

# Module One

## Breastfeeding: A Basic Health Promotion Strategy in Primary Care

### Objectives

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After completing this module, you will be able to:

1. Describe the reasons why breastfeeding is important as well as evidence based risks of not breastfeeding for the infant, mother, family and community at large.
2. Identify factors that contribute to the breastfeeding decision.
3. Counsel a woman about breastfeeding.

### Introduction

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All mothers want to provide what's best for their babies and often turn to their health care provider for advice. This module will help prepare you for this discussion by reviewing human milk composition and some of the major benefits of breastfeeding for infant, mother, family and the community. Some of the factors that influence how women make their infant feeding choice will also be described.

### Case Exercise

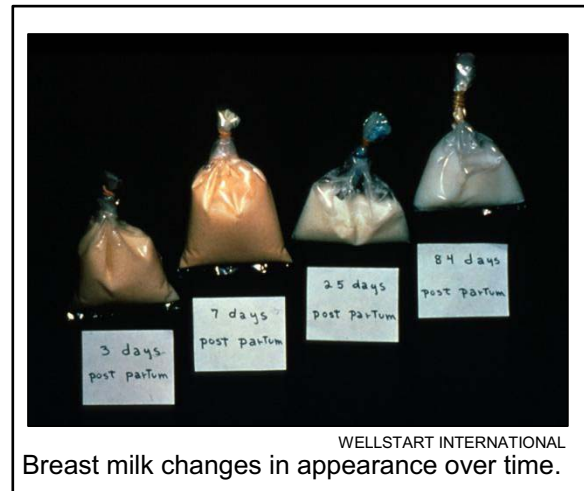
Veronica, a 26-year-old woman, has come for a prenatal visit. You join her in the consultation room and begin to review the history form she filled out in preparation for her visit with you. You note that she has not answered the question regarding how she plans to feed her new baby. When you inquire about this, she responds that she hasn't thought about it as yet and would like to talk about what would be best. Many of her friends have told her that it really doesn't matter how she feeds her baby...



***What do you need to know to advise this mother?***

## Aren't baby formula nearly the same as mother's milk?

The answer is of course “no”. Human milk is specific to the human species, a dynamic and complex biological fluid containing over 200 bio-active constituents including immuno-protective agents, enzymes, hormones, vitamins and other factors as well as essential nutrients in perfect balance for the growth and development of human infants. It changes in composition during a feed, from feed to feed during the day and over time as the growing infant's needs change.



## Human Milk Composition

### Colostrum

Colostrum is a thick, yellowish fluid present in the breast during pregnancy and for about the first 2 to 4 days after birth. It differs from mature milk in many respects (**Table 1-1**) and is a blend of prepartum breast secretions, which begin to accumulate in the breast from about the twelfth week of pregnancy (lactogenesis stage I), and new secretions resulting from the effects on the breasts of hormonal changes surrounding labor and delivery. Though small in quantity (40-50 cc during the first 24 hours), colostrum provides an ideal nutrient and immunological substance to help assure the newborn's successful transition from the protected sterile intra-uterine environment to the non-sterile extra-uterine environment. Colostrum contains much more protein and much less fat and lactose compared to mature milk and is particularly rich in beta-carotene, a precursor of vitamin A, which gives colostrum its yellow color. Vitamin A is important for protection against infection and for early retinal development. It also contains white cells which also help prevent infection in the newborn.

**TABLE 1-1**  
**Comparison of Colostrum (day 1) and Mature Human Milk\***

<u>Constituent (per liter)</u>	<u>Colostrum</u>	<u>Mature Milk</u>
Energy (kcal/deciliter)	57.0	65.0
Lactose (g)	20.0	35.0
Protein (g)	32.0	9.0
Fat (g)	12.0	29.0

\*Data adapted from Lawrence and Lawrence (2011), pp 105 and tables 4-5 and 4-8, pp105

The protein content of colostrum is largely a concentration of immunoglobulins, especially secretory immunoglobulin A (sIgA). As noted in **Table 1-2**, during the first twenty-four hours after delivery, colostrum includes an estimated 80 mg of IgG, 120 mg of IgM and 11,000 mg of sIgA, and can provide the breastfed infant with a powerful passive immunization against bacterial and viral infections. Although the concentration of immunoglobulins decreases in transitional and mature milk, a significant quantity of immunological protection continues to be transmitted to the infant throughout the duration of breastfeeding.

**TABLE 1-2**  
**Immunoglobulins in Human Milk**

<b>Day Postpartum</b>	<b>Output - mg/24 hours</b>		
	<b>IgG</b>	<b>IgM</b>	<b>IgA</b>
1	80	120	11,000
3	50	40	2,000
7	25	10	1,000
8 – 50	10	10	1,000

Adapted from: Remington JS and Klein JO (2001) *Infectious Diseases of the Fetus and Newborn, Fifth Edition*. Philadelphia, WB Saunders Co.



Colostrum also provides lactose which prevents hypoglycemia and facilitates the passage of meconium, which in turn aids in the excretion of bilirubin. Even if a mother decides not to breastfeed, it is desirable to encourage her to provide colostrum to assure that her infant receives the transitional protection only available in this maternal substance. Colostrum is often considered the “first immunization”.

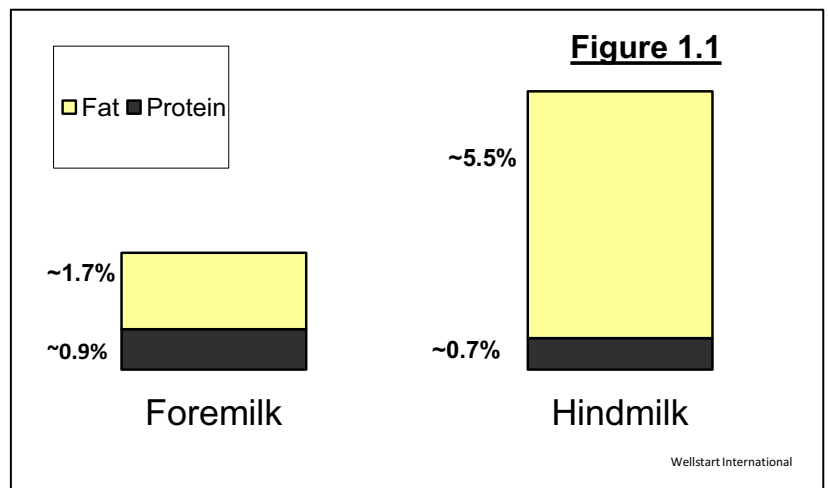
## Mature Human Milk

The development of the breast tissue and secretion colostrum and milk actually begins about the 12<sup>th</sup> week of pregnancy and extends until shortly after delivery. This first stage is known as lactogenesis I. Lactogenesis II begins to occur between the 2<sup>nd</sup> and 4<sup>th</sup> postpartum day and is characterized by the milk “coming in” in greater quantity. The mother notes that her breasts feel full, and the baby’s swallowing pattern becomes more distinct.

Approximately 7 to 10 days after delivery, milk is defined as “transitional”. By 14 days milk is considered “mature”. A volume of 600-900 ml can eventually produced every 24 hours and has a biochemical composition as summarized in **Table 1-1**. Important aspects include the following:

- ◆ **Water** - As is true of most mammal milks, water is the major constituent of human milk. Even in hot climates, human milk, which is 87% water, provides sufficient water for the exclusively breastfed infant to remain adequately hydrated. Only if the infant is unable to nurse effectively as needed or has an unusual health problem (diabetes insipidus) would additional fluids be required.
- ◆ **Lipids** - About 50% of the calories in human milk come from lipids. The primary fats identified in human milk are phospholipids and triacylglycerols. Some 167 fatty acids have been identified in human milk, many of which are long chain, polyunsaturated fatty acids unique to human milk. Human milk contains omega-3 fatty acids, including docosahexaenoic acid (DHA), important for brain and retinal development and function. Cholesterol, important to the development of membranes, is also present in significant quantities.

While the content of milk fat in mature human milk usually ranges from 3.5% to 3.8%, it is important to recognize that these figures represent an average fat content. In reality, the fat content is variable and influenced by a number of factors. Of particular clinical importance is the significant increase which occurs during a feeding from the low fat content of the milk of about 1.5 to 2.0 % which has accumulated in the breasts since the previous feeding (known as “foremilk”) to the higher fat levels present in milk secreted during a feeding. Fat content in milk available near the end of a feeding (“hindmilk”) can be as much as 5 or 6% (**Figure 1.1**). Allowing an infant to nurse until there is an indication of satiation is important if full fat (and thereby caloric and fat-soluble vitamin) intake is to be achieved.



- ◆ **Proteins** - The total protein content of human milk, 0.9%, is the lowest amount identified among the many mammal milks which have been studied to date. This low protein content is well matched with the still developing renal function of the neonate and young infant. The low renal solute load of human milk places less excretory burden on the immature system while providing optimal growth and development.

Milk protein can be divided into two major components, whey and casein. Milk curd, which forms from the casein when the milk pH (normally ranging from 6.7 to 7.4) drops below 5.0, is an insoluble calcium caseinate-calcium phosphate complex. The liquid that remains after the curds are formed is whey. Whey contains water, electrolytes and important proteins that contribute to disease resistance including alpha-lactalbumin, lactoferrin, lysozyme and the immunoglobulins. Human milk protein is predominantly whey. When acidified (such as occurs in the stomach), human milk results in a flocculent suspension allowing for easy digestion and absorption of nutrients as well as rapid transit through the intestinal tract of the human infant. This results in the normal pattern of frequent feeding and stooling characteristic of breastfed infants.

In commercial substitutes for human milk the ratio of casein to whey has been adjusted from the predominant casein of cow's milk. Even with this adjustment, the feeding frequency, stools and stool patterns of formula-fed infants are not the same as breastfed infants. In addition, stools of formula fed infants are firmer than those of breastfed infants.

It is important to note that there are a number of nitrogen containing compounds in human milk with bioactive roles important to the newborn and young infant. These include:

- ◆ epidermal growth factor - contributes to the development and function of the intestinal mucosa
  - ◆ taurine - a free amino acid associated with bile acid conjugation and neurotransmission
  - ◆ nucleotides - metabolic and immune functions
  - ◆ carnitine - needed in the lipolysis of long-chain fatty acids
- ◆ **Carbohydrates** - Lactose, synthesized in the breast, is a disaccharide consisting of galactose and glucose. At concentration levels of 7.2 g/dl, it is the major carbohydrate in human milk and is essential as a source of glucose. Lactose is also the source of galactose needed to produce galactolipids for infant brain development. Other carbohydrates found in human milk include monosaccharides, oligosaccharides and glycoproteins. Oligosaccharides, one of the major components of human milk are short non-digestible sugars. Although the mechanisms by which human milk oligosaccharides are produced and exert their functions is not entirely known, they are believed to promote the establishment of normal intestinal gut flora by acting as a prebiotic or food for probiotic bacteria. They also play a role in bacterial attachment to may modulate gut immune response and may play a role in the prevention of invasive enteric infections and inflammation.

The oligosaccharides and glycoproteins, known collectively as the “bifidus factor”, are important in stimulating the growth and colonization of the newborn gut with *Lactobacillus bifidus*, a non-pathogenic bacteria which protects against invasive enteropathogens. Oligosaccharides also prevent the adherence of bacteria to the mucosal intestinal mucosa.

◆ **Minerals** - While the profile of minerals found in mammal milks is similar, the concentrations, ratios, and bioavailability are highly species specific. In general, all minerals needed for newborn and infant growth are present in, and well absorbed from human milk. (**Table 1-3**). The lower quantities of minerals in human milk result in a substantially lower solute load to the infant’s immature renal system.

<b>Minerals in Mature Human Milk</b>	
<b><u>Mineral (per deciliter)</u></b>	
Sodium (mg)	15
Potassium (mg)	57
Calcium (mg)	35
Phosphorus (mg)	15
Iron (microgram)	100
Zinc (microgram)	120

Adapted from table 4-19, pp 127 and description of zinc in human milk, pp 130-131, Lawrence and Lawrence (2011)

**Is the iron content of human milk sufficient to meet the needs of the growing infant?**

Although the quantity of iron in human milk is not large (100 µg/liter), studies have demonstrated that the absorption from human milk is superior compared to cow milk and iron fortified formula (**Table 1-4**). Lactoferrin contributes to iron bioavailability in human milk. It is a complex protein found in whey where it binds iron and makes it available for digestion and absorption by the infant. (This binding of iron also inhibits bacterial growth by making the iron unavailable to iron dependent organisms.) Normal full-term infants can be “exclusively breastfed” (no other foods or fluids) for six months without becoming iron deficient. After six months, with the continuation of breastfeeding and the gradual addition of appropriate iron-containing complementary foods, term infants continue to have normal iron stores and hemoglobin. Preterm infants or term infants with perinatal blood loss may need additional Fe while still exclusively breastfed.

Zinc is another essential mineral for humans and is important to enzyme activity. Like iron, it is well absorbed from human milk (**Table 1-4**). Zinc deficiency, demonstrated in the form of intractable diaper and perioral rash, is very rare in breastfed infants whose mothers have adequate Zn intake. Both iron and zinc are important to normal brain development and function.

<b>Iron and Zinc Absorption</b>		
	<b><u>Iron</u></b>	<b><u>Zinc</u></b>
Human milk	49%	41%
Iron fortified formula	4%	31%
Cow milk	10%	28

Data abstracted from Lawrence and Lawrence (2011), table 4-22, pp 129

- ◆ **Vitamins** - Human milk, particularly colostrum and early transitional milk, is a major source of *vitamin A*, betacarotene, and *vitamin E* (**Table 1-5**). As previously mentioned, *vitamin A* is important for protection against infection and for early retinal development. *Vitamin E* protects the red cell against hemolysis. The quantity of *vitamin D* in human milk, which occurs in both fat-soluble and water-soluble forms, is sufficient when maternal diet is adequate and there is sufficient maternal and infant exposure to sunlight. Maternal deficiency during pregnancy can result in newborns with reduced stores of *Vitamin D*. In recent years, cases of rickets have been reported in breastfed infants with limited exposure to sunlight. Infants with darker skin pigment seem to be at greater risk. In order to assure that no infants develop rickets, the American Academy of Pediatrics currently recommends that all breastfed infants should receive 400 IU/day beginning in the first few days of life and continuing until they are ingesting or exposed to sufficient Vitamin D from other sources..
  
- ◆ The *Vitamin K* is poorly transported prenatally via the placenta to the fetus and is also limited in human milk. Newborns whether breastfed or not are at risk for hemorrhagic disease, a life threatening disease. Thus it is recommended that all newborns receive an intramuscular injection of 0.5 to 1.0 mg of *vitamin K*. Where an oral form is available the first dose (2.0 mg) is given at birth and repeated at 1 to 2 weeks and again at 4 weeks of age. The United States has no approved form of oral vitamin K.

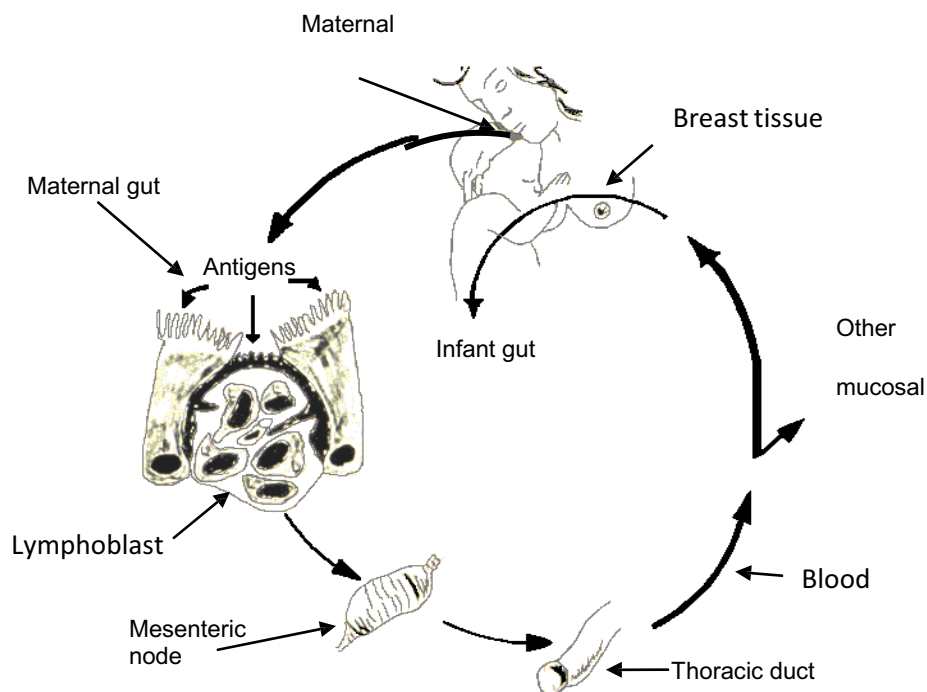
<b>Table 1-5</b>		
<b>Selected Vitamins in Colostrum and Mature Human Milk</b>		
<b>Micrograms per liter</b>		
	<u><b>Colostrum</b></u>	<u><b>Mature Milk</b></u>
<b>Fat Soluble</b>		
A	151	75
Beta carotene	112	23
D	---	0.04
E (mg)	1.5	0.25
K	---	1.5
<b>Water Soluble</b>		
B 1	1.9	14
B 6	---	15
C (mg)	5.9	5

Food and Nutrition Board National Research Council, National Academy of Sciences, Recommended Dietary Allowances, 10<sup>th</sup> ed. Washington, DC 1989

- ◆ **Enzymes** - Over 20 bioactive enzymes have been identified in human milk. Some enzymes function in the synthesis of milk, some compensate for digestive enzymes needed but not yet produced in adequate quantity by the newborn, some help transport minerals, and others are anti-infective. For example, lipase in breast milk

works synergistically with lingual lipase and gastric lipase to form an efficient system for complete digestion of human milk fat. This is particularly important during the months after birth when pancreatic enzyme and bile salt levels are low.

- ◆ **Other Important Components** - Human milk contains numerous peptide and non-peptide bioactive hormones: thyroxine, prolactin, erythropoietin, epidermal growth factor, insulin, leptin and gastrin. Prostaglandins, also present, influence gastrointestinal motility.
- ◆ **Cellular Components** - Human milk is a living tissue. It contains about 4000 cells per cubic mm including neutrophils, macrophages, and lymphocytes. These cells are most concentrated in colostrum but continue to be present in transitional and mature milk. Neutrophils help prevent infection of the breast tissue while macrophages (2000 to 3000 per cubic mm) and lymphocytes (400 per cubic mm) are actively involved in providing immuno-protection for the newborn and young infant. Macrophages secrete lysozyme, kill bacteria, and are active in phagocytosis.
- ◆ **Enteromammary Pathway** - Maternal lymphocytes, both T and B cells, synthesize immunoglobulins and are thought to originate in lymphoid tissue located along the maternal gut and bronchial system. The developing lymphoblasts are sensitized by the antigenic material (bacteria, viruses) ingested by the mother and coming into contact with the particular mucosal surface. As the lymphoblasts mature they migrate into the lymphatic system and are ultimately distributed throughout the body including breast tissue. During lactation these cells and the immunoglobulins they



### Enteromammary Pathway

secrete become components of the milk and are transferred to the nursing infant. Thus the infant is provided with a nearly continuous passive immunization to protect against whatever organisms are present in the environment shared by the mother and infant. While the concentration of cells and immunoglobulins is greatest in colostrum, significant bioactive amounts are present throughout lactation.



**Table 1-6**  
**Summary of Major Differences Between Human Milk and**  
**Commercial Substitutes Marketed for Normal Term infants**

	<b>Human milk</b>	<b>Commercial Substitutes</b>
<b>Protein</b>	Appropriate (species specific) quality/quantity, easier to digest	Corrected in quantity but not in quality ( not species specific)
<b>Fat</b>	Appropriate quality/quantity of essential fatty acids, lipase present	Lipase absent
<b>Vitamins</b>	Adequate except for vitamins D and K in some situations (see text)	Vitamins added
<b>Minerals</b>	Correct amount	Partly corrected
<b>Anti-infective properties</b>	Present	Absent
<b>Growth factors</b>	Present	Absent
<b>Digestive enzymes</b>	Present	Absent
<b>Hormones</b>	Present	Absent

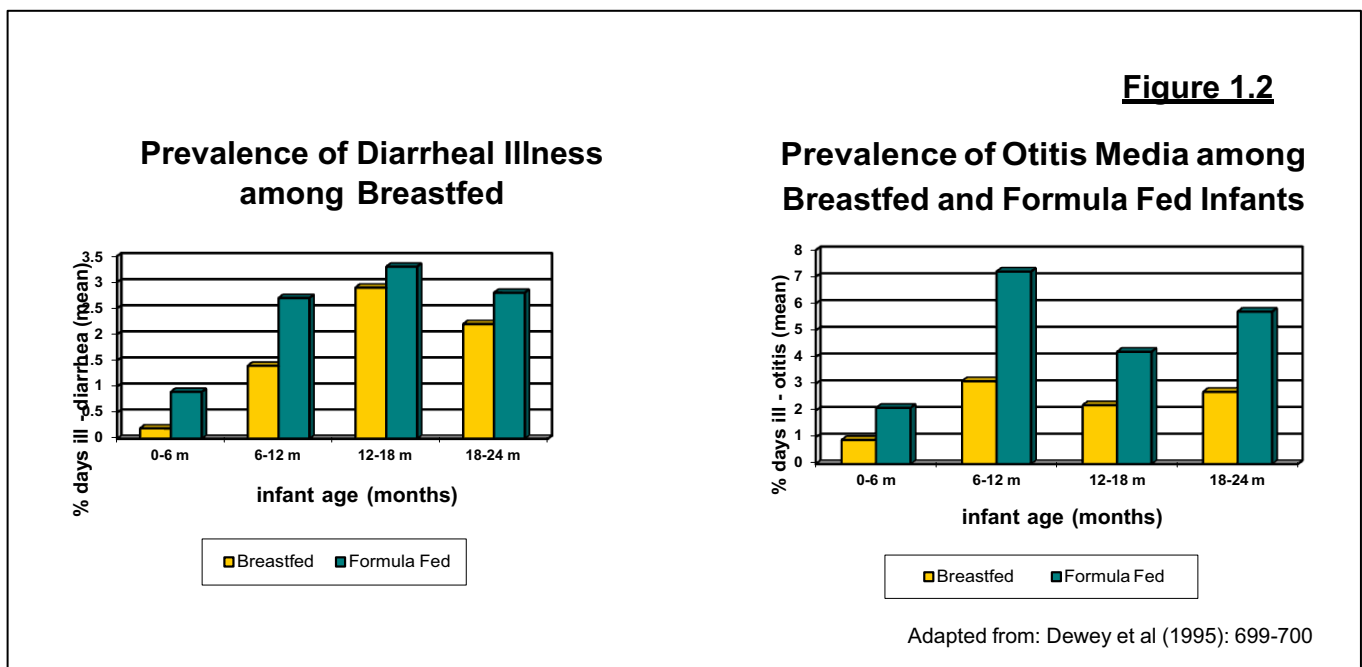
Adapted from WHO/CDR/93.6. and further modified, 2009





## Importance of Breastfeeding and the Risks of Not Breastfeeding for Infants

Supplementation or replacement of breastmilk while sometimes medically necessary should never be a casual decision. There is strong evidence that substitute feeding, in both industrialized and developing countries, increases the risk of a number of illnesses among infants and young children such as such as diarrhea and otitis media (**Figure 1.2**).



A recent review of the relevant literature by Ip et al also indicated that non-breastfed infants also have an increased risk of non-specific gastroenteritis, severe lower respiratory tract infections, atopic dermatitis, asthma, and necrotizing enterocolitis as well as sudden infant death syndrome (SIDS). In addition, research suggests that not breastfeeding is associated with a higher risk of dental caries and several chronic, serious conditions including type I diabetes, obesity, Crohn's and celiac disease, ulcerative colitis, lymphoma and leukemia.

There is also a correlation between exclusive breastfeeding for 6 months and a lowered risk of allergic disease including atopic dermatitis, rhinitis, reactive airway disease, and food allergies. This appears to be related to the sIgA, which binds foreign food macromolecules and prevents their absorption during the first several months after delivery when the infant's own production of IgA is not yet fully activated.

The relationship between breastfeeding and psychosocial development has received a great deal of attention. Recent animal, as well as human, studies suggest the hormones of lactation, particularly oxytocin, play an important role in bonding between infant and mother. With every feeding, maternal oxytocin levels rise. This not only results in the let-down of milk, satisfying the hungry infant, but also provides the mother with pleasant, enjoyable feelings. Thus both mother and baby are rewarded by breastfeeding, and the emotional bonding process is strengthened. Additionally evidence is beginning to accumulate that the risk of maternally perpetrated child abuse may be lower among breastfed infants.

Studies have also suggested that breastfeeding is associated with a small but consistent increase in I.Q. scores and improved school performance. This may be the result of specific nutrients found only in human milk, of the close supportive relationship between mother and infant, of the increased opportunities for interaction between the mother and her infant and/or the lowered risk of a variety of illnesses which temporarily interfere with learning capacity. It is likely that all of these are important to an infant's cognitive development.

## **Other Infant Risks of Using Breast Milk Substitutes**

Besides the loss of specific benefits associated with breastfeeding and already described, additional risks to infant health are associated with the use of human milk substitutes (e.g. cow milk, goat milk, formula). These include manufacturing errors, mixing mistakes, contamination during preparation and overfeeding. In addition, even though powdered formula is made from pasteurized milk, contamination can occur during the later stages of manufacturing. Thus powdered formula is not actually sterile. Reports have been published regarding illness and deaths among preterm infants due to *Enterobacter sakazakii* (*Chronobacter*) found to be present in the powdered formula used in neonatal intensive care units.. There are also reports of powdered formula contamination with various strains of *Salmonella*.

## **Importance of Breastfeeding and the Risks of Not Breastfeeding for Mothers**

In addition to the many risks to infant health associated with not being breastfed there are a number of important health concerns for mothers who do not breastfeed.

- ◇ Oxytocin secreted during breastfeeding not only brings about milk let-down but also:
  - ◆ decreases postpartum blood loss
  - ◆ results in more rapid uterine involution
  - ◆ enhances bonding, attachment and maternal parenting behaviors
  - ◆ reduced vulnerability to stress
- ◇ Mothers who do not breastfeed are likely to lose their prenatally acquired weight more slowly than mothers who do breastfeed.
- ◇ Recent studies suggest an increased risk of type 2 diabetes and ovarian and breast cancers among women who have not breastfed. The explanation for these risk relationships is not yet clear.
- ◇ Breastfeeding plays a role in child spacing. Whereas non-lactating women may ovulate by 6 weeks postpartum, women who exclusively or predominantly breastfeed usually do not ovulate until at least 6 months after delivery. Full nursing during the first 6 months with no signs of menstruation reduces the likelihood of pregnancy to less than 2%. Exclusive breastfeeding with those conditions reduces the likelihood even further to 0.5%.
- ◇ Breastfeeding has also been reported to decrease the risk of serious postpartum depression and maternally caused child abuse and neglect.

## **Importance of Breastfeeding and Risks of Not Breastfeeding for Families**

The use of breastmilk substitutes is more costly to families. Though breastfeeding mothers need to eat a little more than those who do not nurse their infants, the cost of foods to provide the extra calories need not be great and is far exceeded by the savings achieved by not buying substitutes and bottles. There is no need to use costly energy sources to heat substitutes and clean containers. More importantly, there will be a greater expenditure in money and in family time for medical care for a sick child. Babies who are exclusively breastfed during the first six months of their lives rarely become sick during that time. In addition the higher incidence of illness in the non-breastfed infant increases parental absence from work and lost income.

## **Importance of Breastfeeding and Risks of Not Breastfeeding for Communities**

Though most of the benefits and risks reviewed in this module were described in terms of individual infants and mothers, these issues assume community-wide importance. There is increasing evidence that not breastfeeding increases the risk of childhood obesity, both types I and II diabetes as well as hypertension and subsequent cardiovascular disease. Breastfeeding reduces the waste and pollution created by discarding the by-products of formula feeding, is renewable resource and an environmentally friendly “green” activity.

Economically, breastfeeding can be a major source of saving community funds. In the US alone, it has been estimated that if the US breastfeeding goals for 2010 can be realized, it has been estimated that 3.6 billion dollars will be saved.

In addition, globally, breastfeeding provides more child-spacing than all other family planning efforts combined. Because of the natural infertility that accompanies optimal breastfeeding, it is unique among the many programs undertaken to decrease morbidity and mortality. It simultaneously and naturally limits population growth.

## **Current Recommendations for Breastfeeding**

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Because of the importance of human milk and breastfeeding to health, growth and development of infants and their mothers and the significant risks of using a substitute for human milk, the World Health Organization (WHO), UNICEF, the United States Centers for Disease Control and Prevention (CDC) as well as the American Academy of Family Practice (AAFP), American Academy of Pediatrics (AAP), The American College of Obstetrics and Gynecology (ACOG), Academy of Breastfeeding Medicine and similar professional organizations around the world recommend:

***Infants should be exclusively\* breastfed for six months and continue breastfeeding, with the introduction of appropriate complementary foods, through the second year of life and beyond\*\****

\*Exclusive breastfeeding = only human milk . Exceptions include drops or syrups of vitamins, minerals, or medicines or rehydration solution . The definition allows for an infant to be breastfed by his or her mother or a wet nurse or fed expressed milk.

\*\*Note: no recommendation regarding the age of completion of breastfeeding is provided in this statement. It is considered normal and acceptable for mothers to breastfeed their children through the second year of life and beyond for the many nutritional, immunologic and developmental benefits.

This recommendation should be the goal for all health providers who care for mothers, infants and their families. Our professional task is to help mothers and families make an informed decision and then provide appropriate evidence-based care that will help them achieve their decision.

## The Breastfeeding Decision

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### *If breastfeeding is so great, why doesn't everybody do it?*

Some women do not choose to breastfeed. Very often they lack information. It can be an emotional decision, and only one of the many decisions a parent needs to make. Some women may be embarrassed by the idea of breastfeeding or may lack the confidence that they can be “successful”. There may also be cultural factors that play a role. Friends and family members may not be supportive. In many cases, simply providing information will help a woman make her decision. Other influences on the decision to breastfeed include;

- ◆ **Formula Marketing** – It is a commonly held belief that formula is equivalent to human milk. Formula advertising is intended to support that conclusion and convince families that bottle-feeding is normal. If mothers heard the facts about human milk from their health care providers they would be better prepared to make an informed decision about feeding their infants.
- ◆ **Work and School** – After their babies are born, many women enter or re-enter the work force or school. Ideally, women should be able to delay returning to work or school until at least 6 months when they are no longer exclusively breastfeeding. If this is not possible, there are several strategies mothers can use to continue to breastfeed or provide their milk. These strategies include:
  - ✓ making arrangements to take the baby to work/school and continue breastfeeding,
  - ✓ finding a child-care setting near work where they can go during breaks and continue breastfeeding,
  - ✓ arranging part-time, flex-time or job sharing,
  - ✓ arrange for work at home
  - ✓ expressing their milk by hand or mechanical means and storing the milk for daily or future use by their baby. Ideally, such expression is best begun after a month postpartum and breastfeeding is established. (Guidelines for hand expression can be found in Annex F)

In the United States the Affordable Care Act requires some breastfeeding services to be covered by insurers under “preventive services”. Many countries have legislation requiring employers to provide time for nursing breaks and/or time and space for milk expression. Several states in the U.S. have recently passed similar legislation.

- ◆ **Restriction on Activity** - Mothers these days are involved in many activities, and in some cultures women feel breastfeeding will “tie them down”. They fear a loss of freedom if they are the only ones who can feed their child. In fact, infants are very portable and can be easily taken along on most outings. It is possible to feed discretely with a light blanket or shawl draped to preserve modesty if necessary. In some countries, laws specifically protect the right of mothers to breastfeed in public locations. In the United States some states have similar laws in place.

## Concerns, Controversies and Contraindications

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### *Aren't there some situations when a mother shouldn't breastfeed?*

While there are some controversies surrounding breastfeeding, there are very few true contraindications.

- ◆ **Illness and other health conditions** - There are no nutritional reasons to deny infants breast milk unless they have special health problems such as **classic galactosemia**. **Infants with other inborn errors of metabolism like phenylketonuria (PKU) and maple syrup urine disease**, very rare metabolic conditions can receive breastmilk with very close monitoring.

Mothers may be advised to discontinue breastfeeding, either permanently or temporarily, in a few circumstances:

- ◆ In the U.S., the Centers for Disease Control and Prevention (CDC) recommends that mothers infected with **HIV** not breastfeed because of the risk of transmission of HIV to the infant through human milk.

The World Health Organization recognizes the impact that anti-retroviral medications (ARVs) have made during the breastfeeding period. It recommends that national authorities in each country decide which infant feeding practice, (i.e. with ARV intervention) to reduce transmission or avoidance of all breastfeeding, should be promoted and supported by their Maternal and Child Health services. Regardless, breastfeeding should be exclusive for six months.

The reader is encouraged to follow the international research and watch for updated WHO information and guidelines at:

[www.who.int/entity/nutrition/publications/hivaids](http://www.who.int/entity/nutrition/publications/hivaids)

- ◆ In the case of **active maternal tuberculosis** the mother and infant should be separated only until the mother is considered noninfectious. The infant should be placed on preventive therapy immediately. The infant can continue to receive expressed breast milk while separated. Medications used to treat tuberculosis, including INH, are compatible with breastfeeding.
  - ◆ **Hepatitis** often brings up questions about beginning or continuing breastfeeding. Breastfeeding is acceptable with all three major types (**A**, **B**, and **C**). In the case of **Hepatitis B**, the infant can begin breastfeeding before receiving HBIG and the first dose of the Hepatitis B vaccine series which can be given up to 7 days after birth preferably within 12 hours.
- ◆ **Medications** - Most medications taken by breastfeeding mothers are considered safe for the normal full term infant. The risk of affecting the infant is highest during the first 2 months of life (especially the first month) and decreases markedly after that time. Drugs of low molecular weight or low protein binding more readily pass into breast milk. This does not necessarily result in harm to the infant but suggests careful monitoring is warranted. New medications that have not been tested for their effects on the infant or on the milk supply should be closely monitored or alternatives



should be selected if possible. Sometimes one drug can be substituted for another.

Drugs of abuse are contraindicated. Mothers maintained on the proper dose of methadone or a long acting opioid can usually breastfeed. Infant withdrawal symptoms are usually less severe if breastfeeding is allowed. Both mother and baby should be monitored closely. Most radioactive compounds used for diagnostic purposes often require a temporary cessation of breastfeeding, while those used for therapeutic purposes may preclude breastfeeding.

Because of frequent additions to available drugs as well as changes in recommendations, readers should consult the following sources regarding specific recommendations:

(1) Hale T (2012) *Medications and Mothers' Milk*, Fifteenth Edition, Amarillo: Hale Publishing. LP.

(2) LactMed, National Library of Medicine data base. A free frequently updated internet service accessed at:

<http://www.toxnet.nlm.nih.gov/cgi-bin/sis/html.gen?LACT>

- ◆ **Alcohol** – Occasional and limited use of alcohol is not a contraindication to breastfeeding. Alcohol passes quickly into the mother's bloodstream and into her milk equilibrating with maternal blood level. General advice is to avoid breastfeeding for at least 2 hours after one or two alcoholic drinks to allow time for the alcohol levels to fall in both maternal plasma and milk. There is no need to express and discard milk that has accumulated during the waiting time. The alcohol present in the milk will have been reabsorbed into the plasma and metabolized by the mother's liver. Because of the differences in interpretation of the terms "occasional" and "limited", a mother should be individually counseled regarding her alcohol intake.
- ◆ **Caffeine** – Caffeine is excreted into breast milk. The amount contained in breast milk after one cup of coffee is insignificant. However, caffeine is not well metabolized by the young infant and may accumulate in infants of mothers who consume large amounts of caffeinated beverages (such as several cups of coffee or cola drinks daily); the use of caffeine-free beverages is suggested for these mothers.
- ◆ **Smoking** – For general health reasons in both mother and baby, women and their household members are encouraged to cut down or quit smoking during pregnancy and lactation and to avoid exposing the baby to smoke. For those who cannot stop, cigarette smoking is not a contraindication to breastfeeding. In fact the benefits of human milk to a baby who lives in a smoking environment are important to protect against respiratory infection and reactive airway disease. Women who cannot stop smoking should be counseled to smoke only after nursing (but not around the baby) to provide the least amount of nicotine to the baby via the milk. Some doctors recommend changing clothes before breastfeeding. Maternal smoking diminishes the milk supply, and the growth of their infants should be carefully monitored because the rate of growth can be decreased. Infant exposure to cigarette smoke has also been reported to be related to Sudden Infant Death Syndrome (SIDS).
- ◆ **Body Image** - There may be other concerns, such as sagging breasts. Breasts may lose elasticity as a result of pregnancy and years passing, irrespective of whether a

woman breastfeeds. Concerns about body image should be addressed as they are identified.

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**Fitness** – There are usually no contraindications to exercise in moderation during lactation. Breastfeeding prior to exercise and wearing a supportive bra is recommended. There have been reports that increased lactic acid in the milk for about 30 – 90 minutes following strenuous exercise has led to a temporary rejection of the milk by some babies. This has been attributed to a change in the taste of the milk. If it occurs, mothers could postpone feeding or offer previously expressed milk.

◇ **Diet** - Some women feel that in order to breastfeed they must eat a “perfect” diet. Breastfeeding mothers like everyone else need to eat a nutritious diet and consume enough additional calories (approximately 300 to 500 calories per day depending on the size and activity level of the mother) to provide energy and make milk. It is also recommended that prenatal vitamins be continued during lactation. There are no lists of foods to avoid. Poor maternal nutrition is not a contraindication to breastfeeding.

- ✓ Mothers make nourishing milk for their infants from all kinds of food.
- ✓ There are no foods that must be avoided, unless mother or baby develops an allergic reaction.
- ✓ Breastfeeding mothers have an increased thirst that usually maintains an adequate fluid intake; no data support the assumption that increasing fluid intake will increase milk volume.
- ✓ Mothers do not need to drink milk to make milk; thirst can be satisfied from a variety of nourishing beverages, including water.
- ✓ Calcium is available not only in milk and milk products but in many other foods, such as broccoli, spinach, kale, bok choy, and collard, mustard and turnip green, almonds, and canned fish.

**Returning to Veronica at her first prenatal visit...**

You recall she left blank the question about how she plans to feed her baby. This is your chance. Are you convinced about the importance of breastfeeding as a primary health care strategy? For each of us there are different features of human milk and breastfeeding that capture our interest.

What are the three most important things you would like Veronica to know about breastfeeding?

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

You may have included the fact that breast milk and formula are not the same, that breastfeeding provides many benefits to both mother and baby, and that there are very few contraindications. You may have mentioned details within each of these categories.

### **How would you provide a mother with breastfeeding information?**

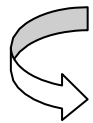
You may ask her what she has heard about breastfeeding, answer her questions, and address any misconceptions. Studies have shown it is not the length of the “lecture” on breastfeeding, but the number of times the topic is introduced and the support for breastfeeding. Since prenatal care usually spans several months, there are many opportunities to discuss the topic. Concerns can be elicited and individual suggestions made to help the mother adapt the information to her own needs. It is also important to consider if and what cultural influences are likely to affect her decision and to engage the father of the baby or another significant family member or support person in the counseling sessions.

## **Prenatal Counseling Questions**

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The answers to the following questions provide a good background:

◆ **Have you thought about how you will feed your baby?**



◆ **What have you heard about breastfeeding?**

Open-ended questions provide the opportunity to continue the discussion.  
If the patient has previous breastfeeding experience:

◆ **How long did you breastfeed a previous child?**



◆ **Why did you stop at that time?**

◆ **Did you have any problems?**

Often mothers stopped breastfeeding earlier than they planned because of a problem or perceived problem. This would be a good time to reassure the mother that there is a lot of new information, and help is available to prevent the problem or solve it if it recurs.


◆ **What is your breastfeeding plan for this child?**



◆ **Do you plan to return to work/school?**


Many mothers would like to know the current recommendations for the duration of breastfeeding so they can think about how to fit it into their lives. If mothers will be returning to work or school they can be advised in general terms that it is possible to continue breastfeeding and that more detailed information will be available when they are ready to consider it. Many countries (and states in the

US) now have maternity protection laws that provide time for milk expression at work. The local situation should be investigated.

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- ◆ **Are your family (your mother, the baby's father and the father's mother) and friends supportive of breastfeeding?**
  - ◆ **Were you breastfed?**
  - ◆ **Was the baby's father breastfed?**

It is helpful for the mother to identify supportive people in her family. Grandmothers who breastfed may be a good source of support. People close to the mother who are not supportive could be invited to learn more about the advantages breastfeeding confers on both mother and baby. It is also important to explore any cultural and religious attitudes that may influence a mother's decision about how she plans to feed her baby.

### **Mother's history:**

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- ◆ **Have you had previous breast surgery?**
  - ◆ **Have you had previous breast problems?**
  - ◆ **Are you taking regular medications?**

Mothers may be concerned there is something wrong with their breasts that will make breastfeeding difficult. If the mother has had problems with her breasts, she may need some help with breastfeeding. Alerting mothers to ask for assistance as soon as possible postpartum will be helpful. Most medications are compatible with breastfeeding and the mother can be reassured; the few medications that are not compatible could be reviewed and an alternative chosen.

Augmentation and reduction surgery are not always revealed in prenatal history. Neither are contra-indications to breastfeeding. Implants are rarely a problem. Reduction surgery may result in increasing the risk of low milk production. In both situations, lactation progress and indicators of adequate milk intake need close monitoring.

- 
- ◆ **Do you have a family history of allergies, breast cancer or diabetes?**

Breastfeeding seems to provide protection from all of these conditions. A mother with a family history of such conditions may be motivated to breastfeed in order to lower the risks for herself and her children.

- ◆ **Would you like information about a breastfeeding class?**

It is very helpful to give the patient either a brochure with information about available classes (date, time, location) or to write out this information for sharing with the father of the baby or other family members.

## **What resources for breastfeeding information are usually available in communities?**

### **Community Resources**

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Many hospitals provide childbirth education classes and printed information as part of their maternity services; often breastfeeding is discussed as part of the childbirth preparation class or there may be a separate breastfeeding class available. In addition, organizations with local offices, such as Red Cross, YWCA and local NGOs offer classes. In the United States many communities have an active Breastfeeding Coalition which gives classes and other support services. It is important for health care providers to investigate the classes and review the literature offered by the hospital and other organizations in order to ensure that consistent, up-to-date information is being offered to families.

**Note: Although educational resources offered by formula companies on the topic of breastfeeding do not always include clear advertisements for the company, it is important to remember that a formula company's goal is to sell formula. They are skilled at implying that substitutes are as good as breastmilk. It is best to seek other materials that do not have this conflict of interest.**

In the United States the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) for lower income families encourages breastfeeding by counseling about nutrition and offering practical lactation management advice to WIC clients. Breastfeeding clients also receive special supplemental foods.

La Leche League International has long been a source of information and support for breastfeeding mothers. Their mother-to-mother approach provides individual problem solving, classes, written information, videotapes, and equipment.

Several international professional organizations with a specialized interest in lactation and breastfeeding promotion can also be helpful such as the Academy of Breastfeeding Medicine (ABM) and the International Lactation Consultant Association (ILCA). These organizations can be contacted for information for local specialists and consultants. (see Annex G for web site contact information.)

There are numerous web sites that address the topic of breastfeeding available to families on-line. Prior to recommending one, be sure to review it for accuracy. Not everything on the Internet is up-to-date and accurate.

Bookstores may carry a selection of breastfeeding books in their Parenting Section. You may wish to review the choices and have one or two recommendations in mind for parents.

**What resources for breastfeeding information and support are available in your community?**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

You may have investigated the patient breastfeeding education opportunities within your hospital, used the Yellow Pages to find breastfeeding resources, or inquired about classes offered by community organizations.

## **Conclusion**

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Each woman brings her own frame of reference to the pregnancy and motherhood experience. Asking, “Have you thought about breastfeeding?” during the prenatal phase of care provides the opportunity to present information, elicit concerns, solve potential problems and refer the mother to resources in the community. Asking about breastfeeding during prenatal visits provides the opportunity to give anticipatory guidance, recognize problems early and assist the mother to initiate and continue breastfeeding for as long as she wishes. If she indicates that she is not interested, it may be best to postpone this discussion and bring it up again at a later visit. Getting mother and newborn off to a good start in the postpartum period is covered in Module Two: Basics of Breastfeeding.

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