar with the neonatal intensive care unit culture and experienced in interfacing with parents during stressful times may be the natural catalyst for this refocusing.

Mothers may spend hours to days on the antepartum unit. This is the ideal time to discuss proactively the importance of breast milk for their infants. A lactation consultant, if available, can custom fit a pump to the mother prior to birth and develop a pumping schedule, based on the principles of early and frequent emptying.

Defining specific tasks for the partner — helping set up and wash the pump, delivering the milk to the nursery, and keeping current photographs of the infant by the pump — establish the partner as the link between the infant and mother. Finally, to express and collect small volumes of colostrum, which has been shown to be important for the first feed in the prevention of necrotizing enterocolitis,36,37 mothers may find manual pumping a strong additive to electric pumping.

**Ineffective Emptying of the Breast**

When milk is not removed from the breast frequently and effectively, local factors may act to reduce milk secretion.38,39 With consistent partial removal, involution develops and productive capacity diminishes, possibly irreversibly. Evidence supports the degree of breast emptying to be even more important than the frequency of emptying as the stronger stimulus for milk synthesis.40

**Breakdowns in scheduled pumping.**Balancing the demands of pumping eight times a day requires discipline, organization, and commitment. In addition to frequent recognition for her efforts, new mothers benefit from pragmatic strate-
kept at the bedside for milk storage. The partner can wash the pump after the first bedtime pumping, and the mother can wash the pump before the third session.

Encourage mothers to pump at the hospital as part of their infant care routine. If space and privacy allow, pumping at the bedside, in close contact with her infant, may enhance the letdown reflex and effective emptying. Mothers who travel far distances may need a nap room to facilitate longer visitation.

Problems with the pump. Pump problems can often go undetected and may contribute to ineffective emptying of the breast. Over-the-counter, nonhospital grade pumps may be underpowered or fit poorly. Pumps designed for use by mothers with a well-established supply may be less effective for mothers who are entirely pump-dependent or who have compromised production. Poor technique may result in uneven pumping.

In some respects, the mechanisms for milk removal differ between pumping and breastfeeding. The pump relies on suction to remove milk, whereas the infant uses a massaging motion of the tongue and jaw on the subareolar glandular tissue. The pump’s less physiological mechanism may adversely affect emptying, particularly in the periphery of the breasts proximal to the pump flanges. This may contribute to the association between pump use and mastitis.41

To combat this problem, mothers can be taught techniques of breast assessment. After pumping, they can palpate each quadrant of the breast for areas of fullness. Then, by pumping each breast while simultaneously massaging the firmer areas, residual volumes can be expressed.

Structural or anatomic defects that obstruct milk flow. Defects can obstruct milk flow. For example, previous breast surgery may cause interruption of the collecting system. Engorgement with inflammation and edema may cause mastitis, which may impair flow. Plugged ducts may cause milk stasis with secondary mastitis. Early and aggressive treatment may prevent irreversible diminution of productive capacity.

Although mastitis is one of many causes for insufficient lactation,42 estimates of the frequency and impact of mastitis in mothers of preterm infants are lacking. In the dairy industry, where lactation depends exclusively on long-term pumping, as is the case of the mother who delivers very early, mastitis is the single most costly expense, because of the irreversible reduction in milk production capacity.43 Mothers must maintain a high index of suspicion for mastitis and their physicians a low threshold for treatment (including antibiotics effective against Staphylococci). Pediatricians can either provide primary care themselves or expedite a referral.

Impaired letdown reflex. This cause of ineffective emptying is the most challenging problem to remedy. Stress, fatigue, and drugs (eg, alcohol) may contribute to this problem.26 Conditioning rituals, relaxation techniques, more attention to nipple stimulation and breast massage before pumping, and more physical contact with the infant while pumping may help mothers overcome this problem.44

For a small cohort of women, pumping under any condition is ineffective. Whether this is due to an impaired letdown or the negative pressures generated by the pump on the ductal collecting structures of the breast is unknown.45

Stimulants to Milk Production

Skin-to-skin care, or kangaroo care (first described in Bogotá, Colombia), provides innumerable benefits to both the mother and the infant. Practiced by mothers in neonatal intensive care units around the world, kangaroo mother care consistently has been associated with improved milk production, improved infant growth, and competence in breastfeeding and extended lactation.46-49

Prolactin enhancers such as dopamine inhibitors (metaclopramide and domperidone) have been used with inconsistent results.40 Herbal remedies such as fenugreek are popular but have not been well studied and therefore are not recommended uniformly by the professional community. A well-referenced review of galactagogues with a helpful table has been published.51 Recently, numerous over-the-counter therapies have emerged that have not undergone valid testing and may be hazardous to the mother or infant. For an in-depth discussion of drugs that may interfere with or promote milk production, see the article by Hale in this issue (page 337).

Unexpectedly, early trophic feeding using colostrum and milk from days 4 to 14 to stimulate intestinal maturity has been associated with improved breast milk production, perhaps suggesting the influence for the mother of a subtle psychological effect (simply knowing that her milk is being used for her own baby) on her milk secretion.6 There may be dual value in beginning early feeds with small volumes of breast milk instead of formula, with benefit for both the infant (improved feeding tolerance) and mother (improved production).36

TRANSITION FROM BREAST MILK FEEDING TO BREASTFEEDING

Mothers of healthy term babies frequently feel overwhelmed with the challenges of learning to breastfeed. Likewise, even with excellent support from the hospital staff, mothers of preterm infants commonly become discouraged by the slow progress. When a successful breastfeeding pattern is established before discharge, success at home is more likely.17,32 Mothers of preterm infants with numerous other health concerns and those with multiples (especially when one or more infants remain hospitalized) face even greater hurdles.

There are four key differences to con-
sider in supporting the preterm infant's transition to breastfeeding:

- An extended developmental readiness/learning curve;
- A greater need for easy access to milk;
- A greater need for physical assistance to latch onto the breast;
- The necessity of a cohesive, tailored home plan.

Development and Maturation of the Infant

The development and maturation of the infant, measured chronologically as corrected gestational age, heavily influences the development of feeding skills. Clinicians observe a wide range of biological variability related to feeding behaviors. Some neurologically normal term infants take weeks to become effective at the breast, while some preterm infants are fully breastfed before 34 weeks.

Early studies suggest adequate neuromuscular coordination in feeding is a function of gestational maturity rather than postnatal sucking experiences. Challenging this belief, the role of experience and learning in acquiring breastfeeding skills was investigated and the results demonstrated that stable preterm infants often can initiate breastfeeding earlier than the traditional 32-week gestation timeline prescribed by many institutions.

In a prospective, nonrandomized, Swedish study, Nyqvist et al. assessed the development of breastfeeding behaviors in 71 preterm singleton infants (27 to 36 gestational weeks). Maternal observations using the Preterm Infant Breastfeeding Behavior Scale were recorded. Efficient rooting, areolar grasp, and latching on were observed at 28 weeks and nutritive sucking from 31 weeks. Eighty percent established full breastfeeding at a mean of 36 weeks, with as early as 33 weeks reported by some.

Resources for the Family of the Premature Infant

**BOOKS**


**VIDEOS**


**WEBSITES**

- Preemie-L Organization
  - www.preemie-l.org/bfaq.html
- La Leche League
  - www.lalecheleague.org
- University of Wisconsin: Prenatal Care at Meriter Hospital
  - www2.medsch.wisc.edu/childrenshosp/parents_of_premies/index.html

The authors suggest that the development of nutritive sucking is not solely maturational, but “a result of a learning experience, elicited and enhanced by contingent stimuli” and that “maternal factors such as pattern of interaction with the infant and frequency and time spent breastfeeding are highly conducive to breastfeeding outcomes.” Important advantages of these Swedish mothers were paid maternity leave and unrestricted access to their infants. Both maturational and experience may play a role in breastfeeding success.

As soon as the infant is physiologically stable, skin-to-skin maternal contact should be encouraged. Early and frequent non-nutritive sucking at the breast has been shown to promote exclusive and extended postdischarge breastfeeding. The numerous benefits of skin-to-skin holding (kangaroo care) include improved growth, improved milk production, and possibly a reduced likelihood of late onset sepsis in the newborn.

Recently, kangaroo care and the provision of breast milk were shown to independently enhance infant perceptual-cognitive and motor development. All of these benefits expedite the transition to the breast.

Ensuring Easy Access

To ingest adequate volumes of breast milk successfully, the preterm infant must be guaranteed easy access to milk flow. It becomes easier for the preterm with less strength and skill to initiate and maintain milk flow when milk production is well established. Milk production well above the infant’s nutrient needs can be achieved by promoting a goal of 20 to 24 oz/d by the end of the first week.

Coordinating the rhythmical process of swallowing relies on having easy access to a volume of milk sufficient to swallow. Although intake during early feedings is minimal, preterm infants are able to coordinate suck-swallow-breathing at least as early when breastfeeding as when bottle feeding. Additionally, the baby is more likely to maintain a stable body temperature and higher oxygen saturation at the breast.

Milk intake can be measured accurately with prefeeding and postfeeding weights (so-called test weights) obtained on an electronic infant scale. This technique has been used commonly by mothers of term babies with growth concerns and is also viewed favorably by mothers of preterm infants.

Typically, milk transfer volume takes many weeks to increase. Instead of focusing on volume ingested as the outcome measure of breastfeeding success, mothers should be encouraged to concentrate on the incremental steps of progress, such as conditioning themselves to let down with their infant and learning the
infant's cues and needs for assistance with latch on and positioning. After these sessions, mothers should be encouraged to pump to ensure maximal breast stimulation and emptying.

**Challenges With Positioning and Latch Unique to Preterm Infants**

Milk transfer is maximized with a generous supply, a reliable letdown, and effective oral dynamics. Fundamental to effective oral dynamics is an adequate latch onto the breast. The preterm infant has a number of unique challenges that may affect latch and positioning. These include a proportionally larger head than a term infant, weak neck muscles, a smaller mouth in relationship to the areola and breast, limited physical reserves, and a propensity to fall asleep at the breast from fatigue rather than satiety.

Effective milk removal occurs only with placement of the mouth over the areola (rather than just the nipple). An asymmetrical latch, with the lower jaw covering more of the areola than the upper jaw, permits the preterm infant's small tongue and lower jaw to massage the milk from the glandular tissue beneath the areola. With the nipple directed far back toward the upper palate, the glandular tissue is maximally accessible to the peristaltic action of the tongue, and the infant can best control the rate of flow.

Effective techniques to assist preterm infants to latch on vary, depending primarily on the strength and skills of the infant and the configuration of the breast. An important part of the learning process involves experimenting with various techniques to assist the infant. Contouring the breast to more easily fit into the baby's mouth may eliminate the need for devices such as the nipple shield.

Another useful skill is the ability to express milk synchronously, once the infant is latched on, helping the infant initiate and maintain the flow of milk. When the infant is exhibiting non-nutritive sucking (short, shallow, flutter-like bursts of sucking with only occasional swallowing and frequent long pauses), the mother can manually express until the infant demonstrates nutritive nursing (sustained, rhythmic sucking periods which are longer than the pauses).

**THE PACIFIER CONTROVERSY**

A meta-analysis of 20 studies suggested that pacifiers used for non-nutritive sucking significantly decreased the length of hospital stay and facilitated the transition to bottle feeding. This review failed to address potential negative effects on the transition to breastfeeding and the secondary cost savings that can be associated with extended breastfeeding. There is lack of agreement about the suggested benefits (ie, increased exposure to oral stimulation, weight gain, and gastric emptying) of non-nutritive sucking used during gavage feeding.

Optimately, tube-fed infants should be offered the breast during feedings, conditioning them to associate maternal contact with sucking and feeding. When the mother is absent, a pacifier may be beneficial for soothing when other techniques are not available or effective.

Pacifiers should not be used to delay feedings. Crying in term infants is a late indicator of hunger. A fretful baby expends calories better reserved for growth, and an exhausted baby learns little about breastfeeding. Restricting feeding volumes until weight plateaues has been identified as the most common cause of growth delay. Whether pacifier use encourages volume restriction deserves attention in future studies.

**THE BOTTLE CONTROVERSY**

With mounting pressure to abbreviate hospitalizations, some neonatologists are encouraging early introduction of bottle feeding 48 hours after achieving full tube feeding of 120 kcal/kg/d. In one study, infants who began oral feeds earlier (31 versus 34 weeks postmenstrual age) attained all oral feeding significantly earlier (34 versus 36 weeks postmenstrual age).

While these results suggest infants can be taught to coordinate sucking, swallowing, and breathing earlier than previously assumed, the degree that early introduction of bottle feeding may interfere with the acquisition of breastfeeding skills is controversial. The oral dynamics of breastfeeding and bottle feeding are significantly different. Whereas bottle feeding depends primarily on suction, breastfeeding is dependent on the massaging action of the tongue and jaw. The extent that the infant's preference for a feeding method (bottle versus breast) impacts feeding patterns is difficult to assess objectively. Preterm infants as young as 35 weeks can discriminate and demonstrate preference for taste. The degree to which "nipple confusion" or infant preference can be blamed for difficulty with making a transition to the breast has not been well studied in preterm infants.

To evaluate the impact of early bottle supplementation on breastfeeding, a prospective randomized trial compared supplementation either by an indwelling nasogastric tube or by bottle in 84 preterm infants. Breastfeeding rates were higher when infants progressed from nasogastric tube feeding to breast, rather than from bottle to breast. Both groups had similar lengths of hospitalization.

There is limited research regarding the optimal method to transition preterm infants to the breast. While some centers have established protocols for making the transition from nasogastric tube feeding to breastfeeding (avoiding bottle use), there is continued concern that this may prolong hospital stays and infant-mother separation. The promotion of bottle feeding to shorten the hospital stay may work for or against a successful transition and extended breastfeeding. The pediatrician and family, not the neonatology staff, will deal with the outcome of this approach.
Cup feeding and supplemental nursing systems have been used primarily in term infants. Although cup feeding has been determined a safe option in preterm infants, the volumes consumed are significantly smaller and the duration of feeding longer compared to bottle feedings.

**DISCHARGE PLANS**

Prior to discharge, if a rooming-in suite is available and the family is amenable, a 1- or 2-night stay, optimally timed during the transition period or prior to discharge, maximizes teaching and learning opportunities. Until evidence-based best practices for the transition from hospital to home can be tested and validated, a practical approach, building on the current state of the art, is suggested. An individualized home plan should be developed for each mother-infant dyad. The plan should be based on the skills of the infant, the mother’s milk production, and the infant’s caloric needs. The pediatrician should be intimately involved in this planning.

Care providers and parents commonly assume the mother, whose milk production has been pump-dependent, can abruptly discontinue pumping and rely on the efforts of her infant. This assumption is incorrect. Preterm infants often provide much less aggressive stimulations and may not confer the same degree of emptying of the breast.

For the preterm infant who has not completely made the transition to breastfeeding before discharge, each feeding can be started with time-limited breastfeeding, followed by liberal supplementation and pumping (with or without test-weights at home, depending on the circumstances). As the infant demonstrates consistent growth and increased strength and stamina, the plan can be adjusted. For example, when a baby is able to consume an adequate volume at the breast in 30 minutes or less supplementation can be eliminated.

At that point, a schedule of alternating breastfeeding followed by supplementation with breastfeeding followed by pumping can be instituted. Although the infant may be progressing well, requiring smaller volumes of supplementation, the mother’s production must be boosted with the use of the pump, typically until the infant reaches a corrected or conceptional age of approximately 40 weeks.

Mothers can wean themselves off the pump gradually when the infant demonstrates consistent weight gain and proficiency. Weaning from a pump, by dropping one session every 2 to 3 days, minimizes the risk of mastitis. Frequent pediatric assessment and consultation are critical. Postdischarge feeding management is discussed in more detail in the article by Meier in this issue (page 317).

**CONCLUSION**

Support for breastfeeding of the preterm infant requires coordination of care, consistency, and continuity. The expertise of a few hospital-based individuals does not provide sufficient support for extended breastfeeding. Consistent care requires that the extended family of care providers of both the mother and the infant adopt unifying policies. As pediatricians understand the specific challenges of breastfeeding the preterm infant, they may contribute to a breastfeeding care pathway, designed with the goal of extended breastfeeding. Besides the obvious investment in the future health of their patients, pediatricians gain a more effective and meaningful relationship with their families.

**REFERENCES**


