

## The Benefits of Breastfeeding

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## Abstract

Breast milk is the gold standard for infant nutrition. In the past, infant formula was promoted as equal or superior to breast milk. However, research has shown that breastfeeding is the superior form of infant nutrition except in rare circumstances. Breast milk provides for all of a newborn's caloric needs and has the correct balance of nutrients to promote proper development. In addition, breast milk provides protection against illnesses, supports an infant's immune system, and promotes life-long health for the newborn. Mothers also experience personal benefits by breastfeeding such as decreased cancer risks, bonding with their babies, and faster postpartum weight loss. There are multiple reasons why a mother does not breastfeed or is unsuccessful in continuing breastfeeding, but receiving support and education can help a new mother be successful. The Baby Friendly Initiative has improved breastfeeding rates but further work still needs to be done to increase breastfeeding initiation and continuation in order to promote and increase both infant and maternal health.

*Keywords:* breastfeeding, baby-friendly, breast milk, neonatal, maternal health

### The Benefits of Breastfeeding

Breastfeeding rates have declined drastically since the invention of infant formula (U.S Department of Health and Human Resources, 2011). According to the last Healthy People report released by the Department of Health and Human Services, the goals for breastfeeding in 2010 were not met (CDC, 2016). The American Academy of Pediatrics recommends exclusive breastfeeding for at least the first six months of an infant's life. Exclusive breastfeeding means that an infant requires no additional supplements or solid food, with the exception of Vitamin D, unless otherwise prescribed by a healthcare provider. The American Academy of Pediatrics further recommends that an infant continues breastfeeding for a year or longer provided that both the mother and baby mutually desire to continue breastfeeding (American Academy of Pediatrics, n.d.). In addition to benefitting the infant, breastfeeding also provides beneficial mother-infant bonding and additional health benefits to the nursing mother (Mathur & Dhingra, 2014).

It was once thought that the new infant formula was actually better for infants and would ultimately replace the need for breastfeeding. However, research has shown that this is not the case and it has been proven that formula is not as beneficial for an infant as was previously thought. And while it is true that infant formula will provide for the caloric needs of a newborn and has the necessary requirements for life and for the promotion of newborn development, as this paper will show, infant formula is lacking in many areas and provides absolutely none of the long-term benefits that can be gained by an infant being fed breast milk. In addition to these reasons, there are cost, ingredient, and allergy concerns associated with the use of infant formula. Breast milk is considered

the gold standard for an infant's nutritional needs during the first year of life.

Breastfeeding provides infants and mothers with both long and short-term benefits. In addition, breastfed babies have a greater chance of living a healthier life with decreased risks of childhood obesity, decreased rates of childhood illnesses, decreased chances of developing allergies, and a decreased chance of dying from sudden infant death syndrome (SIDS; U.S Department of Health and Human Resources, 2011).

### **Composition**

Breast milk is considered the superior form of infant nutrition during the first year of life because it contains all of the nutritional components required for life and for the promotion of the infant's health. According to an article in *The Pediatric Clinics of North America*, human breast milk is unique and varies between feedings, unlike formula, which is standardized and has a narrow range of composition (Ballard & Morrow, 2013). Human milk is specially tailored and changes throughout the infant's breastfeeding years in order to meet the growing child's needs. When the mother's milk first comes in after giving birth it is called colostrum. The colostrum, which may be produced for up to a week, can have a watery appearance and is limited in quantity, but it does meet the newborns nutritional needs during the first week of life before the mother's mature milk comes in. During the first six months of life, the average infant consumes two and a half to four cups of breast milk a day and each cup of milk contains approximately 160 calories. It is important to understand the composition in order to manage infant feedings and effectively educate mothers (Grosvenor & Smolin, 2015). According to Rachel Hale (2007), "Breast milk provides free nourishment that is perfectly balanced, temperature-

controlled and adapts to meet the nutritional and energy requirements of the growing child” (p. 369).

Despite variations in maternal nutritional status, the macronutrient composition of mature breast milk is overall very consistent. The macronutrient content of human milk is as follows: 0.9 to 1.2 g/dL for protein, 3.2 to 3.6 g/dL for fat, and 6.7 to 7.8 g/dL for lactose. Overall energy estimates range from 65 to 70 kcal/dL and this can vary depending on the breast milk’s fat content. Macronutrient composition does vary between preterm and term milk, with preterm milk having a higher fat and protein content when compared to term milk (Ballard & Morrow, 2013). A study in Davis, California looked at the association between maternal variability and the composition of human milk macronutrients and found that four months after giving birth, the mother’s breast milk macronutrient concentrations were associated with one or more of the following factors: maternal body weight for height, protein intake, parity, return of menstruation, and the frequency of nursing or pumping. This study also found that mothers who are able to produce larger quantities of milk usually have lower milk concentrations of both fat and protein, but they have higher concentrations of lactose in their milk (Nommsen, Lovelady, Heinig, Lonnerdal, & Dewey, 1991).

### **Protein**

Protein is essential for every cellular function that occurs within the human body. Proteins are essential components of both skeletal tissue and muscle tissue and they catalyze chemical reactions within the body; in addition, proteins play a critical role in the body’s immune response. During the first few months, infants require more calories and protein per kilogram of body weight than they will at any other time in their lives.

However, this need for protein has to be balanced with the immature kidneys' ability to breakdown the nitrogen waste stemming from the protein intake. Human milk has both the perfect balance of 1.8 g of protein/100 ml of milk and the perfect composition of protein to allow for incomparable infant digestion. Alpha-lactalbumin forms a soft and easily digestible curd in the infant's stomach and is the predominant protein found in human milk. In comparison, infant formulas usually have a ratio of 1.4 g of protein/100 ml of formula and the protein is derived from cow's milk and then modified to mimic the properties of human milk protein concentration and amino acid composition. However, the protein found in infant formulas fails to come close to fully replicating the protein found in breast milk, contributing to formula being more difficult for the infant to digest (Grosvenor & Smolin, 2015).

The two main types of protein found in human breast milk are whey and casein, which are each separately comprised by a specific sequence of proteins and peptides. Alpha-lactalbumin is found abundantly within breast milk along with casein, lactoferrin, secretory immunoglobulin IgA (SIgA), lysozyme, and serum albumin. Regardless of delivering term or preterm, the protein content of human breast milk decreases over the first four to six weeks postpartum. Human milk protein concentration is not affected by the mother's diet; instead, protein concentration increases with maternal body weight for height, and decreases in mothers who produce a higher quantity of milk. Feeding preterm infants requires special attention if using a resource such as donor human breast milk, because this milk is usually donated by a mother who is expressing late milk in terms of lactation, which would have lower levels of protein compared to a mother who just began to lactate. The lower levels of protein and lack of specific amino acids in the donor milk

means that preterm infants utilizing this method of nutrition require additional nutrient supplementation in order to meet their unique dietary needs (Ballard & Morrow, 2013).

### **Fat**

Lipids are necessary for the maintenance of health and are required for the absorption of fat-soluble vitamins. In addition, dietary fats are a source of essential fatty acids, and provide energy. Lipids in the body are stored mostly as adipose tissue, in which the triglycerides provide a lightweight energy source, protect vital organs, and provide insulation. During infancy, babies require a higher percentage of fat in their diet than they will ever need again during their lifetime. For the first six months of life, infant energy sources should be comprised of 55% fat. During the following six months, the percentage decreases to a diet made up of 40% fat. These percentages are significantly higher than the recommended 20-35% energy from fat recommended for adults. Because fat has the highest amount of energy per calorie, the high-fat diet of an infant allows a small volume of food to fill the infant's tiny stomach and provide enough energy to meet the needs of the growing infant. As an infant grows and solid food is introduced, the percentage of carbohydrates in the diet increases to make up for the decreasing percentage of fat intake (Grosvenor & Smolin, 2015).

Human breast milk is high in cholesterol and the essential fatty acids linoleic acid and alpha-linolenic acid, as well as their long-chain derivatives arachidonic acid (ARA) and docosahexaenoic acid (DHA). These long-chain acids, ARA and DHA, are crucial for the growing infant's eyesight and retina development. In addition, they aid with brain development, while also contributing to the infant's overall bodily growth.

Accumulations of these fatty acids in the brain and retina occur most rapidly beginning in

the third trimester of pregnancy and extending through the infant's first twenty-four months of life. The long-chain fatty acids, DHA and ARA, are found in high quantities in breast milk and some studies have speculated that babies who are breastfed may have a higher IQ due to these high levels of essential fatty acids. However, unlike other nutrients, levels of DHA and ARA are variable depending on the mother's diet, so it unclear as to what can be defined as an optimal level (Grosvenor & Smolin, 2015).

In contrast to human milk, formula's source of fat comes from vegetable oils. Formula contains 4.8 g of fat/100 ml of milk compared to 4 g of fat/ 100 ml of milk in human breast milk. Some companies do fortify their formulas with DHA and ARA, and if an infant is fed unfortified formula he or she may have had adequate quantities transferred via the placenta in the third trimester that would allow for adequate brain and retina development. However, even when comparing fortified formulas, breast milk has 167 other fatty acids occurring naturally that cannot be replicated by artificial means. Infants can synthesize DHA and ARA when born at term, but there is a wide variation in the ability to convert alpha-linolenic acid to DHA, and some infants may not synthesize enough for adequate brain and eye development. In addition, preterm infants cannot synthesize ARA and DHA, so this must be added to their diet, or the preterm infant must be breastfed, as breast milk naturally has high levels of ARA and DHA if the mother is consuming enough essential fatty acids in her diet (Grosvenor & Smolin, 2015).

Human breast milk contains high levels of palmitic acid and oleic acid, and is easily digested by infants. Fat is the most highly variable macronutrient found in human breast milk. The fatty acid makeup of human milk varies depending on the mother's diet; this variability is particularly dependent on the mother's consumption of polyunsaturated

fatty acids. In North America and other western countries, people generally consume more omega-6 fatty acids instead of omega-3 fatty acids, leading to an imbalance of fatty acid intake. Due to this imbalance, DHA levels can be particularly low in breastfeeding women. Supplementation of the breast milk or improvement in the mother's diet are suggested in mothers who have a low intake of DHA and essential fatty acids in order to provide for the growing infant's need for DHA. Another variability in the fat content of human milk is that there is two to three times more fat content in the hindmilk, or last milk of a feeding cycle than there is in the first milk the mother expresses. Also the time of the day may impact human milk fat content, with higher quantities of milk fat being found in mid-day feeds in contrast to the milk produced in the morning or evening (Ballard & Morrow, 2013).

### **Carbohydrates**

Carbohydrates are required for energy, and make up a large percentage of breast milk composition. The carbohydrate galactose combines with glucose to produce the milk sugar lactose that is found in breast milk. Brain cells and red blood cells require glucose in order to survive. Galactose promotes the development of the brain and central nervous system through the production of cerebral galactolipids, in which galactose is a key component. In addition, monosaccharide's ribose and deoxyribose have important non-energy related roles as components of RNA and DNA (Grosvenor & Smolin, 2015).

The concentration of lactose in human breast milk varies the least between different mothers in contrast to other macronutrients. Lactose aids in the absorption of minerals such as zinc, magnesium, and calcium. Other significant carbohydrates found in breast milk are oligosaccharides and glucosamines. Oligosaccharides, which are

considered a non-nutritive bioactive factor, comprise 1 g/dL of human milk concentration. Breastfeeding enhances the infant's digestive system in part by the role of oligosaccharides, which encourage the growth of beneficial bacteria in the infant's gut. Glucosamines are necessary for the formation and strengthening of connective tissues (Riordan & Wambach, 2010).

### **Vitamins**

Human milk provides the standard intake for the majority of vitamins required by an infant. However, like macronutrient concentrations, vitamin concentrations can vary according to the mother's diet and body stores. If the mother's diet is not optimal, she should continue taking a multivitamin throughout her time breastfeeding. Vitamin K levels are extremely low in human milk, so an injection of this vitamin is recommended by the American Academy of Pediatrics at birth in order to prevent hemorrhagic disease of the newborn. In addition, vitamin D levels are also naturally low in human milk, so the American Academy of Pediatrics recommends postnatal supplementation of vitamin D for breastfed infants (Ballard & Morrow, 2013).

### **Minerals**

Mineral levels in breast milk are not impacted by the mother's age, parity, or diet. In both adults and infants, minerals are vital for many of body's functions and both breast milk and formula contain sufficient quantities of minerals to provide for the infant. However, breast milk contains a superior ratio of minerals compared to the quantities found in formula. The minerals in infant formulas have a lower bioavailability, when compared to the minerals in breast milk. In order to compensate for the lower bioavailability, higher concentrations of minerals are found in infant formulas. However,

lower percentages of these minerals are actually absorbed by the developing infant (Davidson, Ladewig, & London, 2011).

### **Health Benefits**

Breast milk is considered the gold standard for infant nutrition for many reasons. One important reason is because formula cannot replicate all of the vast components and benefits breast milk has to offer. Breast milk is uniquely tailored to the growing infant's changing needs and perfectly formulated for the infant's immature digestive system. While formula does provide for a growing infant's basic nutritional need, it cannot offer any of the long-term benefits such as decreased chances of obesity and decreased allergies or short-term benefits such as improved digestion and protection against infections (Davidson et al., 2011).

### **Digestion**

Breast milk contains enzymes such as amylase, lipoprotein lipase, and lactoperoxidases, which increase the infant's ability to digest each meal. In addition, these enzymes also contain bacteriostatic properties (Mathur & Dhingra, 2014). Infants easily digest the high levels of naturally occurring palmitic acid and oleic acid found in breast milk. Also, the predominant protein found in breast milk, Alpha-lactalbumin, forms a soft curd that is easily broken down in the infant's digestive system (Ballard & Morrow, 2013).

The human infant gut is immature at birth, but human breast milk contains nutrients that promote a healthy microenvironment that can help provide gut protection and facilitate gut maturation. When a cross-section of the small intestine of a human fetus still in the womb, is examined, immature epithelium, delayed enterocyte proliferation,

and few lymphoid cells can be seen. In contrast, when the same section of small intestine of an infant who has been born and has begun to consume breast milk is examined, it reveals an actively proliferating and mature epithelium with all types of enterocytes present; in addition, a richness of lymphoid tissues can be found in the infant who has begun to consume breast milk (Walker, 2010).

Infants are susceptible to developing intestinal infections. A large cohort study conducted by hospitals in the Philippines revealed that solely breastfed infants had less intestinal infections than the formula fed babies in the study. The non-breastfed babies in this study had ten times more cases of diarrhea than the breastfed babies. When looking at a specific causative agent, *Campylobacter jejuni*, breastfed infants had fewer cases during the first six months of being breastfed and after the six-month period had ended (Clavino, 1982). This suggests that the breast milk stimulates active protection within an infant's gut that lasts after nursing ceases. In addition, breastfed babies have fewer cases of celiac disease, a common autoimmune disease. Maturation of the intestinal immune functions and activation of oral tolerance against gliadin, the autoantigen in celiac disease, are presumably responsible for the decreased incidences of autoimmune diseases in infants who have been breastfed (Walker, 2010).

Many of the infant's intestinal immune functions are underdeveloped at birth, but breast milk helps fill in the gap while the infant is developing intestinal defenses during the postpartum stages. In addition to providing protection against intestinal infections, breast milk also aids in the maturation of the infant's intestinal defenses. In order to produce certain key antibodies such as SIgA, the infant gut requires colonization by beneficial bacteria, *Bifidobacteria* and *Lactobacilli*. Breast milk actually aids in the

production of SIgA because non-digestible oligosaccharides found in breast milk ferment and help colonize these key bacteria, which leads to the production of SIgA around thirty days postpartum. The oligosaccharides also can inhibit pathogen attachment to the intestinal walls, thus obstructing the first step of pathogenic infection in the intestines. In addition to the work of oligosaccharides, partially digested milk proteins can also stimulate the proliferation of protective bacteria. These protective bacteria then help stimulate the production of SIgA and help the infant develop an oral tolerance to pathogens (Walker, 2010).

### **Immune Benefits**

At birth, all infants are SIgA deficient until around thirty days postpartum. During this vulnerable time, SIgA found in breast milk as a percentage of total protein is at the highest level it ever will be. Breast milk especially has increased percentages of the antibody SIgA during the pre-milk stage of colostrum production, which gives infants the highest level of protection during their vulnerable first weeks of life. In addition, specific antibodies directed against pathogens in the mother's environment can be found in expressed breast milk, and these antibodies serve to protect the infant from infection. Also, it has been discovered that when a mother is vaccinated in the last trimester of her pregnancy, specific SIgA antibodies can be found in the mother's breast milk, which will help protect the infant against the disease for which the mother was vaccinated (Walker, 2010).

In addition to being SIgA deficient at birth, newborns also lack important components of the inflammatory response, which protects against infections. In particular CD14, a soluble component of the toll-like receptor innate immune response, is lacking

in the intestinal secretions of newborns. Fortunately, human breast milk has been found to have high levels of CD14, especially in the colostrum stage of milk production. This means, that if the infant's immature intestines come under pathogenic attack, the infant's body would be able to produce an immune response against the pathogen (Walker, 2010).

Studies have suggested that the mother's lymphocytes may also be transferred to the infant via breast milk. This, in addition to the transfer of cytokines, growth factors, anti-antibodies, the bactericidal milk protein lactoferrin, and other mechanisms contribute to breastfed babies having a greater protection against infections than non-breastfed babies. The antibody SIgA directly protects infants against intestinal infections caused by bacteria such as *Campylobacter* and *Vibrio cholera*. Due to the capacity of breast milk antibodies to prevent microbes from attaching to cellular surfaces and mucosal membranes, it is likely that SIgA also helps protect breastfed babies from urinary tract infections and respiratory infections (Hanson et al., 2009).

### **Allergy Protection**

An allergy is defined as a hypersensitive reaction that is initiated by exposure to a certain substance that causes an immunologic reaction and specific symptoms that are replicable with subsequent exposure. Research shows that breastfed babies may have protection against the development of allergies. Breast milk contains trace amounts of the food proteins that the mother consumed, which could promote tolerance in the infant to the foods the mother ate (Kneepkens & Brand, 2010). Another way breastfeeding could help prevent allergies is that breastfed infants are exposed to less allergens during the first few months of life. They drink breast milk instead of formula containing the prevalent allergens of cow's milk and soy products (Zeretzke, 1998). In addition, formula is harder

to digest than breast milk. The undigested milk proteins can trigger an immune response and allergic reaction, leading to a higher number of allergies found in formula fed infants compared to breastfed infants (Grosvenor & Smolin, 2015).

Factors in human breast milk such as IgA, oligosaccharides, nucleotides and leukocytes can modify the infant's mucosal immune function by controlling the growth of intestinal microbiota and long-chain polyunsaturated fatty acids. Research also shows that a certain type of fatty acids called n-3 fatty acids, have anti-inflammatory and immune regulating features that could lead to the breastfed child having a reduced risk of developing allergies (Kneepkens & Brand, 2010). Furthermore, breastfed babies also may have protection against allergic diseases such as eczema and asthma (Hanson et al., 2009). In the Surgeon General's report on breastfeeding, researchers found a 67% excess risk of asthma in children who were not breastfed when a family history of asthma was present. In children with no family history of asthma, a 35% excess risk factor was associated with being formula fed over being breastfed (U.S Department of Health and Human Resources, 2011).

### **Ear Infections**

Ear infections, or acute otitis media, are a common malady of infancy and childhood. However, infants who are breastfed have lower incidences of this type of infection versus infants who were formula fed. In the Surgeon General's call to action to promote breastfeeding, researchers found that the risk for an acute ear infection was 100% higher among infants who had been exclusively formula-fed in comparison to infants who had been exclusively breastfed during the first six months of life (U.S Department of Health and Human Resources, 2011).

Acute otitis media often occurs secondarily to a viral infection of the upper respiratory tract. This leads to dysfunction of the eustachian tubes and microbial colonization of the nasopharynx and the middle ear by pathogens such as *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*. Breastfeeding can help prevent ear infections in infants by the action of maternal antibodies against potential middle ear pathogens. In addition, the maternal antibodies can coat the nasopharyngeal epithelium, creating a protective barrier and preventing bacterial adhesions. New research has also shown that human milk modifies the infant's own humoral immune response to certain otitis media pathogens by stimulating the production of IgG antibodies specific to whole-cell, nontypeable *H. influenzae* and to its surface antigens. This immune response, along with other immune regulating and promoting functions of human milk, may result in breastfed children having protection against ear infections even after they have been weaned from breast milk (Abrahams & Labbok, 2011).

Another potential way in which breastfed infants receive protection against acute otitis media is that breastfeeding has a different physiology than drinking from a bottle. When breastfeeding, there is a strong negative pressure and distinct suck, swallow, and breathing patterns that differ from a child who accepts the milk flow from a bottle. There are different pressure gradients and positioning during bottle-feeding that allow more milk to pool and increase the risk of fluid entering the middle ear. The risk of acquiring an ear infection is further increased if the infant is being fed formula by bottle, as the risks resulting from the lack of immunologic protection are added to the increased risk of milk pooling and differential pressure at the eustachian tube opening, leading to a case of acute otitis media (Abrahams & Labbok, 2011).

**Obesity**

The Surgeon General's call to action in support of breastfeeding recommended that children be exclusively breastfed for at least the first six months of life to decrease the rate of childhood obesity and other childhood diseases (U.S Department of Health and Human Resources, 2011). Early beneficial feeding practices are crucial for the development of a healthy weight status in young children. Having a healthy weight status as a young child can potentially impact the child's weight status later on in childhood and adolescence and protect against obesity (Moss & Yeaton, 2014).

A study conducted in the *Maternal and Child Health Journal* analyzed data on delaying the introduction of solid foods and breastfeeding and its correlation with decreased cases of childhood obesity. The study found that breastfeeding alone seemed to be a protective factor against obesity, with significantly lower odds for obesity. Lower odds for obesity were also found if introducing solid food was delayed to at least the child's fourth or fifth month of life. The study found that while delaying the introduction of solid food reduced the risk of obesity, breastfeeding further and significantly reduced those risks by nearly one half (Moss & Yeaton, 2014). The duration of breastfeeding also impacts the chance of a child developing obesity; with the longer the child is breastfed being associated with a further decrease in obesity odds. In addition, exclusive breastfeeding appears to have a stronger protective effect against obesity in contrast to being combined with formula feeding. The protection against obesity may extend into the teenage years and beyond (CDC, 2007).

Moss and Yeaton (2014) conducted a study, which found that one explanation for decreased obesity rates in breastfed children is that breastfed children learn to self-

regulate appetite control. This self-regulation persists even with the introduction of solid foods. Breastfeeding lets the child control food intake and may lead to children developing and recognizing internal cues that indicate hunger gratification. In contrast, bottle-fed children may overeat because they rely more on their caregiver signals and are encouraged to finish the entire bottle, whether they are already satisfied or not. This could lead to a tendency to overeat that persists into childhood and beyond, leading to the child becoming overweight or obese. In addition, early introduction of solid foods and early termination of breastfeeding can lead to unhealthy habits if the foods introduced are low in nutritional value and high in sugar and fat. Early, unhealthy eating habits in children under the age of two are linked to later unhealthy eating habits throughout the lifespan (Moss & Yeaton). For this reason and many others, it is recommended that children are exclusively breastfed for at least the first six months, and then breastfed with healthy and balanced supplementation with solid food for the next six months of life (American Academy of Pediatrics, n.d.).

An additional reason for the linkage between breastfeeding and decreased obesity is that formula-fed infants have higher plasma insulin concentrations and a prolonged insulin response. High insulin levels stimulate the deposition of fat tissue, which can lead to weight gain, obesity, and an increased risk of type-two diabetes. An additional contributing factor is that the higher levels of protein found in formula may cause more insulin to be released. Leptin levels may also be influenced by breastfeeding and lead to improved appetite inhibition and body fat control in children who have been breastfed (CDC, 2007). A study found that children who had the highest intake of breast milk early in life had more favorable concentrations of leptin in contrast to their fat mass later on in

life (Singhal et al., 2002). Infants who are breastfed can have a 4% risk reduction of being overweight later on in life for each month that they are breastfed. This is a life-long benefit that breast milk offers infants that formula cannot even come close to replicating. Contrariwise, being formula-fed increases a child's chances of being overweight or obese later on in life, where being breastfed directly decreases the risk (Eglish, Montgomery, & Wood, 2008).

### **Sudden Infant Death Syndrome**

Sudden infant death syndrome (SIDS) is when a child under the age of one unexpectedly dies in his or her sleep and upon investigation and autopsy, no medical cause for the death can be found. Current recommendations to prevent SIDS are that infants should be put to sleep on their backs with no extra blankets, pillows, or stuffed animals in the crib. Parents should not smoke around their infants, or smoke while pregnant, and the child should be put to sleep on a firm mattress. Additionally, many studies have shown that breastfeeding may serve as a protective factor against SIDS (Young, Watson, Ellis, & Raven, 2012).

One protective factor against SIDS seems to be an infant's ability to be easily aroused from sleep. It has been shown that smoking in the home negatively affects an infant's arousal and thus increases the child's chance of dying from SIDS. In addition, sleeping in the prone position also decreases the infant's ability to be aroused from sleep. One reason why breast milk may help protect an infant against SIDS is that babies who are breastfed are exposed to higher levels of DHA through their mother's milk. Postmortem studies showed that formula-fed infants who died from SIDS had significantly lower levels of DHA in the frontal lobes of their brains than breastfed

infants. DHA is a long chain fatty acid that is concentrated in neural tissue and can help predict infant development. Higher concentrations of DHA have been associated with more mature patterns of infant sleep. Enhanced infant brain neuron functioning may be a benefit of breastfeeding as demonstrated by the discovery that breastfed babies have superior visual-induced acuity when compared to formula fed infants (Adamson, Ferens, Horne, Parslow, & Watts, 2004).

The study conducted in the *Archives of Disease in Childhood: Fetal and Neonatal Edition*, revealed that breastfed babies are more readily aroused from sleep than non-breastfed babies. The study had forty-three full-term infant participants, and examined the levels of arousability in the breastfed infants and formula fed infants throughout their first six months of life. The study showed that breastfed infants were more easily aroused at two to three months of age in contrast to the formula fed infants. This age correlates with SIDS peak incidence times, and breastfeeding during these crucial months could decrease infants' chances of dying from SIDS (Adamson et al., 2004).

A meta-analysis study conducted in 2011 by Hauck and colleagues addressed the relationship between breastfeeding and decreased SIDS rates. Eighteen case-controlled studies were included and the researchers examined the relationship between any amount of breastfeeding and decreased SIDS rates. For babies who received any quantity of breast milk for any duration the univariate summary odds ratio was 0.40 (95% Confidence Interval (CI): 0.35-0.44) and the multivariable summary odds ratio was 0.55 (95% CI: 0.44-0.69). The univariable summary odds ratio for exclusive breastfeeding of any duration of breastfeeding was 0.27 (95% CI: 0.24-0.31). Hauck and his colleagues concluded that while exclusive breastfeeding offered the most protection against SIDS,

breastfeeding of any duration and any quantity still provided some protection against SIDS (Hauck et al., 2011). In the Surgeon General's call to action in support of breastfeeding, for SIDS, an excess risk of 56% was identified for infants who were never breastfed (U.S Department of Health and Human Resources, 2011).

### **Preterm infants**

Approximately 14% of infants born in the United States are admitted into a neonatal intensive care unit (NICU) after birth and research has shown that human breast milk can be beneficial to preterm babies in several ways. Breast milk improves the preterm infant's host defenses, leads to enhanced digestive capabilities, facilitates gastrointestinal development, and helps the infant have a greater chance of healthy neurodevelopment. In addition, the infant can benefit from the mother being more psychologically and physically healthy due to her decision to breastfeed her preterm infant (Wight, 2015). In December 2015, Nancy Wight said:

Human milk is more than nutrition; it is medicine for both the infant and his mother: the milk for the infant, and the provision of it for his mother.

Breastfeeding should be considered a health care issue, not just a lifestyle choice. (p.840).

Human breast milk intake decreases a NICU infant's chances of becoming septic or acquiring other dangerous infections. One way by which this benefit occurs is through the enteromammary system. When the mother of a baby in the NICU is exposed to her infant's environment and potential pathogens by skin-to-skin contact with her preterm baby, it can induce the mother's immune system to make specific antibodies against the nosocomial pathogens threatening the health of her infant. These specific antibodies are

then transferred to the preterm infant via their mother's breast milk and provide substantial protection against hospital-acquired infections. Skin-to skin contact highly correlates with a mother's ability to produce milk and can lead to decreased cases of necrotizing enterocolitis (NEC), late-onset sepsis, chronic lung disease, retinopathy of prematurity, and overall can decrease the infant's length of stay in the NICU (Wight, 2015).

The promotion of healthy gut microbiota is influenced by an infant's mode of delivery into the world. Babies born via cesarean section, which is common for NICU infants, are not exposed to the bacteria in the mother's birth canal and have different bacteriologic patterns than infants born vaginally. For this reason, these infants can also greatly benefit from being breastfed in order to help colonize the digestive tract with beneficial bacteria. Benefits can be long-term and lead to decreased hospital re-admissions and respiratory infections within the first year. Also, breastfed NICU babies, like full-term babies, have decreased cases of ulcerative colitis, Crohn's disease, and allergies in comparison to formula-fed infants (Wight, 2015).

It has been shown that human breast milk is specifically tailored to each infant's individual needs, which is especially beneficial for NICU infants. The milk produced by a mother who delivered preterm is different from milk produced by a mother who delivered full-term in that preterm milk uniquely provides for the increased nutritional needs of a premature infant. Preterm milk has increased percentages of total protein, nitrogen, immune proteins, total lipids, medium-chain fatty acids, total energy, and some vitamins and minerals. Also, preterm milk in comparison to full-term milk has higher concentrations of growth factors, hormones, immunoglobulins, epidermal growth factors,

anti-inflammatory factors, and immunomodulators. As with full-term milk, nutrient and immunological factors decrease as the lactation process continues (Wight, 2015).

Studies have shown that human milk intake by NICU infants can positively impact the child's IQ (Wight, 2015). A long-term large cohort study looking at neurodevelopment and performed by Vohr et al (2007), discovered that there is a dose-dependent relationship between the quantity of human milk feedings during the NICU stay and the infant's neurodevelopmental outcome at eighteen and thirty months of age. This finding was consistent even when adjusted for multiple cofounders. The result of the study was that for each 10 ml/kg/day increase in human milk consumption over the NICU stay, the infant's mental development index score increased by 0.53 points. Also, the psychomotor development index score increased by 0.63 points and the total behavior rating scale percentile score increased by 0.82 points (Vohr et al.).

### **Necrotizing Enterocolitis**

NEC commonly occurs in preterm babies in the NICU and is a multifaceted illness that is not completely understood. NEC has a sudden onset and is the most common cause of infant mortality and morbidity in the NICU. An inflammatory cascade set off by hypoxia in utero or sepsis is thought to precipitate NEC and causes the intestinal mucosa to become necrotic. Further mucosal breakdown causes more severe NEC and can lead to worse sepsis and death. The most prevalent risk factor for NEC is prematurity; the more premature an infant is, the higher the risk for NEC (Gephart, McGrath, Effken, & Halpern, 2013). Breast milk can offer protection against NEC presumably by the oligosaccharides forming a protective coating over the mucosa of the intestines (Wight, 2015). A trial of formula-fed versus breastfed NICU infants found that

infants fed breast milk were six to ten times less likely to develop NEC than those fed formula. Babies fed a mixture of formula and breast milk were three times less likely to develop NEC. In addition to oligosaccharide protection, epidermal growth factor can also be found in breast milk; this is a compound that limits ileal damage from bile acids and has been shown to be protective against NEC. This protective factor is present in breast milk but not in formula (Gephart et al., 2013). A different study performed by Evenhouse and Reily found that infants fed formula and breast milk have a 50% lower risk of developing NEC than infants fed solely formula. In contrast to exclusively breastfed infants, infants fed both formula and breast milk are twice as likely to develop NEC (Evenhouse & Reily, 2005). These studies show that any quantity of breast milk can be beneficial, but a higher quantity will give greater benefits and offer the maximum level of protection against NEC.

### **Maternal Benefits**

While breastfeeding is primarily for the benefit of the growing infant, research has shown that the breastfeeding mother may also receive some benefits by choosing to breastfeed her child. Mothers who breastfeed have decreased chances of contracting certain reproductive cancers such as breast cancer and ovarian cancer. Other long-term benefits include decreased incidences of diabetes, obesity, and cardiovascular disease. Short-term benefits for the breastfeeding mother include decreased chances of a postpartum hemorrhage and faster postpartum weight loss. Exclusive breastfeeding can also be a natural form of birth control, by delaying ovulation and the return of the mother's menstrual cycle. In addition, breastfeeding helps facilitate bonding between the mother and child. Breastfeeding mothers also have fewer cases of postpartum depression

(Davidson et al., 2011). The act of breastfeeding goes beyond just supplying a nutritious meal for the infant. In October, 2011, Tonse Raju said:

An infant suckling at his or her mother's breast is not simply receiving a meal, but is intensely engaging in a dynamic, bidirectional, biological dialogue. It is a process in which physical, biochemical, hormonal, and psychosocial exchange takes place, designed for the transfer of much needed nutrients, as well as building a lasting psychosocial bond between the mother and her infant. (p. 257)

### **Breast Cancer**

There are multiple factors, both modifiable and non-modifiable, that contribute to a woman developing breast cancer. These factors include a woman's age, menstrual history, childbearing history, genes, use of hormone therapies, and socioeconomic and physical environment considerations. Of these factors, breastfeeding is a modifiable factor that can potentially provide some protection against developing breast cancer. While the data sets are not completely consistent, most studies do agree that an extended period of breastfeeding during a woman's lifetime can reduce the risk of breast cancer (Pechlivani & Vivilaki, 2012). In developed countries, where women either never breastfeed or breastfeed only for a short duration, there are higher incidences of breast cancer. This observation led to speculation by researchers that the duration of breastfeeding may correlate with protection against breast cancer, with the longer a woman breastfeeds associated with the highest level of protection against breast cancer (Godfrey & Lawrence, 2010).

A meta-analysis study with 147,275 women participants, combined forty-five studies published through 2001 and calculated a 4.3% (95% CI 2.9-5.8) reduction in

breast cancer for every year of breastfeeding. A separate meta-analysis revealed a 28% decreased risk of breast cancer in women who breastfed longer than 12 months. These studies show that there is a dose-dependent relationship between breastfeeding and lower incidences of breast cancer (Egash et al., 2008). Therefore, it is beneficial for both the mother and the infant to continue breastfeeding throughout the first year of the infant's life and even beyond if mutually desirable for the child and mother.

### **Ovarian Cancer**

Not only can breastfeeding help lower the mother's risk of acquiring breast cancer, but it also may offer some protection against developing ovarian cancer. Epithelial ovarian cancer is the second most common cause of gynecological cancer mortalities worldwide and was the cause of 4.2% of female deaths in 2008 (Luan et al., 2013). The Agency for Healthcare Research and Quality did a meta-analysis on nine separate studies that examined the relationship between ovarian cancer and breastfeeding, and this study found a 21% (95% CI 9-32) reduction in the risk of ovarian cancer in comparison to woman who had never breastfed (Egash et al., 2008). A different meta-analysis looking at epidemiologic studies found that a woman who had breastfed at some point in her life had an almost 24% reduction in ovarian cancer risk compared to a woman who had never breastfed. Furthermore, results of dose-response analysis suggested that the risk of ovarian cancer decreased by 8% for each five-month increase in total breastfeeding duration. Resembling the link with breastfeeding and breast cancer reduction, it appears that the longer a woman breastfeeds, the greater her chances are of remaining cancer-free throughout her life (Luan et al., 2013).

**Weight Loss**

Many mothers are concerned about the weight they gained during pregnancy, and after the baby is born they are eager to return to their pre-pregnancy appearance and weight. A maternal benefit of breastfeeding is that it is linked to increased maternal postpartum weight loss. A randomized controlled trial study conducted by Nommsen et al found greater maternal weight loss with exclusive breastfeeding than with partial breastfeeding. Pregnancy is associated with accumulation of fat stores and harmful changes in glucose and lipid metabolism. It has been hypothesized that lactation plays a role in resetting maternal metabolism after pregnancy, which also decreases a woman's chances of acquiring metabolic diseases later on in life. Studies have provided evidence that lactation is a modifiable risk factor for maternal metabolic disease because lactation is associated with favorable changes in adiposity, glycemic control, and lipid homeostasis that persist after the baby has been weaned (Stuebe & Rich-Edwards, 2009).

**Oxytocin**

Oxytocin is a hormone produced by the hypothalamus and stored in the posterior pituitary gland. This hormone has several functions that benefit the postpartum mother through the action of breastfeeding, which include increased maternal bonding with the newborn and decreased chances of a postpartum hemorrhage. Oxytocin is responsible for the milk ejection, also known as the let-down reflex. Oxytocin acts by stimulating contraction of the myoepithelial cells surrounding the alveoli and ducts of the breasts. The contraction of the myoepithelial cells enables milk transport and ejection from the breast. Tactile stimuli to the nipples can cause this neuroendocrine reflex. In addition,

mothers often experience the let-down reflex whenever they see their infant, hear the cry of their infant, or even just think of their baby (Eglash et al., 2008).

Postpartum hemorrhage is responsible for the majority of maternal morbidity and mortality worldwide. Oxytocin release causes uterine contractions, which decreases blood loss and can result in a decreased postpartum hemorrhage risk. In underdeveloped countries, this has important implications, as breastfeeding and the release of oxytocin can cause uterine contractions and stop a potential hemorrhage when artificial oxytocin, known as Pitocin is unavailable. Furthermore, in developed countries where Pitocin is commonly used in the third stage of labor, breastfeeding could be considered an alternative to this medication in low-risk patients (Abedi, Jahanfar, Namvar, & Lee, 2016).

It is common for new mothers to feel slightly depressed after giving birth due to the rapid change in hormones that occurs immediately after the baby is born. This condition is commonly referred to as baby blues. However, the hormone oxytocin can help decrease these feelings and aids in facilitating the bond between mother and child. Lactation is associated with a mitigated stress response, involving cortisol and the lactogenic hormones oxytocin and prolactin. These hormones seem to have both an antidepressant and anxiolytic effect on the nursing mother (Godfrey & Lawrence, 2010).

### **Bonding**

The term bond refers to the emotional connection of the mother to her infant and oxytocin is a powerful hormone that helps a mother bond with her child (Else-Quest, Hyde, & Clark, 2003). When an infant suckles at his mother's breast, this hormone is released causing more milk to be ejected. The surge of oxytocin throughout the mother's

body results in feelings of closeness and affection for her newborn (Godfrey & Lawrence, 2010). Maternal oxytocin increases parasympathetic activity and decreases anxiety, resulting in enhanced bonding. It is likely that when a mother feels a stronger bond to her infant, she may be more responsive to her infant's needs and a more sensitive caregiver, resulting in a higher quality mother-child relationship. The immediate postpartum period is a sensitive time for maternal- infant bonding. Oxytocin levels are at their highest, and this is a crucial time to initiate breastfeeding. The skin-to-skin contact that occurs during breastfeeding can improve maternal affect and reduce anxiety. Further research has shown that breastfeeding mother-infant couplets spend significantly more time in mutual gaze during feedings than do bottle-feeding mother-infant couplets. Breastfeeding not only provides for the infant's nutritional needs, but as many women have reported, it is an enjoyable and emotionally benefitting experience that mother's share with their infants (Else-Quest et al., 2003).

### **Long-Term Health Benefits**

In addition to offering short-term maternal benefits, breastfeeding also has long-term maternal benefits that can increase a woman's chances of having a longer and healthier life. This, in turn, also positively impacts the baby by having a mother who is healthy and able to provide appropriate care. Breastfeeding is associated with a decreased risk of developing type two diabetes mellitus. As with many of breastfeeding's benefits, this risk reduction is dose dependent. A longer duration of breastfeeding is positively correlated with a decreased risk of developing type two diabetes mellitus. It is theorized that lactation may decrease diabetes risk in women with no history of gestational diabetes by improving glucose homeostasis. In addition, the reduction of diabetes incidences may

also be explained by the related reduction in obesity rates in women who breastfeed.

Breastfeeding women lose weight at a more rapid pace after giving birth than non-breastfeeding mothers, and women who breastfeed have lower incidences of obesity later in life. And while it appears that there is no evidence showing breastfeeding lowers the risk of diabetes for women who had gestational diabetes, it also causes no harm and is beneficial for these women for a plethora of other reasons (Godfrey & Lawrence, 2010).

Research also shows that women who breastfeed for a lifetime total of two years or more have a 37% lower risk of developing coronary heart disease. Even when this statistic was adjusted for lifestyle factors, early-adult adiposity, and parental history, these same women had a 23% lower risk of developing coronary heart disease when compared to women who had never breastfed (Godfrey & Lawrence, 2010). Researchers have also found that breastfeeding is linked with a decreased risk of hypertension, decreased risk of a myocardial infarction, fewer cases of hyperlipidemia, and a decreased chance of developing metabolic syndrome due to the role lactation plays in resetting the mother's metabolism after giving birth. The longer a woman lactates, the more completely she reduces the fat stores that accumulated during pregnancy when her body was providing for two. Contrariwise, in a woman who does not breastfeed, unfavorable metabolic changes can persist for a longer period of time and increase her disease risk (Stuebe & Rich-Edwards, 2009).

## **Implications for Practice**

### **Breastfeeding Rates**

Despite the overwhelming evidence that breastfeeding is the superior form of infant nutrition, breastfeeding rates in the United States failed to reach the set national goals. According to the last Healthy People report released by the Department of Health and Human Services, the goals for breastfeeding in 2010 were not met. The percentage of infants ever breastfed was 74% of the population of the United States; the goal was for 81.9% of the nation's infants to be breastfed at some point of their lives. A more drastic percentage was the number of infants still being breastfed at six months, which dropped from the starting percentage of 74% of infants at birth to 43.5% of infants still being breastfed at the six-month mark. This percentage significantly falls short of the goal that 60% of infants would still be breastfeeding at six months of age. According to the same report, only 22.7 % of infants were being breastfed for a whole year. The goal for infants being breastfed at one year was 34.1% of the population's infants (CDC, 2016).

### **Determinants of Breastfeeding**

There are various reasons why women choose not to breastfeed or do not continue breastfeeding once they leave the hospital. Nearly all women are biologically capable of breastfeeding, with the exception of a few medical diseases that limit or prevent lactation and conditions such as HIV in which the virus could be transmitted to the infant via the breast milk. Instead, a wide range of historical, social, socioeconomic, cultural, and individual factors influence breastfeeding practices. Some contributing factors to delayed breastfeeding, and therefore potentially failed breastfeeding include high-risk pregnancies, assisted delivery with a long hospital stay, mother and baby separation,

maternal illness, a preterm infant, infant formula supplementation, and free samples of formula provided by the hospital (Rollins et al., 2016).

A leading motive for a woman deliberately choosing not to breastfeed or early weaning is the woman's job and her return to work. Many studies have reported negative experiences for women who try to breastfeed after returning to work, and women who plan on working are less likely to begin or continue breastfeeding. Because of the increase of women in the workplace, it is important that employers are supportive of nursing mothers and provide private areas for pumping and allow adequate break times. A study conducted in the United States showed that lactation rooms and breaks to express breast milk increased breastfeeding rates by 25% at six months. Breastfeeding needs to be promoted as normal and healthy and a culture of acceptance, support, and encouragement needs to be adapted by society (Rollins et al., 2016).

Mothers who fail to breastfeed their first child are less likely to initiate breastfeeding with their next child. Individual factors that negatively affect a woman's ability to breastfeed include poor advice from friends or family, a lack of self-confidence and self-efficacy, inadequate support, and anticipation of breastfeeding difficulties. If an infant is fussy or crying, a mother may interpret this as hunger and feel that she is not feeding her child enough and therefore resort to supplementation with formula or abandon breastfeeding altogether. For this reason it is vital to educate mothers on how much milk is required by an infant and more substantial ways to monitor whether or not an infant is receiving adequate nutrition (Rollins et al., 2016).

**Baby Friendly Initiative**

The Baby Friendly Initiative was a joint World Health Organization and UNICEF initiative that began in 1991 and was aimed at increasing breastfeeding rates in hospitals through improvement of healthcare practices. The initiative contains a ten-step program to facilitate successful breastfeeding, which is referred to as Ten Steps to Successful Breastfeeding. It is recommended that every hospital providing maternity services and care for newborn infants should implement the Ten Steps to Successful Breastfeeding. The ten steps are as follows: have a written breastfeeding policy that is regularly communicated to all health care staff, train all health care staff in skills needed to implement this policy, educate all pregnant women about the benefits and management of breastfeeding, help mothers initiate breastfeeding within half an hour of birth, show mothers how to breastfeed, teach mothers how to maintain lactation even if they should be separated from their infant, unless medically indicated give newborn infants no food or drink other than breast milk, practice rooming-in, encourage breastfeeding on demand, give no artificial teats or pacifiers to breastfeeding infants, encourage the organization of breastfeeding support groups, and refer mothers to support groups upon discharge from the hospital (Barnes, Cox, Doyle, & Reed, 2010).

In order to become a Baby Friendly designated hospital, a hospital must overcome many obstacles and change various policies and implement new guidelines. This impacts the whole health care team, and resistance is common with change. Involving both nurse and physician leadership has been shown to be an effective way to manage the necessary changes that must take place in order to adopt all of the Ten Steps. It can take years to fully implement the Ten Steps to Successful Breastfeeding and for a hospital to receive

Baby Friendly status, but studies show that the Baby Friendly Initiative does improve breastfeeding rates. Rosenberg and colleagues found that Baby Friendly practices improve breastfeeding rates at two days and at two weeks. The researchers of this study also found that hospitals implementing step one, which is having a breastfeeding policy in place, were more likely to have improved breastfeeding outcomes. A different study found that rates of breastfeeding initiation increased from 58% to 86.5% in the four years after hospitals received Baby Friendly designation. An additional study found positive results from instituting step four and mothers who breastfed within the first hour of birth were more likely to practice exclusive breastfeeding at two to four weeks postpartum compared to mothers who did not (Hughes, 2015).

### **Beyond Baby Friendly**

While the Baby Friendly Initiative should be implemented by hospitals and has been shown to help increase breastfeeding rates, other measures can be taken to increase breastfeeding rates and improve the duration of breastfeeding in mothers who choose to initiate breastfeeding. In addition to new mothers receiving support in the hospital by trained medical professionals such as nurses and lactation specialists, a study conducted in England demonstrated that home support in the first week postnatal helped improve breastfeeding prevalence and duration. The project's goal was to increase the six to eight week prevalence rate in breastfeeding and it exceeded the set goal of a 3% increase in breastfeeding prevalence at six and eight weeks postnatal. Members of a healthcare team trained in Baby Friendly standards visited the women who participated in the study during their first weeks postpartum and assisted them with breastfeeding problems, answered questions, and offered breastfeeding support. The feedback from the study's

participants was very positive and the women reported appreciation that they were contacted directly from the hospital, which made them feel confident that they would have support as they breastfed. Readily available support and information for new mothers is necessary in order to promote breastfeeding initiation and continuation (Price, 2014). In 2014, Linda Price said:

Infant feeding choices are complex and are related to social, cultural and economic factors. It is therefore essential that every effort is made within the social environment to promote breastfeeding as the norm, for all mothers. It is important to recognise that health impacting decisions, such as infant feeding choices, are not made within a social vacuum, but rather within an environment, influenced by a host of factors, not necessarily related to health concerns. The opinions and experiences of partners, family and friends influence a mother's infant feeding decisions. Therefore, it is important that the community as a whole understands the importance of breastfeeding and supports new mothers in their efforts to breastfeed (p.30).

Often new mothers need support and resources after leaving the hospital if they are to be successful in breastfeeding. Women are educated that breastfeeding is best, and therefore want to do what is best for their children, but if not supported they fail in their endeavor as demonstrated by the statistics in the Healthy People 2010 report, which stated that 74% of infants were breastfed at birth but only 43.5% of infants were still being breastfed at the six-month mark (CDC, 2016). A meta-analysis study found that interventions providing antenatal and postnatal support to mothers, fathers, and other family members at home such as post-discharge telephone calls and home visits were

effective at improving exclusive and continued breastfeeding. Mass media promotion of breastfeeding has been shown to improve initiation of breastfeeding and in addition, government promotion of breastfeeding can also help increase rates. Laws regulating workplace protection for mothers who are breastfeeding, regulation of the infant formula industry, healthcare coverage of lactation support, and the creation of community-based programs can help women be successful in breastfeeding initiation and continuation. Political institutions should strive to remove societal and structural barriers that thwart a mother's ability to breastfeed. The economic benefits provided by breastfeeding through reduced healthcare costs for both mother and child should be considered when funding for the promotion and protection of breastfeeding is evaluated, as breastfeeding has been shown to be a primary prevention protective factor for mother and baby for a plethora of disease conditions (Rollins et al., 2016).

### **Conclusion**

Human breast milk is the gold standard for infant nutrition, and the act of breastfeeding provides many incomparable benefits both for the infant and for the mother. The composition of human breast milk is perfectly tailored to the growing infant's needs and has the perfect formulation of essential nutrients within it that can never be replicated by artificial formula. Breast milk has a better balance of fats, carbohydrates, proteins, vitamins, and minerals when compared to formula and breastfed babies have an easier time digesting their food due to its perfect chemical composition. In addition, breast milk aids the newborn's body in building up the immune system, which protects the baby from infections. Breastfed infants have decreased cases of ear infections due to breast milk's immune building properties. Also, breastfed infants have decreased

rates of allergies and asthma. Premature infants can benefit from being breastfed and breastfeeding is associated with a lower risk of an infant developing NEC. Premature milk is specially formulated to provide superior nutrition that is tailored to meet the fragile premature infant's needs. Breastfeeding has been found to be a protective factor against an infant dying from SIDS. Breastfeeding mothers can enjoy quicker weight loss after pregnancy and the chance of a postpartum hemorrhage is decreased.

Breastfeeding can benefit a child and his mother long after the child is weaned. Breastfeeding is associated with higher IQs later on in life and breastfed children have a decreased chance of developing type two diabetes mellitus and becoming overweight or obese. Maternal benefits of breastfeeding include a decrease in each of the following: ovarian and breast cancer rates, cardiovascular disease, obesity, type two diabetes mellitus, and hypertension. In addition, breastfeeding is an experience that allows the mother to bond with her child, which has both short and long-term benefits for mother and child. Breastfeeding starts a child off with a wholesome foundation, which contributes to the child growing into a healthy adult. Breast milk is the superior form of infant nutrition that not only benefits the child but also benefits the supplier.

The Baby Friendly Initiative has helped improve breastfeeding rates. It is important for hospitals and health care professionals to overcome perceived barriers to instituting the Ten Steps in order to achieve the goal of improved infant and maternal health through breastfeeding. Breastfeeding needs to be promoted as normal and healthy and a culture of acceptance, support, and encouragement needs to be adopted by society. In order for breastfeeding rates to improve it is vital that new mothers receive quality education by health care professionals and support both in the hospital setting and at

home. A mother's decision to breastfeed her child impacts the mother and child for the remainder of their lives; therefore, all efforts should be made by governments, health care professionals, and communities to support breastfeeding as the gold standard for infant nutrition.

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