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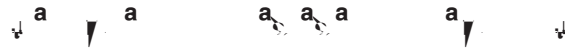
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Hospital breastfeeding initiation rates (75%) show that most mothers in the United States want to breastfeed and are trying to do so. Even from the very start, however, mothers may not be getting the breastfeeding support they need. Low breastfeeding rates at 3, 6, and 12 months illustrate that women face multiple additional barriers to maintaining breastfeeding. What can we do to help more mothers be more successful? As healthcare providers, we need to be believers that breastfeeding is worth the effort. Perhaps most important for us is to realize that human milk is not simply a food but rather a complex, human infant support system. We can then articulate to families the importance of breastfeeding as a clinical imperative, a preventer of acute and chronic illness and disease.

It will take integration, normalization, and mainstreaming of breastfeeding into our culture for acceptance and growth of the practice. Once we assist families in making educated decisions about breastfeeding, we need to provide supportive environments in our hospitals, medical practices, workplaces, and communities that implement the best ways to support breastfeeding. Breast milk is worth the effort, and the time has come to be ardent supporters of mothers and infants and their breastfeeding intentions.

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feeding has long-range effects on metabolic efficiency and energy balance. In addition, whereas benefits to infants are easy to recount, the health benefits to mothers cannot be underestimated. Table 2 lists the cancer and chronic disease protection afforded to women and infants by breastfeeding. For both, it is important to note that cumulative breastmilk intake by an infant and cumulative breastfeeding experiences by the mother increase the overall protective effect of breastfeeding.



All mammalian mothers feed milk to their young. Therefore, all mammalian young must also reach the stage of weaning. How mammalian mothers instruct their young as to what they should and should not consume when weaned was first suggested only a decade ago, largely based on studies of food acceptance in human infants at weaning.¹⁶ These studies have shown that maternal diet can influence the recognition

aerodigestive tract infections caused by bacteria and viruses,^{7,8} and even against bacterial urinary tract infections (UTIs).⁹ This leads to the question: How can a single agent, human milk, be protective against multiple types of infections caused by multiple classes of pathogens at multiple sites mediated via multiple different pathophysiologicals? The answer comes from the support system aspect alluded to above: protection is provided directly and indirectly via multiple milk components and activities that include immunoglobulins, various glycoproteins such as mucins and lactadherin, oligosaccharides, binding proteins and enzymatic activities, antioxidants, soluble cytokine receptors/cytokine antagonists, free fatty acids, acidic fecal pH, and a characteristic fecal flora.

Direct binding effects, which aggregate potential pathogens/toxins and prevent disease by preventing their attachment to host target tissue, are mediated by secretory immunoglobulin A (IgA), oligosaccharides, and even milk fat globule membranes.¹⁰ Notably, by minimizing attachment/infection potential via organism binding rather than overt organism killing (as occurs in classical human immunity), a pertinent point can be made: recovery of live pathogens from asymptomatic breastfed infants would be expected to occur,¹¹ and symptom severity for a given type of infection may be minimized. The latter effect may also be affected by the anti-inflammatory components contained in human milk.¹² Indirect effects of nonnutritive components mediating protection from infection relate to unexpected, nonhuman consumers of the lactose and oligosaccharides in human milk—the colonic microbial flora that occurs in the breastfed infant. This acid-producing, fermentative flora likely controls the numbers of potentially pathogenic adult enteric flora in the breastfed infant. Recent sequencing of the genome of *Bifidobacterium longum* subsp. *infantis*, clearly illustrates that this organism is metabolically optimized to use human milk carbohydrates as an energy source,¹³ reinforcing appreciation of the interactions and impacts of this infant support system.

It would be incorrect to presume that breastfeeding and human milk benefit the infants only via effects that counter/prevent infection. The meta-analysis summary from the Alliance for Healthcare Research and Quality (AHRQ) makes the point clearly that breastfeeding decreases adult obesity as well as adult-onset type 2 diabetes mellitus.¹⁴ Although these effects are less well understood mechanistically, the infant support system standpoint might suggest that human milk

sophisticated and intellectually curious, in the modern world, decisions often boil down to the answers to such questions as: What's in it for me? or What'll it cost me? The answers to such questions as they relate to breastfeeding can be summed up in the statement: It'll save you money. A series of studies, performed by government agencies and independent investigators, has documented the savings associated with breastfeeding from a variety of perspectives. From the population perspective of overall costs of illness in 2001,²¹ the impact (on three diseases) of raising the breastfeeding rate to the Healthy People 2010 targets (75% initiating, 50% at 6 months) was estimated to be a savings of \$3.6 billion. A more recent population-based assessment that examined effects on ten diseases estimates savings of \$10–13 billion per year if 80%–90% of families would exclusively breastfeed for 6 months.²² Although these monetary savings at the U.S. population level are the most striking, they are difficult to appreciate at the personal level. When healthcare use by exclusively formula-fed infants for lower respiratory tract infection, otitis media, and gastroenteritis was compared to that of exclusively or partially breastfed infants, both exclusive and partial breastfeeding decreased the numbers of office visits, follow-up visits, medications, and hospitalizations for all three illnesses.²³ The authors then translated the calculated use of healthcare into the healthcare cost of formula feeding and estimated that these costs per 1000 formula-fed infants were \$331,051, or about \$331 per baby per year. For households that purchase formula at retail cost, a year's worth of powdered formula costs approximately \$820 in year 2000 prices.²⁴

The implications of the cost of formula itself and savings related to less infant healthcare use are blunted in populations that have access to deeply discounted formula costs or subsidized healthcare costs. The federal government purchases over half of all formula sold in the United States for food aid programs that supply formula at deeply discounted prices,²⁵ and the populations using these programs typically also receive subsidized medical care. In these populations, enthusiastic encouragement and support of breastfeeding by healthcare providers likely has more impact than the specific economic considerations.

So, from multiple different perspectives, it is clear that breast is best—but how do we get there from here?

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Women make feeding choices for their infants based on many influences, and these decisions are typically made well in advance of the birth of their baby. In one study, 78% of women decided their infant feeding plan before conception or during the first trimester of their pregnancy.²⁶ This knowledge encourages us to discuss breastfeeding during preconception well-woman visits, perhaps in conjunction with teaching breast self-examination as a way to reduce one's risk of breast cancer and other diseases (Table 2). In caring for the newly pregnant woman, prenatal providers should take the opportunity to engage in a breastfeeding conversation early, simply endorsing it and recommending additional educational opportunities. Teachable moments about the benefits of breastfeeding should include the people who make a difference, the father and grandmothers.^{26,27} Kessler et al.²⁷ reported 71% of feeding decisions were influenced by the

infant's father and 29% by the maternal grandmother. A mother's primary sources of feeding information have been shown to be family (33.9%), friends (9.9%), the physician (8.3%), prenatal class (8.3%), and nurses in the hospital (6.6%).²⁶

Integrating, normalizing, and mainstreaming breastfeeding behavior into our culture is important for acceptance and growth of the practice. Whereas female breasts are routinely seen in the media as symbols of femininity and sexuality, they are infrequently used to portray breastfeeding as a common daily practice in movies, sit-coms, or advertisements. Best-for-Babes is an example of a nonprofit organization designed to "give breastfeeding a makeover" and "beat the booby traps—the barriers to breastfeeding success."²⁸ This novel social marketing approach on behalf of Mother Nature highlights examples of modern breastfeeding women in the media that might be emulated by women who follow pop culture. The goal is to empower women to make educated decisions and seek out the providers/facilities that will help them be most successful in attaining their goal to breastfeed. It will take many years of routine, daily, brief encounters with breastfeeding before it is thought of as the norm and gold standard for infant feeding.



The U.S. Preventative Services Task Force identified education on breastfeeding as the most effective single intervention for increasing breastfeeding initiation and short-term duration.²⁹ Cochrane Reviews also cite increased breastfeeding rates when breastfeeding education was provided vs. controls. Cochrane's summary of best education practices notes educational information is effective in the prenatal and postnatal periods and is most effective when it is maternal need based, informal, and repetitious, focusing on interactions between mothers (peer support) before and after delivery.³⁰ A breastfeeding class, taken alongside the baby's father, future grandmother, or girlfriend, is one way to learn the basics and have an additional breastfeeding advocate after the delivery. A postpartum breastfeeding class reunion in a support group setting would help reinforce keys to breast-

TABLE 3. TEN STEPS TO SUCCESSFUL BREASTFEEDING

The Baby-Friendly Hospital Initiative promotes, protects, and supports breastfeeding through the Ten Steps to Successful Breastfeeding for Hospitals, as outlined by United Nation Children's Fund and World Health Organization. The steps for the United States are:

1. Have a written breastfeeding policy that is routinely communicated to all healthcare staff.
2. Train all healthcare staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within 1 hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation even if they are separated from their infants.
6. Give newborn infants no food or drink other than breastmilk unless medically indicated.
7. Practice rooming-in—allow mothers and infants to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no pacifiers or artificial nipples to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Available at www.babyfriendlyusa.org/eng/10steps.html

Economically, a study in Texas demonstrated that the process of implementing the BFHI in U.S. acute care hospital settings is relatively cost-neutral.³⁶

Families who arrive for the birth of their infant with an educated intention to breastfeed will be more likely to succeed. Families who are confident in their decisions are more likely to make their breastfeeding desires known, request assistance, and avoid formula supplementation. Assuming a routine vaginal delivery, a stable newborn should be placed in skin-to-skin contact with the mother, naked and prone on the mother's bare chest. The infant is dried, covered with a blanket, and allowed to transition in direct contact with the mother. This early bonding opportunity has been shown to assist the transitioning infant metabolically and thermodynamically. It also provides an early opportunity for introduction to the breast and promotes breastfeeding initiation within 1 hour of delivery. Early feedings provide the foundation and reinforce the expectation that babies should be breastfed early and often. Postcesarean birth babies will be encouraged to breastfeed as soon as possible, ideally in the operating room or recovery area. Vitamin K injection and prophylactic antibiotics to prevent ophthalmia neonatorum can be delayed for the first hour after birth to allow for facilitation of skin-to-skin contact and initiation of breastfeeding with the mother.³⁷

Rooming-in, that is, having mother and infant in the same room, encourages more opportunities to breastfeed in a timely fashion. Close proximity allows for identification of early signals of hunger from the infant, such as sucking on the fist, rooting, or stirring in sleep. Identifying these early cues facilitates latching at the breast in a more controlled fashion for mother and baby. Hospital support staff, including delivery and postpartum nurses and lactation consultants, are a big

part of breastfeeding success. Breastfeeding assessment, teaching, and documentation of feeds, voids, and stools should be done at every opportunity on each nursing shift. Allowing the family to participate in logging of the data will help them continue their own diary of input and output upon discharge. This diaper diary record of information helps families keep on track with feedings and demonstrates evidence of increasing milk transfer with the growing number of voids and stools that should occur. It also provides great documentation for parents to bring to their first doctor visit. Additional knowledge and skills the breastfeeding mother should have before discharge are shown in Table 4.

Supporters of breastfeeding have long advocated early follow-up visits within the first week of life, preferably within 48–72 hours of hospital discharge. The July 2004 AAP Clinical Practice Guideline, Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation,³⁸ lends additional weight to the need for early postdischarge follow-up. The guideline recommends that all infants be examined by a qualified healthcare professional within 48 hours of discharge to assess infant well-being and the presence of jaundice. The follow-up examination should include the infant's weight and percent change from birth weight, adequacy of intake (8–12 breastfeeds per day), pattern of voiding and stooling, observation for jaundice, and measurement of transcutaneous or serum bilirubin levels if indicated. The Academy of Breastfeeding Medicine Protocol, Guidelines for management of jaundice in the breastfeeding infant equal to or greater than 35 weeks' gestation, helps address medically indicated reasons for supplementation, such as clinical dehydration, weight loss >8%–10%, delayed bowel movements, significant hyperbilirubinemia, delayed maternal milk onset, or hypoglycemia. Supplementation with expressed breast milk is ideal, followed by pasteurized donor breast milk, and lastly, infant formula if necessary.³⁹

Adequate milk supply is a concern of many mothers and healthcare professionals. Routine, effective milk removal from the breasts is essential to growing and maintaining an adequate supply. An active whey protein isolated from milk has been

TABLE 4. BEHAVIORAL CHECKLIST FOR BREASTFEEDING

1. Position baby correctly at breast with no pain during feeding.
2. Latch the baby to breast properly.
3. Note when baby is swallowing milk.
4. State that the baby should be nursed a minimum of 8–12 times a day until satiety, with some infants needing to be fed more frequently.

shown to act as a feedback inhibitor of lactation (FIL) when allowed to collect in the breast. The frequency or completeness of FIL removal regulates the rate of milk secretion by a mechanism that has been found to be local, chemical, and inhibitory in nature. Collection of the FIL in the breast inhibits milk constituent synthesis and decreases milk secretion on an autocrine basis. Therefore, completeness of milk removal (and FIL) ensures ongoing supply.⁴⁰ Mothers should practice breast massage and compression during feedings to assist with maximal milk emptying. This concept is especially important for mothers who are separated from their infants or choose to use a breast pump for milk expression. A hands-on approach, incorporating manual massage and compression during pumping, will aid in the completeness of milk removal.⁴¹



Nipple pain has been found to be one of the most common early breastfeeding challenges. For most women, this is a transitory discomfort that improves relatively quickly. However, complaints of nipple pain should prompt an evaluation of the infant's latch at the breast and perhaps repositioning of the infant. Often, a positional change that helps to extend rather than flex the baby's neck or gentle pressure on the chin of the infant to encourage a wider gape is a simple fix. A thorough examination of the infant's oral cavity may identify ankyloglossia or tongue-tie, which can affect tongue movement and function and cause nipple abrasion. For mild nipple soreness or cracking, applying expressed breast milk, warm water compresses, lanolin cream, or tea bag compresses has been shown to be equally effective.⁴²

Prevention of the greater problem of mastitis and being on the lookout for signs of milk obstruction are key. The risk of mastitis can be minimized with unrestricted feeding and avoiding constriction from bra or purse strap and pressure from side lying, seatbelts, and so on. Mothers should take care to perform routine breast inspection and palpation during feedings to identify lumps, pain, or redness. If these symptoms are noted, particularly if the mother is experiencing fever, body aches or flu-like symptoms, she should contact her healthcare provider and rest, increase breastfeeding, and use hand expression, warm compresses, and massage to relieve milk stasis. Anti-inflammatory/analgesics, such as ibuprofen, are safe for breastfeeding mothers to relieve discomfort. A review of the treatment of mastitis, with suggestions for covering Staphylococcus, Streptococcus, and Escherichia coli, can be found in the Academy of Breastfeeding Medicine Protocol: Mastitis.⁴³



Mothers often have questions about over-the-counter or prescription medications and their impact on breastfeeding. There are very few medications that are contraindicated in breastfeeding. Helpful references to assist in counsel

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