

**WOMEN, INFANTS AND CHILDREN (WIC) BREASTFEEDING INITIATIVE: A  
PROPOSED PROGRAM EVALUATION**

by

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**ABSTRACT**

Breastfeeding is an essential strategy for providing babies with first-rate nutrition, neurological developmental advantages, and improved bonding with mother. The American Academy of Pediatrics states that infant nutrition and breastfeeding should be considered a public health issue and not simply a lifestyle choice. Breastfeeding is significant for public health because it contributes to positive health outcomes for child and mother, decreases on impact the environment and helps to reduce health care costs.

One population that would strongly benefit from the advantages of breastfeeding are women who utilize the services of WIC (Women, Infants and Children). WIC provides economically and nutritionally disadvantaged mothers with supplemental food packages and nutritional education and counseling, as well as medical referrals and screenings. However, breastfeeding rates among those who participate in WIC are, on average, lower than rates of those who do not.

One reason for this is that the demographics of those least likely to breastfeed are the same demographics of most WIC participants. According to Healthy People 2020, those with the lowest breastfeeding rates are African-Americans, American Indians, and Pacific Islanders. Those three races/ethnicities make up over 35% of WIC's participants, which translates into over 3,407,000 participants.

WIC has been working to address this issue with programs specifically aimed at breastfeeding promotion, but they have yet to be effective. This paper examines why this is, and proposes a national program evaluation of WIC's breastfeeding initiatives. The evaluation is designed to find out how WIC can better reach its target population and address the barriers that are keeping it from being able to do so.

This evaluation will assess the various tools WIC is currently using in its program so that WIC is able to identify which ones are and are not working. There will also be a significant amount of participant feedback, so that WIC is able to understand why certain tools are effective while others are not and to identify barriers. Ideally, the evaluation will also indicate how to improve on those tools that are not effective and thereby improve breastfeeding rates among WIC participants.

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## 1.0 INTRODUCTION

Over the last century, researchers and health officials have discovered and supported numerous advantages to breastfeeding over infant formula. These benefits include a multitude of positive health outcomes for infant and mother, and increased bonding between infant and mother, as well as beneficial outcomes for the environment (Eidelman, & Schanler, 2012; Ip, Chung, & Raman, 2007; Ip, Chung, Raman, Trikalinos, & Lau, 2009; Isaacs et al., 2010; Lawrence & Lawrence, 1999; Layde, 1989; Lipworth, Bailey, & Trichopoulos, 2000; Lucas & Cole, 1998; Newcomb, 1994; Nyqvist et al., 2013; Radford, 2014; Stuebe, Willett, Xue, & Michels 2009).

Although the advantages of breastfeeding are numerous, breastfeeding rates in America steadily declined from the 1930s until the early 1970s (Stevens, Patrick, & Pickler, 2009). Since then rates have started to rise but still are not yet at the levels that public health officials are aiming for. Currently, in the United States (U.S.), 74% of infants are breastfed, while public health officials are striving for a rate of 81.9% (HealthyPeople.gov, 2008). The proportion of infants still breastfed at six months is 43.5%, and officials are trying for a rate of 60.6% (HealthyPeople.gov, 2008). Infants still breastfed at one year is at 22.7%, officials would like to see that rate increase to 34.1% (HealthyPeople.gov, 2008). Infants exclusively still breastfed at three months is at a rate of 33.6%, and the goal rate has been set at 46.2% (HealthyPeople.gov, 2008). The number of infants who are still exclusively breastfed at six months is 14.1%, with officials wanting that rate to reach 25.5% (HealthyPeople.gov, 2008).

As a means to reach these goals, several breastfeeding campaigns have been initiated over the last few decades. One in particular was created and implemented through the Women,

Infants and Children (WIC) government assistance program. This program was designed to provide nutritional aid and information to financially disadvantaged mothers, pregnant women, and young children (Oliveria, 2002). As a result of its mission, WIC stands behind breastfeeding as the ideal choice for infant feeding (USDA, 2013a). It has dedicated an entire campaign to educating, encouraging, facilitating, and assisting women in breastfeeding their babies (USDA, 2013a).

However, several studies have been conducted with WIC participants that have shown them to have lower breastfeeding rates than the rest of the population (Balcazar, Trier, & Cobas, 1995; Baumgartel & Spatz, 2013; Chatterji, Bonuck, Dhawan, & Deb, 2002; Hedberg, 2013; Oilveria, 2002; Schwartz, Popkin, Tognetti, & Zohoori, 1995; Ziol-Guest & Hernandez, 2010). This leads many to wonder where the disconnect is between this campaign and its target population.

The first chapter of this paper provides a detailed background of breastfeeding, including the advantages, disadvantages and extensive research on the topic. The second chapter explains the structure and functions of WIC. The third chapter specifically focuses on the breastfeeding promotion section of WIC and all it entails. The fourth chapter will be a point by point proposed program evaluation of WIC's breastfeeding campaign. The fifth and final chapter include the limitations of this evaluation and recommendations based on potential results from the evaluation.

## 2.0 BACKGROUND

For centuries breastfeeding was the most commonly used, and often, the only form of infant feeding (Stevens et al., 2009). As a result, the profession of wet nursing was created. In situations where a mother could not or chose not to breastfeed her child, a wet nurse could supply the service for her. Wet nursing began as early as 2000 BC and continued until the 20<sup>th</sup> century. Over the course of this time wet nursing evolved from being a need to a lifestyle choice (Stevens et al., 2009).

Early on, wet nurses were used only when necessary, such as when a mother was unable to lactate or had passed away (Stevens et al., 2009). Primarily this was due to the belief that breast milk could transmit both physical and psychological characteristics, so it was assumed that breastfeeding was best when performed by the natural birth mother. During the Renaissance period, wet nursing became an indication of social class. Wealthy women did not want to ruin their figures or be inconvenienced by the act of breastfeeding so they most often chose to employ wet nurses. As the 18<sup>th</sup> century transitioned into the 19<sup>th</sup> century and the Industrial Revolution occurred, wet nursing continued to exist, but society began to believe again that breastfeeding should be performed by the birth mother whenever possible (Stevens et al., 2009).

By 1900, wet nurses were almost entirely extinct as alternatives to breast milk, along with the early developments of bottles began to gain popularity (Stevens et al., 2009). The first

feeding bottle was designed in France, in 1851. By 1896, England had perfected a simpler and easier to use model that was sold well into the 1950s (Stevens et al., 2009).

Until the 19<sup>th</sup> century, animal milk was the most widely used alternative to breast milk (Stevens et al., 2009). During the 18<sup>th</sup> century, scientists began to analyze human milk, discovering that breast milk was healthiest and thus began the creation of a nonhuman milk substitute to closely resemble it. The 18<sup>th</sup> century also brought the invention of food sterilization and evaporated milk, which both greatly contributed to the use of infant formula. By 1883, there were 27 patented brands of infant food, and in 1929 the first non-milk formula was made available to the public (Stevens et al., 2009).

By the 1940s, physicians and mothers saw formula as a safe and easy alternative to breastfeeding (Stevens et al., 2009). Not surprising, breastfeeding rates declined steadily in the U.S., straight through to the 1970s. In 1930, breastfeeding initiation rates were around 50% (Wright & Schanler, 2001). By 1950 they had dropped to 25%, and in 1972 rates reached an all time low of 22% (Wright & Schanler, 2001). At this time, public officials began to be concerned with low breastfeeding rates, and several breastfeeding awareness and promotion campaigns were started (Stevens et al., 2009). Over the next 30 years, the U.S. saw a steady increase in both breastfeeding rates and duration (Stevens et al., 2009). The public began again to see the advantage and need for breastfeeding.

However, in 1988, the infant formula industry, in the U.S., was granted permission by the government to begin advertising directly to the public for the first time (Stevens et al., 2009). This has had an impact on infant feeding, and some public health officials have felt that this has caused interference with physicians' advice to mothers, led to confusion among consumers and increased the cost of infant formula (Stevens et al., 2009). Although breastfeeding rates have

increased over the past few decades, they are still far from where public health officials would like them to be and getting them there has proven to be an uphill battle.

## **2.1 BREASTFEEDING BENEFITS**

Breastfeeding has a number of benefits including health advantages for baby, for mother, for the environment, and society as a whole. The most widely known and referenced benefits of breastfeeding are those regarding the health of the infant. The American Academy of Pediatrics states that breastfed babies have fewer health problems, fewer hospital visits and a lower mortality rate than formula-fed babies (Pellum, 2011). Breastfeeding has been found to significantly reduce the chances of several negative health outcomes including respiratory tract infections, asthma, gastrointestinal tract infections, necrotizing enterocolitis, atopic dermatitis, inflammatory bowel disease, obesity, celiac disease, types 1 & 2 diabetes, leukemia, and SIDS (Eidelman & Schanler, 2012).

Health benefits do vary depending on the duration of breastfeeding and whether or not it is exclusive. When babies are breastfed exclusively for six months as compared to four, studies have found positive significant differences in health outcomes for such conditions as gastrointestinal disease, otitis media, respiratory illnesses, and atopic disease (Eidelman & Schanler, 2012). Research has also found that babies who are exclusively breastfed for four to six months are at a four times greater chance of developing pneumonia than babies who have been breastfed exclusively for six months or longer (Eidelman & Schanler, 2012).

Breastfeeding is also attributed with the increased likelihood of positive health outcomes, such as neurodevelopmental ones. Long-term studies have shown that breastfed babies have

more white matter (Lucas & Cole, 1998; Isaacs et al., 2010). White matter is positively correlated with higher levels of cognition and higher IQ scores (Isaacs et al., 2010). Studies have also found that infants who are exclusively breastfed for three months or longer have higher intelligence scores and higher teacher ratings (Eidelman & Schanler, 2012). It should be noted however, that there are confounding factors among breastfed babies that could also contribute to their neurodevelopment such as parental education, intelligence, home environment and socioeconomic status (Eidelman & Schanler, 2012).

Breastfeeding has also been shown to play a vital and positive role in the health of preterm babies, a population whose health is compromised immediately starting at birth (Eidelman & Schanler, 2012). Preterm infants are at an increased chance for several chronic health complications, and many of them can be averted by the consumption of breast milk. Premature babies who receive breast milk have shown lower rates of severe retinopathy of prematurity (Hylander, Strobino, & Dhanireddy, 1998; Okamoto, Shirai, & Kokubo, 2007). Human milk also aids in the development of a preterm infant's immature host defense, as well as reducing mortality rates, long-term growth failure and neurodevelopmental disabilities (Furman, Taylor, Minich, & Hack, 2003; Hintz, Kendrick, & Stoll, 2005; Lucas & Cole, 1990; Meinzen-Derr et al., 2009; Schanler, Shulman, & Lau, 1999; Shah, Doyle, & Anderson, 2008; Sisk, Lovelady, Dillard, Gruber, & O'Shea, 2007; Sullivan, Schanler, & Kim, 2010).

Researchers have found that breastfed preterm infants start seeing health improvements while still in the neonatal intensive care unit (NICU). One reason for this is the mother-infant skin-to-skin contact that takes place during breastfeeding (Nyqvist et al., 2013). Babies with low infant birth weight who experience skin-to-skin contact have shown improved physical growth compared to those who have not (Nyqvist et al., 2013). Skin-to-skin contact has also been

shown to improve maternal milk volumes, breastfeeding initiation rates, duration, and exclusivity of breastfeeding (Nygqvist et al., 2013). Compared to non-breastfed babies, preterm babies have fewer hospital readmissions in their first year after NICU discharge (Eidelman & Schanler, 2012). Long-term research has also shown that premature babies who are breastfed have lower rates of metabolic syndrome and lower blood pressure rates (Eidelman & Schanler, 2012).

Somewhat lesser known benefits of breastfeeding are the positive effects on the mother. Most often, the first effects noticed are physical. Breastfeeding causes the release of oxytocin in the mother, which aids in preventing postpartum hemorrhage and promoting uterine involution, which is the return of the uterus to a non-pregnant state (Dermer, 2001; Eidelman & Schanler, 2012). Breastfeeding also helps to delay the return of menstruation. The benefit of this is the resulting conservation of iron in the mother's body and in naturally aiding the spacing of pregnancies (Lawrence & Lawrence, 1999). Producing milk for a newborn burns 200-500 calories a day for mom. A non-breastfeeding mother would need to swim 30 laps or bicycle uphill for an hour to burn this many calories (Dermer, 2001). A breastfeeding mother simply needs to feed her baby. This means that breastfeeding women are at a significant advantage when it comes to losing weight put on during pregnancy. Studies have shown that non-breastfeeding mothers lose less weight after pregnancy and do not keep it off as well as breastfeeding mothers (Brewer, Bates, & Vannoy, 1989; Ip et al., 2007).

Evidence also supports long-term positive health outcomes for breastfeeding mothers. It has already been stated that breastfeeding assists in weight loss. In addition, breastfeeding also improves blood sugar control and cholesterol count (Dermer, 2001). This has led many to believe that breastfeeding could be a positive factor in helping to reduce a mother's chances of developing diabetes and heart problems later in life (Dermer, 2001).

Numerous studies have shown that women who do not breastfeed are at an increased risk for developing reproductive cancers, as compared to women who do breastfeed (Ip et al., 2007; Ip et al., 2009; Layde, 1989; Lipworth et al., 2000; Newcomb, 1994; Stuebe et al., 2009). Their risks are especially high for ovarian and uterine cancer (Ip et al., 2007; Ip et al., 2009). This is due to the fact that women who do not breastfeed have more exposure to higher levels of estrogen and have repeated ovulatory cycles (Dermer, 2001).

There have been numerous studies done on the correlation between breastfeeding and breast cancer, but the findings are mixed. This is mainly due to inconsistent definitions of breastfeeding across studies. Some studies required subjects to breastfeed at least once a day, while others required subjects to breastfeed exclusively (Ip et al., 2007; Ip et al., 2009; Layde, 1989; Lipworth et al., 2000; Newcomb, 1994; Stuebe et al., 2009). This has made it difficult to compare data. However, evidence suggests that a woman who breastfeeds anywhere from six to 24 months in her life span will reduce her chance of breast cancer from 11 to 25 percent (Dermer, 2001).

There are also multiple advantages for the breastfeeding mother that cannot be measured or quantified. For one, “[b]reastfeeding provides a unique interaction between mother and child, an automatic, skin-to-skin closeness and nurturing that bottle-feeding mothers have to work to replicate” (Dermer, 2001, p.126). Certain hormones produced in lactation have also been shown to help calm mothers and to decrease the intensity of their response to adrenaline (Dermer, 2001). Lastly, there is the added comfort and peace of mind that comes for a mother who has a healthy, growing baby.

Breastfeeding has advantages not just for mother and child but for society as well. Society as a whole benefits from a healthy population in a multitude of ways. Breastfeeding

increases productivity, reduces health care costs and improves overall quality of life (Eidelman & Schanler, 2012). Many of the health benefits that breastfeeding provides are life long and involve serious chronic conditions. One recent study found that if 90% of U.S. mothers breastfed exclusively for six months, the saving would result in over \$13 billion a year (Eidelman & Schanler, 2012). This amount is likely an underestimate, as it does not include other indirect costs such as parental absenteeism resulting from caring for sick children (Eidelman & Schanler, 2012).

Another advantage of breastfeeding that is often overlooked is the positive impact it has on the environment. Breast milk is a natural, self-renewing resource. It creates no waste, packaging, or pollution. The packaging of infant formula alone greatly taxes many of the environment's natural resources (Radford, 2014). Packaging requires tin, paper, glass, rubber and silicon. Many of these resources are not recycled and the plastic remains virtually indestructible once dumped. If every baby in America was bottle fed, 86,000 tons of tin would need to be produced to make the 550 million cans of infant formula that would be needed for one year's supply (Radford, 2014). The formula then often travels great distances for distribution, which leads to even more resource consumption and a significant amount of air pollution (Radford, 2014).

As stated earlier, many benefits from breastfeeding depend on the duration and exclusivity of breastfeeding practices. Therefore, specific guidelines for breastfeeding have been set forth by many world and national health organizations. The World Health Organization (WHO) and United Nations Children's Fund (UNICEF) suggest that breastfeeding be initiated within one hour of birth and be exclusive for the first six months, and that the introduction of nutritionally adequate and safe solid foods at six months be accompanied by breastfeeding for up

to two years of age or beyond (WHO, 2013). The American Academy of Pediatrics supports the same recommendations with the exception that breastfeeding needs to continue for only the first year after birth and then as desired afterwards (Eidelman & Schanler, 2012).

### **2.1.1 Breastfeeding exclusions**

However, breastfeeding is not always the best and healthiest option for baby or mother. Certain conditions and circumstances do arise where breast milk substitutes are the more appropriate option. Babies should not receive breast milk if they have classic galactosemia, maple syrup urine disease, or phenylketonuria (WHO, 2009). Galactosemia is an inherited condition which makes a person unable to break down the simple sugar, galactose (U.S. NLM – NIH, 2014). Ingesting galactose can lead to kidney, liver, brain, or eye damage (U.S. NLM – NIH, 2014). A baby with this condition must receive special galactose-free formula instead of breast milk (WHO, 2009). Maple Syrup Urine Disease is caused by a gene defect that prevents a person from being able to break down the amino acids leucine, isoleucine and valine (U.S. NLM – NIH, 2014). An infant with this disorder cannot have breast milk either, but needs a formula free of these amino acids (WHO, 2009). Phenylketonuria is a genetic disorder which prevents individuals from processing the protein phenylalanine (U.S. NML – NIH, 2014). If they ingest it, it can cause severe mental damage (U.S. NLM- NIH, 2014). Therefore, babies with this condition can have only special formula, free of this protein (WHO, 2009).

In some cases, it is still best for babies to be given breast milk, but it may not be enough. In situations when the baby is born weighing less than 1500 g, at less than 32 weeks of gestational age, or is at risk of hypoglycaemia by virtue of impaired metabolic adaption or increased glucose demand, the baby should then also receive additional food (WHO, 2009).

There are also circumstances that can arise for the mother when it is not advisable for her to breastfeed. These include her having HIV, herpes simplex virus type 1, or any other severe illness where she may not be able to care for her baby or is taking certain medications (WHO, 2009). In some instances, the mother can continue to breastfeed but health problems may arise and therefore she should be monitored by a health professional. Such situations are when the mother has breast abscess, hepatitis B, hepatitis C, mastitis, tuberculosis, or substance abuse (WHO, 2009).

## **2.2 BREASTFEEDING DEMOGRAPHICS**

In 2010, the United States (U.S.) Department of Health and Human Services (DHHS) released an updated version of a previously created health promotion and prevention program, entitled Healthy People 2020 (HealthPeople.gov, 2014). This program is comprised of various health goals and objectives that the DHHS wants to see met over the next ten years (HealthPeople.gov, 2014). Breastfeeding is now such a strongly endorsed public health issue that Healthy People 2020 created eight separate goals specifically aimed at improving breastfeeding rates in the U.S. (HealthPeople.gov, 2014). They include increasing the number of infants breastfed at six months and one year, increasing the number of infants who are breastfed exclusively at three and six months, and increasing both the number of employers that have worksite lactation support programs and the number of live births that occur in facilities that provide the recommended care for lactating mothers and their babies (HealthPeople.gov, 2008). Healthy People 2020 is also looking to decrease the proportion of breastfed newborns that receives formula within the first two days of life (HealthPeople.gov, 2008).

In light of these recommendations, the U.S. has devoted a great deal of research to breastfeeding by tracking initiation rates, duration and predictors. According to the Centers for Disease Control and Prevention (CDC) (2012), the national average for those who were ever breastfed was 76.9% (CDC, 2012). This is a significant and steady increase from those born in 1993, when the rate was only 60% (CDC, 2008). Although this statistic is encouraging, rates are not as high when looking specifically at duration and exclusivity. In 2006, the rates were as follows: 43.5% were breastfed at six months, 22.7% were breastfed at one year, 33.6% were breastfed exclusively through three months, and 14.1% were breastfed exclusively through six months (HealthyPeople.gov, 2008).

Breastfeeding rates and practices also vary significantly when broken down by various demographics. Ethnicity of the mother is one of the most often referenced indicators for breastfeeding. In the U.S, Asian women have the highest rate for having ever breastfed at 88.5%, which is almost 14% higher than the national average (HealthyPeople.gov, 2008). Others above or close to the national average include Pacific Islanders (73.3%), Caucasians (77.1%), and Hispanic/Latino (80%) (HealthyPeople.gov, 2008). Those who fall below include American Indians (71.2%), Native Alaskans (71.2%), and especially African-Americans. The breastfeeding rate for women who identify as African-American is only 58.9% (HealthyPeople.gov, 2008). The trend is the same among races when also looking at breastfeeding duration (HealthyPeople.gov, 2008). African-Americans have shown significant increases in breastfeeding rates over the last 20 years, although they continue to lag behind other groups (CDC, 2008).

Another often noted factor for breastfeeding initiation is the socioeconomic status of the mother. Data have shown a consistent positive correlation between family income and

breastfeeding rates (CDC, 2008). Although many breastfeeding programs have been aimed at low income mothers, their breastfeeding rates remain approximately 35% below the recommended level (Humphreys, Thompson, & Miner, 1998). Similar findings have been reported concerning the mother's age. Teen mothers (age 12-17) have the lowest breastfeeding rates at 42.4%, with rates increasing with age (HealthyPeople.gov, 2008). Education of the mother also creates a similar trend. Breastfeeding rates for mothers with less than a high school diploma are at 66.9% (HealthyPeople.gov, 2008). For women who have graduated high school the rates dip slightly to 64.1% but then increase as education increases (HealthyPeople.gov, 2008). Breastfeeding rates based on education are as follows: some college - 76.1%, associates degree – 79.2%, four-year college degree – 87.6%, and advanced degree – 89.2%. Lastly, there is also a significant contrast in breastfeeding rates when comparing married to unmarried mothers. Women who are married have breastfeeding rates of 82.2%, while those who were never married are at 58.1% (HealthyPeople.gov, 2008).

### **2.2.1 Breastfeeding indicators**

Demographics such as these, however, tell only part of the story. Many other factors, indicators, and barriers come into play when analyzing and predicting breastfeeding behaviors. One indicator that has been looked at repeatedly is self-efficacy. This is “the personal belief that one can effectively perform a given behavior and that the behavior will result in the desired outcome” (Wilhelm, Rodehorst, Flanders-Stepans, Hertzog, & Berens, 2008, p.124). It has been identified in many studies as one of the best and most reliable predictors of breastfeeding behavior and duration (Chezem, Friesen, & Boettcher, 2003; DiGirolamo, Thompson, Martorell, Fein, & Grummer-Strawn, 2005; Duckett et al., 1998; Piper & Parks, 1996; Rothman, 2000;

Wambach, 1997). Even a marginal amount of confidence can make a significant difference. Mothers who see themselves as ‘somewhat confident’ concerning breastfeeding are three times more likely to discontinue breastfeeding during the first six months after delivery, than mothers who feel ‘very confident’ (Chezem et al., 2003). Self-efficacy contributes strongly to not only a woman’s intention to breastfeed but for how long she continues to do so. Although self-efficacy is a strong indicator of behavior, it is also fluid and changes over time. So while a mother may have high self-efficacy levels prior to delivery, breastfeeding challenges or negative experiences after birth may result in an early termination of breastfeeding (Wilhelm et al., 2008).

Self-efficacy is not just a mother’s general thinking that she will do well at breastfeeding. The literature shows that what is often a factor in a woman’s perceived self-efficacy is her impression of her ability to produce a sufficient milk supply. Inadequate milk supply is often a large contributor to low maternal confidence (Blyth et al., 2002; Ertem, Votto, & Leventhal, 2001; Hill & Humenick, 1996; McCarter-Spaulding & Kearney, 2001; Quinn, Koepsell, & Haller, 1997; Segura-Millan, Dewey, & Perez-Escamilla, 1994). It has been found to be strongly related to discontinuation of breastfeeding, especially within the first two weeks after birth (Blyth et al., 2002; Ertem et al., 2001; Hill & Humenick, 1996; McCarter-Spaulding & Kearney, 2001; Quinn et al., 1997; Segura-Millan et al., 1994).

Another factor that has been identified as a breastfeeding indicator is the amount of social support the mother receives. One example of social support is the attitude towards breastfeeding by influential people in the mother’s life. Those people often include family, friends, partners and health professionals, among others. Women whose mothers breastfed them are more likely to breastfeed their own children (Brodribb, Falon, Hegney, & O’Brein, 2007). This is likely due to the fact that their mothers and families are already supportive of breastfeeding. African-

American mothers tend to cite friends as being a very important influence in their decisions concerning breastfeeding (Guttman & Zimmerman, 2000). Hispanics often list their own mothers and Caucasians name their partners as most influential (Guttman & Zimmerman, 2000).

It is also imperative that support and information be in the mother's community to help aid her in her decisions (Brodrigg et al., 2007). Not only is social support vital in deciding to breastfeed but it plays an obvious crucial role in a woman's decision to continue breastfeeding. In the absence of strong social support, many mothers will cease breastfeeding, often sooner than they had intended or sooner than is optimal for their child (Burdette, 2013).

Many studies have shown that the advice and support of health professionals have a positive impact on their decisions to breastfeed (Anchondo et al., 2012; Brodrigg et al., 2007; Moore & Coty, 2006). Research has shown that women respond best to a health professional who has spent time with the mother helping her to breastfeed, giving her support and encouragement, as well as having shared her own breastfeeding experiences with the mother (Moore & Coty, 2006). The reasonable conclusion is that if a physician is educated and encouraging when addressing breastfeeding, then the mother will be more likely to breastfeed and have a positive experience doing so.

Some research, however, found that there is more to the role of the physician than just knowledge and support. Physicians tend to believe that they have a great deal of influence over a mother's decision to breastfeed, but they are often not specific with patients about their own attitudes and experiences with breastfeeding (Anchondo et al., 2012). It has been shown that more important than a positive attitude is the physician's personal experience with breastfeeding. Those who have experience report being more self-confident when addressing breastfeeding with

patients and when managing problems that a new mother may have with breastfeeding (Anchondo et al., 2012).

Unfortunately, physician breast feeding duration rates are low. Studies have shown that breastfeeding rates among physician residents can be as high as 80% and then drop to as low as 15% after returning to work (Finch, 2003; Miller & Miller, 1996; Walsh, Gold, & Jensen, 2005). Physicians stated that they wanted to continue breastfeeding for longer but did not specify how long their maternity leave lasted (Finch, 2003; Miller & Miller, 1996; Walsh et al., 2005). Common reasons cited by physicians for not continuing to breastfeed are short maternity leave, high volume of work, lack of privacy for pumping, and lack of understanding from coworkers (Anchondo et al., 2012). These findings reveal a contradiction surrounding physicians and their attitudes towards breastfeeding. Although they may be knowledgeable and supportive of breastfeeding, they often lack the real life experience and advice needed to help women to continue to breastfeed successfully.

A physician with breastfeeding experience is especially helpful when paired with the availability of a lactation consultant (Bonuck et al., 2014). Interventions have shown that when lactation consultants are available to new mothers there is an increase in breastfeeding rates, intensity and duration (Bonuck, Trombley, Freeman, & McKee, 2005; Castrucci, Hoover, Lim, & Maus, 2006; Thurman & Allen, 2008; Witt, Smith, Mason, & Flocke, 2012). One particular study found that mothers who receive consultations from a lactation specialist are three times more likely to breastfeed exclusively than those who do not (Bonuck et al., 2014).

Another major influence in the mother's decision to breastfeed is the father's attitude towards breastfeeding. Studies have shown that women often cite the father's preference as a primary reason for choosing bottle feeding (Arora, McJunkin, Wehrer, & Kuhn, 2000). It has

been reported that “[s]ome men believe that breastfeeding interferes with sexual relations and makes the breasts ugly” (Moore & Coty, 2006, p.36). Interestingly, studies have been done to determine the accuracy of the mother’s perception. Most often, researchers found that the father had a more positive attitude towards breastfeeding than the mother anticipated (Arora et al., 2000). This finding means that many women are choosing not to breastfeed because they believe their partner will disapprove, and for many of those women that belief is not accurate.

### **2.2.2 Breastfeeding barriers**

Though people understand the benefits of breastfeeding, several barriers come into play. One of the biggest barriers that has been identified for breastfeeding women in the U.S. is returning to work. It has been estimated that about one third of working mothers return to work within three months of delivery and approximately two thirds return within six months (Khoury, Moazzem, Jarjoura, Carothers, & Hinton, 2005).

Breastfeeding duration has been found to be directly related to a woman’s length of maternity leave (Moore & Coty, 2006). The longer a woman’s maternity leave is, the longer she is able to postpone weaning. Not only does returning to work impact a mother by limiting her time and availability to breastfeed, but it can also affect the social support she is receiving if her workplace is not encouraging or conducive to breastfeeding (Wilhelm et al., 2008). Returning to work/school is such a significant barrier that many women cite it as a reason for bottle feeding even though they are aware of the health benefits, have strong social support, and are not embarrassed by the act of breastfeeding in public (Guttman & Zimmerman, 2000).

Embarrassment is another obstacle for many women when deciding to breastfeed or not. Women often experience awkwardness and difficulty when engaging in public breastfeeding.

This is very often the reason that they choose to formula feed instead (Holmes, Chin, Kaczorowski, & Howard, 2009; McCann, Baydar, & Williams, 2007; Rojjanasrirat & D Sousa, 2010; Wojcicki, Gugig, Tran, Kathiravan, Holbrook, & Heyman, 2010). One study in particular, which examined women's views and beliefs about breastfeeding, found that the second most common reason for not breastfeeding was not wanting to breastfeed in public (McCann et al., 2007).

Up until the late 1990s, misinformation was still acting as a barrier for women in the U.S. Research showed that the medical community had only then started to provide accurate information on breastfeeding to their patients (Dennis, 2002; Dettwyler, 1995; Hailes & Wellard, 2000; Hong, Callister, & Schwartz, 2003). The risks and benefits of breastfeeding as compared to bottle feeding were rarely outlined for new mothers. Many doctors explained breastfeeding as simply a preference or lifestyle choice, without explaining all of the benefits and health issues involved (Dennis, 2002; Dettwyler, 1995; Hailes & Wellard, 2000; Hong et al., 2003). This often led many mothers to believe that there was little or no great advantage to breastfeeding over bottle feeding.

Since then physicians have been speaking more positively to their patients about breastfeeding and supplying them with more accurate information. However, communication has still not been ideal. A recent study was conducted to analyze the breastfeeding discussions that occur during a woman's first prenatal visit. The study found that breastfeeding was discussed in only 29% of the visits and mean duration of the discussion lasted only 39 seconds (Demirci et al., 2013). Qualitative data found that most health care providers remained ambivalent about breastfeeding when discussing it with their patients (Demirci et al., 2013). Data also showed that comparisons between breast milk and formula rarely occurred,

breastfeeding was often regarded as a personal choice and that a combination of breastfeeding and infant formula was seen as equal to exclusive breastfeeding (Demirci et al., 2013).

### **2.2.3 Breastfeeding research**

As stated above, breastfeeding rates differ across certain demographics such as race, income, and age (HealthyPeople.gov, 2008). It has also been noted that there are several contributors, indicators and barriers, that contribute to breastfeeding rates and duration. As a result, a great deal of research has been devoted to determining why breastfeeding rates vary so greatly among certain demographics and how certain factors contribute.

As noted above, one of the biggest differences in breastfeeding rates is found between races. African American women continue to consistently have breastfeeding rates that trail as much 20% below their Caucasian and Hispanic counterparts (Bentley et al., 2003). One reason that has been given for this is the lack of social support for breastfeeding within the African-American community. As stated earlier, African-American mothers tend to greatly rely on the social support of friends when making decisions about breastfeeding (Burdette, 2013). But since breastfeeding is already less common in their community than most others, it is hard for African-American women to find support among their friends. This continues the cycle of African-American women not choosing to breastfeed because other African American women are not doing so either.

Even when African-American mothers are not being told to bottle feed they are receiving that message indirectly, by the lack of breastfeeding exposure they receive in their community. In one study of African-American mothers, most had never seen a woman in their neighborhood breastfeeding and could not fathom engaging in breastfeeding in public (Burdette, 2013).

As noted above, another influence in a woman's decision to breastfeed is the role of the father. In the African-American community this has posed another issue for low breastfeeding rates. Many African-American men have reported that they do not feel comfortable with the mother breastfeeding because they see her breasts as a sexual feature and not to serve any other function (Bentley et al., 2003). They therefore feel it is inappropriate for a woman to use her breasts for any reason other than sexual stimulation and certainly do not feel comfortable with them being shown in public (Bentley et al., 2003).

Several other complex factors come into play for African-American women, at various levels. One article in particular (Bentley et al., 2003) explains how issues that would make it difficult for any woman to breastfeed are particularly relevant for African-American women. A trickledown effect can happen when, for example a structural change in welfare results in changes in child care needs. This change often results in new mothers needing to seek employment outside the home. A new mother may already be unsure about wanting to breastfeed. Then there is the added stress of returning to work and pumping where it may not be supported and there is a lack of social support or role models, which makes it easier to simply discontinue breastfeeding (Bentley et al., 2003).

Low income women also have consistently lower breastfeeding rates. On average, socioeconomically disadvantaged women breastfeed at rates 35% below the recommended level of 81.9% (Humphreys et al., 1998; HealthyPeople.gov, 2008). It was also found that nearly 35% of low income women discontinue breastfeeding within eight days of delivery (Pugh, Milligan, Frick, Spatz, & Bonner, 2002). This is fascinating considering that many of the benefits garnered from breastfeeding are especially valuable for low income women. Such advantages

include saving money on formula, lowering health care costs and helping with birth spacing (Pugh et al., 2002).

One explanation for this is that low income women, like African-American women, are more susceptible to the several barriers to breastfeeding. Mothers who are financially disadvantaged often need to return to work sooner and are usually returning to jobs that are not conducive to breastfeeding (Khoury et al., 2005). They also experience such obstacles as embarrassment, time, social constraints and lack of support (Khoury et al., 2005). Another barrier found was the belief that breastfeeding is more commonly associated with being in a higher social class and is more difficult for them to participate in due to the time constraints of breastfeeding and working (Guttman & Zimmerman, 2000).

Some government programs that are aimed specifically at low income women end up discouraging breastfeeding overall. Breastfeeding advocates have raised issue with various government infant nutrition programs (Guttman & Zimmerman, 2000). These advocates “fear they may actually contribute to the relatively low rates of breastfeeding in low-income populations because they provide formula with no or a nominal monetary cost to mothers enrolled in them” (Guttman & Zimmerman, 2000, p.1459).

As a result, much research has been done to try to increase the rates of breastfeeding in low income women. Studies have repeatedly found that low income women show strong positive responses to peer counselors (Pugh et al., 2002; Pugh et al., 2010). They have reported that peer counselors are extremely helpful in establishing personal relationships, showing enthusiasm for breastfeeding and facilitating breastfeeding through concrete actions (Pugh et al., 2002).

Adolescent mothers are another group that have been looked at closely due to their low breastfeeding rates. In 2008, only 42.4% of mothers (age 12-17) had ever breastfed their baby (Healthypeople.gov, 2008). Teen mothers' breastfeeding rates fall well below the goals set forth by Health People 2020 in both initiation and duration (Wambach & Cohen, 2009). Many believe that they are an important group to focus on because if they are convinced to breastfeed as teens, there is a greater chance that they will choose to breastfeed with later babies.

The most common barriers found among adolescent mothers are the fear of public exposure while breastfeeding, belief that breastfeeding is painful, a general unease with the act of breastfeeding, myths about breastfeeding and the perceived inconvenience of breastfeeding (Hannon, Willis, Bishop-Townsend, Martinez, & Scrimshaw, 2000). Due to being young, many adolescent mothers are uneducated or misinformed about breastfeeding (Hannon et al., 2002). They also have the added obstacle of attempting to continue breastfeeding after returning to school (Hannon et al., 2002).

Research has found that some factors are positive influences on breastfeeding behaviors among adolescent mothers. Teen mothers respond well to breastfeeding support from influential people in their lives, such as their mother and the father of the baby (Hannon et al., 2002). However, the adolescent's personal breastfeeding experiences and beliefs also play a vital role, even when these contradict what she has been told by people she deems influential (Hannon et al., 2002). Of the teen mothers who do choose to breastfeed, they most often cite health benefits for the baby and increased bonding as reasons (Wambach & Cohen, 2009).

Due to the findings on breastfeeding rates among various demographic groups and the numerous factors involved, much work has gone into the design and implementation of interventions aimed at increasing overall breastfeeding rates and duration. Those that have been

found to be most effective involve health education or peer support/counseling (Dyson, McCormick, & Renfrew, 2005). Data analysis has shown that health education interventions are most effective when they are one-to-one, needs based and comprised of repeated informal sessions (Dyson et al., 2005).

### **2.3 WOMEN, INFANTS AND CHILDREN (WIC) BACKGROUND**

Women, Infants and Children (WIC) is a supplemental nutritional program administered by the United States Department of Agriculture's (USDA) Food and Nutritional Service (FNS). Its mission "is to safeguard the health of low-income women, infants, and children up to age 5 who are at nutritional risk, by providing nutritional foods to supplement diets, nutrition education, and referrals to health care and other social services" (Oliveira, Racine, Olmsted, & Ghelfi, 2002, p.1).

It began originally as a pilot program in 1972, but the ground work for WIC actually began in the 1960s (Oliveira et al., 2002). Attention was being drawn to the fact that many low income Americans were suffering from malnutrition, and hunger was often cited as a major problem for the poor and impoverished. In 1969, the White House Conference on Food, Nutrition, and Health met to determine how to focus more funding among the poor, hunger and malnutrition. One of the recommendations stated in the conference report was for funds to be specifically allocated for the nutritional needs of low-income pregnant women and preschool aged children (Oliveira et al., 2002).

WIC became a permanent program in 1975 and continues to be one (Oliveira et al., 2002). Each year Congress allots a specific amount of funding for WIC and its operations

(USDA, 2013a). In 2013, WIC was given over \$6.5 billion in funding (USDA, 2013a). The FNS then provides this funding to WIC state agencies such as state health departments and other comparable agencies (USDA, 2013a).

WIC is currently found in all 50 states, 34 Indian Tribal Organizations, American Samoa, District of Columbia, Guam, Commonwealth of Northern Mariana Islands, Puerto Rico, and the Virgin Islands (USDA, 2013a). There are approximately 90 WIC state agencies, 1,800 local agencies, and 9,000 clinic sites (USDA, 2013a).

### **2.3.1 WIC requirements**

WIC has established several specific eligibility guidelines for its program. The first is categorical eligibility. WIC states that a participant must be either pregnant (including women up to six weeks postpartum), a non-breastfeeding woman (up to six months postpartum), a breastfeeding woman (up to one year post partum), an infant (under one year of age), or a child (up to his/her fifth birthday) (Oliveira, 2002). The second requirement is residential eligibility. The participant must live in the state in which she is establishing eligibility and receiving benefits (Oliveira et al., 2002).

The third requirement is income eligibility. Participants must fall at or below 185% of the U.S. Poverty Income Guidelines (USDA, 2013a). Currently, those guidelines state that a family of two cannot make more than \$28,694, a family of three cannot make more than \$36,131, and a family of four cannot make more than \$43,568 (USDA, 2013a). Participants are also automatically income eligible if they are already participating in other benefit programs, such as the Supplemental Nutrition Assistance Program, Medicaid, or Temporary Assistance for Needy Families (USDA, 2013a).

The fourth and final requirement for a participant is to be deemed at nutritional risk, determined by meeting one of five possible health conditions that has been verified by a health professional. Those conditions are (1) detrimental or abnormal nutritional conditions detectable by biochemical or anthropometric measurements, (2) other documented nutritionally related medical conditions, (3) dietary deficiencies that impair or endanger health, (4) conditions that directly affect the nutritional health of a person, including alcoholism or drug abuse, and (5) conditions that predispose persons to inadequate nutritional patterns or nutritionally related medical conditions (Oliveira et al., 2002).

WIC participants typically remain eligible for six months increments and afterwards must reapply (Oliveira et al., 2002). However, pregnant women remain eligible for the duration of their pregnancy plus for up to six weeks postpartum and most infants remain eligible for their first year of life (Oliveira et al., 2002). If a woman miscarries, she is eligible for WIC only for the duration of her pregnancy and then her aid is discontinued (USDA, 2013a).

### **2.3.2 WIC statistics**

Participation in WIC has continued to grow steadily. At the onset, in 1974, there were 88,000 participants (Oliveira et al., 2002). In 1980 participation was at 1.9 million, in 1990 it reached 4.5 million, in 2000 it was 7.2 million, and by 2010 it had reached 9.2 million (USDA, 2013a). Approximately half of all infants and about 25% of all children age one to four are enrolled in WIC (Oliveira et al., 2002). Participants are approximately half children, a quarter infants, and a quarter women (USDA, 2013a.) Of the entire WIC population, in 2012, 10.1% were pregnant women, 6.8% were breastfeeding mothers, and 6.7% were postpartum women (Johnson et al.,

2013). Most enrolled women (85.9%) were between the ages of 18-34 and most pregnant women (56.9%) enrolled in WIC during their first trimester (Johnson et al., 2013).

In 2012, the race breakdown for WIC participants was as follows; 58.2% White, 19.8% African-American, 12.2% American Indian or Alaska Native, 3.9% Asian or Native Hawaiian or Pacific Islander, and 5.1% were two more or races (Johnson et al., 2013). With regard to ethnicity, 41.5% participants reported themselves as Hispanic/Latino (Johnson et al., 2013).

### **2.3.3 WIC services**

WIC's main service is to provide supplemental nutritional food packages that are most advantageous to its participants. In 2003, the National Academies' Institute of Medicine (IOM) was tasked with reviewing how well WIC's food packages were meeting the needs of its population (USDA, 2013c). As a result, in 2006, the IOM published its proposal for new, cost-neutral food package regulations. The new packages were designed to meet the 2005 Dietary Guidelines for Americans and the infant feeding guidelines of the American Academy of Pediatrics (USDA, 2013c). The IOM also intended for the packages to support long-term breastfeeding, provide a greater variety of food and accommodate cultural food preferences (USDA, 2013c).

WIC mothers also have access to formula due to a rebate system through WIC state agencies. The amounts of formula that a baby is allotted per month are determined by the baby's age and whether the baby is partially or fully formula fed (see APPENDIX A). WIC agencies establish a rebate contract with specific infant formula manufacturers (USDA, 2013a). In exchange for this, WIC provides only their brands of formula to its participants (USDA, 2013a).

These manufacturers then provide WIC with a rebate for each can of formula purchased with WIC dollars (USDA, 2013a).

In addition to providing supplemental food packages, WIC also provides nutritional education and referrals for health care and social services (Oliveira et al., 2002). Each WIC office has at least one nutritionist on staff whose goal is “to change lifetime nutrition and health behaviors with realistic goals” (USDA, 2013a). WIC will also assist and refer participants who need help with such needs as acquiring health coverage, immunization, and dental care, among others (USDA, 2013a).

### **3.0 PROGRAM DESCRIPTION**

#### **3.1 WIC'S BREASTFEEDING PROGRAM**

WIC's other mission of great importance is breastfeeding promotion/education. WIC mothers are encouraged to breastfeed, given educational materials, and offered counseling. WIC states that its program is specifically designed to promote breastfeeding by giving breastfeeding participants higher priority for program certification, a greater quantity and variety of food, a longer certification period, one-to-one support through peer counselors and breastfeeding experts, and the ability to purchase breast pumps at a reduced cost and other breastfeeding aids (USDA, 2013a). Group counseling programs are available, as well as peer counseling on a one-on-one basis for mothers who have been breastfeeding for at least six months (Baumgartel & Spatz, 2013). WIC also provides vouchers similar to those for food packages for breast pumps (USDA, 2013a).

Food packages are divided into several categories (see APPENDIX A). Categories for infants (age 0-11 months) are based on if the baby is fully formula fed, partially breastfed, or fully breastfed (USDA, 2013c). For mothers, categories are based on being pregnant or partially breastfeeding (up to one year postpartum), postpartum (up to six months postpartum), or fully breastfeeding (up to one year postpartum) (USDA, 2013c). All food packages are the same for children ages one to four (USDA, 2013c).

Food packages are designed with the intent of encouraging breastfeeding among WIC's participants. Fully breastfeeding mothers get greater amounts of food and higher dollar value for fruits and vegetables (USDA, 2013c). Fully breastfed babies receive baby food meat and more baby food fruits and vegetables (USDA, 2013c). Partially breastfed babies are given minimal formula in their first month of life in order to help mothers build and maintain their milk production and in subsequent months to encourage the continued use of breast milk (USDA, 2013c).

Extensive educational materials about breastfeeding can be found on the Pennsylvania WIC website. Handouts available for printing cover a range of topics and address several common barriers to breastfeeding. They tackle barriers such as pain from breastfeeding, embarrassment from breastfeeding in public, breastfeeding after returning to work/school, breastfeeding while caring for other children, what to do if your milk supply is low, or if your baby is refusing to take the breast (PA DH, 2013). They offer advice on finding a nursing bra, the proper diet for a nursing mother, dealing with breastfeeding twins and knowing what over-the-counter medications are safe for nursing mothers (PA DH, 2013).

There are also materials geared towards grandparents and fathers to help them aid the mother with her breastfeeding challenges (PA DH, 2013). In addition to this, WIC also supplies its participants with a Breastfeeding Referral Guide with contact information for participants in every county of the state (PA DH, 2013).

Another way that WIC promotes breastfeeding is by supplying resources for the community by way of a campaign entitled "Loving Support Makes Breastfeeding Work." It is a national campaign that is being carried out at the state level. "Loving Support" provides materials that help to build breastfeeding-friendly communities, as well encourage peer

counseling (USDA, 2013b). The campaigns goals are to encourage breastfeeding among WIC participants; increase referrals to WIC for breastfeeding support; increase general public acceptance and support of breastfeeding; and to increase breastfeeding promotion through WIC agencies (USDA, 2013b). The campaign also has tools especially designed to increase breastfeeding rates among African-American participants by involving fathers. It is also attempting to increase rates among Hispanic participants by addressing perceived barriers specific to them (USDA, 2013b).

The “Loving Support” campaign has outlined eight services designed to increase breastfeeding rates among WIC participants. They include providing breast pumps, training WIC staff in breastfeeding promotion activities, conducting media campaigns and providing educational materials, supporting other counseling activities, hosting classes and support groups for WIC participants, making lactation consultants available, offering training for lactation consultant certification, and supplying a telephone hotline to address questions and concerns for WIC participants (Sparks, 2011). However, not all services are offered at all agencies.

As of 2012, WIC reported that 67.1% of all six to 13-month-old infants had been breastfed but there was no specification on duration or exclusivity (Johnson et al., 2013). Approximately half of all state agencies had breastfeeding initiation rates above 60% (Johnson et al., 2013). Only 7% of agencies had initiation rates below 40%, and only 1.2 % of agencies had initiation rates above 90% (Johnson et al., 2013). Pennsylvania WIC participants had an initiation rate of 51.2% (Johnston et al., 2013). Utah had the highest initiation rate at 84.4%, while Louisiana had the lowest at 34% (Johnston et al., 2013).

### **3.2 WIC'S BREASTFEEDING BARRIERS**

Some have argued that even though WIC provides several advantages to women who choose breastfeeding, WIC may be ultimately discouraging breastfeeding by supplying participants with infant formula (Oliveira et al., 2002). Many see these as contradictory messages. WIC supports breastfeeding but offers formula as an easy and available alternative. Studies have found that the formula is more valued than the food packages offered for breastfeeding mothers and that exclusive breastfeeding is not encouraged enough as an important health goal (Haughton, Gregorio, & Perez-Escamilla, 2010; Holmes et al., 2009; Jensen & Labbock, 2011). It has also been argued that WIC's rebate agreement with formula companies ultimately undermines WIC's breastfeeding promotion. The more formula purchased via WIC, the more funding WIC receives (Jensen & Labbock, 2011). Therefore, WIC financially benefits more from participants using formula than from breastfeeding, which ultimately creates a conflict of interest.

Women enrolled in WIC consistently have lower breastfeeding rates than those not enrolled in WIC, for the entire first six months of their child's life (Oliveira et al., 2002). In 1993, the General Accounting Office studied the effect of WIC breastfeeding promotion on actual breastfeeding rates among the WIC population (Oliveira et al., 2002). After controlling for several factors, they found that there was no significant difference between breastfeeding rates of those who participated in WIC prenatally and those who did not (Oliveira et al., 2002).

Prenatal WIC participation is associated with a reduced likely of breastfeeding initiation and duration (Ziol-Guest & Hernandez, 2010). Studies have also shown that regardless of when a mother enters the WIC program she is more likely than a non-WIC participant to formula feed her baby (Balcazar et al., 1995; Chatterji et al., 2002; Schwartz et al., 1995).

In 2010, the national average for babies having ever been breastfed was 75% (Hedberg, 2013). For that same year, WIC's average was only 63.2% (Hedberg, 2013). The national average for babies still being breastfed at six months was 43% (Hedberg, 2013). WIC's average was 25.1% (Hedberg, 2013). Non-WIC participants are more than twice as likely as WIC participants to still be breastfeeding at six months (Baumgartel & Spatz, 2013).

As of 2012, WIC's pregnant, breastfeeding and postpartum population of 2,300,065 was made up of approximately 5% (over 100,000) teenagers (Johnson et al., 2013). This significantly contributes to WIC's low breastfeeding rates. Teenagers also possess many of the characteristics that are associated with low breastfeeding rates: lower education, lower income, and unmarried status (Park, Meier, & Song, 2003).

As of 2012, only 0.6% (\$34 million) of WIC's budget was designated for breastfeeding promotion (Baumgartel & Spatz, 2013). However, in 2009 11.6% (\$850 million) of WIC's expenses were devoted to formula. Infant formula accounts for 44% of all food items purchased through WIC, and more than half of all the infant formula purchased in the United States is done so through WIC (Baumgartel & Spatz, 2013).

The high cost of formula may encourage non-WIC participants to breastfeed, therefore contributing to the disparity in breastfeeding rates among WIC and non-WIC participants (Hedberg, 2013). As a result, much research has been done to determine what causes WIC participants to have lower breastfeeding rates than the rest of the population and potentially what can be done to change that.

One study conducted in-depth interviews with WIC participants to investigate what other factors specific to them create barriers for breastfeeding (Holmes et al., 2009). The study concluded that exclusively breastfeeding mothers either did not know about, accept or value the

food package that WIC specifically designed for them (Holmes et al., 2009). It was also found that mothers understood little about the health benefits of exclusive breastfeeding, making provided formula an added bonus (Holmes et al., 2009). Lastly, the study found that WIC employees and health professionals sent contradictory messages to participants about the importance of exclusive breastfeeding or any breastfeeding at all (Holmes et al., 2009).

Women who are African-American, poor and have lower education levels are less likely to breastfeed and also are a significant portion of WIC's population (Oliveira et al., 2002). Many of the barriers that women in the general population have with breastfeeding are also found among the WIC population. They include lack of support, returning to work/school, physical pain, embarrassment, and time restraint (Hedberg, 2013). The real issue however, is how these barriers play out specifically among the WIC population.

### **3.2.1 WIC and social support**

One study sampled WIC participants to examine how much support they received in regards to breastfeeding. It was found that 49% received some prenatal education on breastfeeding from their obstetrician; however, many mothers reported that the information was limited (Hedberg, 2013). They stated that they were often not given tangible resources for breastfeeding or that they were given misleading information, such as being told that breastfeeding required dietary changes for the mother (Hedberg, 2013).

The study also looked at how social support impacts WIC participants. The study found that an unsupportive partner, no previous breastfeeding experience, lack of support from family and friends, being a single mother, or living in rural areas all contribute to a greater chance of a discontinuation of breastfeeding (Hedberg, 2013).

In addition, studies have found that breastfeeding support groups and peer counseling provided by WIC lead to an increase in breastfeeding rates for WIC participants (Gross et al., 2009; Haughton et al., 2010; Landau, 2011; Mickens, Modeste, Montgomery, & Taylor, 2009). Peer counseling has been shown to improve breastfeeding rates for WIC participants, including difficult to reach populations such as, African-Americans and adolescents (Calfield et al., 1998; Volpe & Bear, 2000; Wambach et al., 2010). One study in particular found that WIC mothers who participate in peer counseling have significantly higher breastfeeding initiation rates than those who do not and those advised by a lactation consultant (Gross et al., 2009). It has also been found that in peer counseling agencies, that participation length is positively associated with the likelihood of breastfeeding initiation (Gross et al., 2009; Yun et al., 2009).

Although peer counseling has time and again been found to have a positive impact on breastfeeding rates among the WIC population it gets little funding and support (Baumgartel & Spatz, 2013). Statistics show that only 16.7% of WIC service delivery sites actually offer peer counseling programs (Baumgartel & Spatz, 2013). In addition, reviews of WIC's peer counseling programs have shown that "there were inconsistent policies, a failure to match counselor demographics with new mothers, and an inability to provide adequate counselor training programs" (Baumgartel & Spatz, 2013, p.468).

### **3.2.2 WIC and race**

A factor that comes up often when discussing breastfeeding, with both WIC and non-WIC individuals is race and ethnicity. As stated earlier, in the general population, African-American women have lower breastfeeding rates than individuals of other races. Research has tried to

determine if the rates within the WIC population are merely reflecting the general population trends, or if other factors within the WIC structure are playing a pivotal role.

It has been speculated that due to the formula reimbursement offered by WIC, participation may be based on a predetermined desire to bottle feed (Marshall et al., 2012). The relationship between this pre-enrollment bias and race could greatly impact breastfeeding rates. The belief is that African-American women are more often motivated to participate in WIC for the formula reimbursement benefit than Caucasian women (Marshall et al., 2012). This finding would then result in lower breastfeeding rates among African-American WIC participants.

Evidence suggests that the variations in breastfeeding rates found between races may be due to the disparity in services provided by WIC to women of different backgrounds (Evans, Labbok, & Abrahams, 2011). Surveys have found that African-American women are less likely than Caucasian women to receive breastfeeding information from WIC and more likely to receive bottle-feeding instructions (Evans et al., 2011).

African American women are already statistically less likely to breastfeed than other races, but within the WIC structure they have less access to breastfeeding services and support (Evans et al., 2011). Breastfeeding support services such as the highly effective peer counseling, are less likely to be found in areas with a high African-American population (Baumgartel & Spatz, 2013).

This could very easily have a significant impact on breastfeeding rates among African-American WIC participants. Researchers have found that the “black community is based on kinship and social connections. Often, a black woman’s decision to breastfeed her child is directly related to influences from her peers, who include her significant other, mother, grandmother, friends or relatives” (Mickens et al., 2009, p.158). One study found that African-

American, low-income, urban mothers with a peer counselor have longer breastfeeding durations than those without peer counseling support (Kistin, Abramson, & Dublin, 1994).

### **3.2.3 WIC and drug use**

An estimated 3% of all mothers struggle with drug addiction during their pregnancies (Wachman, Byun, & Philipp, 2010). WIC's population is no different. In 2012, almost 250,000 (2.6%) of WIC participants had a substance abuse problem at the time of their enrollment in WIC (Johnson et al., 2013). However, WIC offers very little information and education to its participants regarding this subject and especially on how it relates to their potential breastfeeding practices.

WIC's handouts do address alcohol use and breastfeeding. They advise mothers on how many drinks a day they can safely consume while breastfeeding and how long they must wait after drinking to breastfeed (PA DH, 2013). WIC also offers recommendations on using over-the-counter medications while breastfeeding (PA DH, 2013). When speaking about illegal drugs, WIC simply tells its participants to avoid illegal drugs while breastfeeding (PA DH, 2013).

This leads WIC participants to believe that if they are using illegal drugs they should not breastfeed their baby. This could very easily contribute to lowering breastfeeding rates among WIC participants, who are not only capable of safely breastfeeding their babies but would also greatly benefit from it.

## **4.0 PROPOSED EVALUATION**

Due to the significance that WIC places on its breastfeeding program, a program evaluation would be helpful in determining where the program's strengths and weaknesses lie. In order to accurately identify how and why the program is or is not working, a structured evaluation is necessary. WIC's program is complex and made up of several components that require a close look. This chapter presents the proposed evaluation. Each activity is evaluated separately and in most cases measured by multiple sources. The evaluation focuses on the activities experienced by WIC participants. It does not address effects that occur as a result of from WIC's distribution of information or education through partnerships that may reach non-WIC participating mothers.

### **4.1 BREASTFEEDING INFORMATION AND MATERIALS**

The first activity to be assessed is supplying breastfeeding information and materials. WIC provides an extensive amount of material on breastfeeding education through both its offices and its website. In order to evaluate the effectiveness of these materials pre- and post-test surveys will be conducted with WIC participants in regards to the breastfeeding materials and education they receive.

The pretest survey is a breastfeeding knowledge assessment designed by Lansinoh Laboratory Health Professionals (see APPENDIX B) (Lansinoh Laboratories Health

Professionals, 2014). It will first determine pregnant WIC participants' basic knowledge about breastfeeding. They will be asked about benefits, breastfeeding myths and recommended breastfeeding guidelines. In addition to this survey, they will be asked their specific breastfeeding intentions with regard to duration and exclusivity. A general baseline of breastfeeding knowledge will be determined by this survey, so that any changes after enrollment in WIC can be identified. Participants will also be asked specifically about subjects addressed in WIC's handouts such as how to deal with various barriers like returning to work, embarrassment from breastfeeding in public and possible pain from breastfeeding. This will help to establish if the participants are actually reading and understanding the materials to which they have access.

The same questionnaire will be administered to WIC participants six months after delivery. The survey will be used to identify what changes, if any, the WIC participant had in breastfeeding knowledge after being exposed to WIC's educational materials. Were the materials accessible, were they read, were they understandable? It will also help to identify if any gaps in the participant's knowledge were filled or if there any gaps in WIC's information that need to be addressed. The survey will inquire about the WIC participants' actual breastfeeding behavior, including duration and amount of exclusivity. This information will be vital in helping to determine if WIC had any impact on the participants' decision and subsequent actions involving breastfeeding.

## **4.2 WIC TRAINING**

WIC trains its staff on how to properly educate and support breastfeeding WIC participants. A 19 item, five point Likert scale pre-test survey was created by Baylor School of Medicine. It was created to assess the breastfeeding knowledge and lactation counseling skills of physicians' assistant students (see APPENDIX C). The pretest will be administered to staff members at point of hire, and the same survey will be administered after they complete their training. The purpose of these pre- and post-tests is to determine how effectively the staff is being trained. Are they able to complete all tasks on the scale? Is there an increase in knowledge after completing their training in WIC? Are there areas they are still not competent in even after completing training?

## **4.3 PEER SUPPORT**

Peer support is effective in increasing breastfeeding rates and duration. Therefore, in addition to the pre- and post-survey conducted with staff and participants, a series of focus groups will be held in order to collect qualitative data on the subject. Focus groups will be held separately for WIC participants and staff.

The first groups will be held specifically for WIC participants who are either currently breastfeeding or have breastfed within the last year. They will first be asked if they were assigned a peer counselor and if so, to talk about their experiences with them in a more detailed manner. How helpful and accessible were their peer counselors? How did they help them to overcome breastfeeding barriers? Did the peer counselors or their advice impact breastfeeding

duration or exclusivity in any way and how? What were the negatives and positives of having a peer counselor's support? If they were not assigned a peer counselor, they will be asked to explain why and discuss their feelings about that. Participants will also be asked if they received any other social support specifically from WIC and if so, what.

The other set of focus groups will be held with the WIC peer counseling staff. Its focus will be to improve the quality of training they are receiving (as initially looked at in the pre and post test survey) and to examine the actual interactions they are having with participants while offering support. What have their experiences with participants been like? How do the participants respond to the support they are offered? What techniques are they learning to use in order to support breastfeeding mothers? What advice and problem solving methods are they being given to help breastfeeding mothers overcome common barriers? What techniques seem to work and which do not? What obstacles do they often run into while trying to support WIC participants? How could they be better trained?

In addition to peer support, self-efficacy is also a vital factor in raising breastfeeding rates. It is also greatly impacted by peer support and counseling. Therefore, a self-efficacy breastfeeding scale designed by Dr. Cindy-Lee Davis (see APPENDIX D) will be administered to WIC participants six months post delivery, who have reported breastfeeding at all during that time. This scale will help to discover how well a mother's self efficacy is being encouraged through peer support and how it is impacting breastfeeding behavior.

#### **4.4 BREASTFEEDING INCENTIVES**

The last activity to be evaluated at WIC will be its distribution of enhanced food packages for breastfeeding mothers and breast pumps. Data will be collected on how many enhanced food packages are being distributed and which types. Additionally, information on how many breast pumps are being distributed will be collected.

A survey will be administered to WIC participants asking their opinions on WIC provided incentives such as, enhanced food packages, extended enrollment and breast pumps. What incentives have they been given access to? What incentives do they like and dislike? How useful are these incentives? What suggestions or criticisms do they have about them? Do they take advantage of the incentives? What incentives would facilitate them to breastfeed more?

## 5.0 CONCLUSIONS

Research has proven the numerous benefits and advantages of breastfeeding, among them are improved health outcomes for preterm babies, increased bonding for mother and child, and a reduced likelihood of cancer among mothers. However, breastfeeding rates in the U.S. remain below recommended levels and disproportionately so among certain races, ages and education levels (HealthyPeople.gov, 2008). Researchers have attempted to pinpoint barriers, indicators and predictors of breastfeeding behavior in the hopes of developing interventions and awareness programs that will increase breastfeeding rates.

One of the more prominent breastfeeding promotion programs is offered on a national scale through WIC (USDA, 2013a). WIC has taken advantage of its influence and interaction with new mothers to promote and educate them on the benefits of breastfeeding (USDA, 2013a). WIC endorses breastfeeding to its participants as the optimal choice for infant feeding (USDA, 2013a). However, WIC participants on average have lower breastfeeding rates than women not enrolled in WIC (Oliveira et al., 2002). These findings demonstrate the need for an evaluation of WIC's breastfeeding program to determine the causes and possible solutions.

Though WIC is a national program, its breastfeeding program is not implemented in the same way at all branches. This proposed evaluation is based on the general structure of its program, taking into account variations across the 90 state agencies responsible for administering WIC, such as differences in educational materials, staff training and services offered (USDA,

2013a). All of this needs to be considered when implementing and analyzing the findings of this proposed evaluation.

Due to the many state and local agencies of WIC, this evaluation is very large in scope. It would be very difficult, expensive and time consuming to apply it to all WIC agencies. A possible solution would be to evaluate a carefully selected group of agencies. Agencies would be grouped together based on similar characteristics such as size, demographic makeup, geographical location and services offered. Then a small selection of agencies from each group would be used in the evaluation as a representative of the other agencies that they are similar to. The characteristics of the representative agencies will be measured to verify that they are a statistically representative sample. As a result, the findings of their evaluation will likely be able to be applied to the other agencies that they were chosen to represent.

As previously stated, WIC disproportionately allocates a much larger portion of its budget for formula related costs than for breastfeeding (Baumgartel & Spatz, 2013). There are several ways that part of this budget could be more effectively used. The most obvious is to put more funding into peer counseling so that it is available at all agencies.

It should be noted; however that part of the problem is the complicated relationship between WIC and infant formula companies. Formula companies make bids on exclusively supplying WIC with their brand of formula. In return they offer WIC rebates, sometimes as high as 90% of retail value (Nestle, 2011; USDA, 2013a). The higher of a rebate WIC can acquire to cover formula costs, the greater amount of participants they can assist. Formula companies also win out on the arrangement as well. WIC mothers often need more formula than what is provided for them and need to buy more at their own cost (Marcus, 2010). Most often they will purchase the formula brand that they are already receiving through WIC. This results in

increased sales for the company. With both WIC and formula companies benefiting from the arrangement, it is hard to see from a financial standpoint, the incentive for WIC to promote breastfeeding over infant formula.

There are also potential ramifications for WIC and its breastfeeding program due to new health care coverage developments. The Affordable Care Act (ACA) has stated that health insurance programs must now offer breastfeeding support, counseling and equipment to their subscribers (HealthCare.gov, 2014). Specifically speaking, health insurance must cover the cost of counseling by a lactation consultant and provide either a new or rental breast pump (National WIC Association, 2013). The specifications surrounding the amount of counseling allotted and the brand or type of breast pump that is covered will be determined individually by each health plan. The ACA also states that these services are to be offered both during pregnancy and postpartum and must be made available for the duration of breastfeeding (HealthCare.gov, 2014).

It is too soon to see any real repercussions of the ACA on breastfeeding but the potential for them is substantial, especially concerning WIC. The ACA will relieve much of the burden for supplying breast pumps and lactation consulting, which means that WIC can put that funding into other areas of its breastfeeding program. One suggestion would be to offer other breastfeeding tools, such as nursing bras and nursing covers instead of pumps.

It would also be advantageous for WIC to put more funding into other forms of social support, especially for African-American participants. WIC sponsored support groups, online forums, lectures or other social gatherings would be great ways for pregnant women and new mothers from WIC to meet each other. It would give them an opportunity to offer one another support and advice about breastfeeding. WIC could also offer classes and groups specifically

targeted towards African-American fathers to help educate them and to aid in making them more accepting of breastfeeding.

Another suggestion is to put more money into supplying WIC participants with better and more nursing supplies. WIC could offer better breast pumps as well as, a variety of nursing tools like nursing covers, storage bags and storage bottles. All of these could make breastfeeding more comfortable and more convenient for new mothers. If WIC is not willing to allot more money for breastfeeding, it should at the very least reconsider how it spends the money that is presently budgeted.

Another issue that needs to be considered by WIC is its breastfeeding education content, specifically in regards to substance use. Extensive research in the area has found that the “benefits of breastfeeding outweigh the risk of exposure to most therapeutic agents via human milk” (Sachs, 2013, p.e805). The Academy of Breastfeeding Medicine has even set forth very specific and extensive guidelines for drug using women to use in determining how safe it is for them to breastfeed. The guidelines cover who can safely breastfeed, who cannot and who can do so under close supervision (see APPENDIX E) (Jansson, 2009). These guidelines could very easily be adapted and implemented at WIC to help guide more mothers towards safe breastfeeding. This is especially relevant for mothers who are not aware that they can use drugs and still breastfeed without compromising their child’s health.

Several studies have found that not only is it safe for drug using mothers to breastfeed, but that it also offers much needed nutrients for babies whose health has already been compromised by being exposed to drugs in utero (D’Apolito, 2013; Hilton, 2012). WIC’s participants are already at nutritional risk and financially disadvantaged. If they are also illegal drug users, the benefits from breastfeeding for both mother and child are great. WIC’s not

addressing this portion of its population and educating them on breastfeeding does a great disservice.

The benefits of breastfeeding are not only numerous but expansive. They impact infant, mother, society, and the environment. They are not limited to only mothers and their breastfed babies. They contribute to creating an overall healthier population which leads to several positive results, such as a lower infant mortality rate, greater productivity, and lower health costs.

The need for breastfeeding campaigns has been established for some time. Now there is a call for truly effective ones. Just having them is not enough. Time and attention needs to be paid to implementing breastfeeding campaigns that properly work and obtain results. This one health initiative benefits not just many but in several ways. Increasing breastfeeding rates improves physical health, emotional health, the economy, and the environment for many.

## APPENDIX A: WIC FOOD PACKAGES

<b>SNAPSHOT of the WIC Food Packages <sup>1</sup></b>				
<b>Maximum Monthly Allowances of Supplemental Foods for Children and Women</b>				
Foods	Children	-----Women-----		
	Food Package IV 1 through 4 years	Food Package V: Pregnant and Partially Breast- feeding (up to 1 year postpartum)	Food Package VI: Postpartum (up to 6 months postpartum)	Food Package VII: Fully Breastfeeding (up to 1 year post- partum)
Juice, single strength	128 fl oz	144 fl oz	96 fl oz	144 fl oz
Milk <sup>2</sup>	16 qt	22 qt	16 qt	24 qt
Breakfast cereal <sup>3</sup>	36 oz	36 oz	36 oz	36 oz
Cheese				1 lb
Eggs	1 dozen	1 dozen	1 dozen	2 dozen
Fruits and vegetables	\$6.00 in cash value vouchers	\$10.00 in cash value vouchers	\$10.00 in cash value vouchers	\$10.00 in cash value vouchers
Whole wheat bread <sup>4</sup>	2 lb	1 lb		1 lb
Fish (canned) <sup>5</sup>				30 oz
Legumes, dry or canned and/or	1 lb (64 oz canned) Or	1 lb (64 ounce canned) And	1 lb (64 ounce canned) Or	1 lb (64 ounce canned) And
Peanut butter	18 oz	18 oz	18 oz	18 oz

<sup>1</sup> Refer to the regulatory requirements at <http://www.fns.usda.gov/wic/benefitsandservices/foodpkg.htm> for the complete provisions and requirements for WIC foods.

<sup>2</sup> Allowable options for milk alternatives are cheese, soy beverage, and tofu.

<sup>3</sup> At least one half of the total number of breakfast cereals on State agency food list must be whole grain.

<sup>4</sup> Allowable options for whole wheat bread are whole grain bread, brown rice, bulgur, oatmeal, whole-grain barley, soft corn or whole wheat tortillas.

<sup>5</sup> Allowable options for canned fish are light tuna, salmon, sardines, and mackerel.

## SNAPSHOT of the WIC Food Packages <sup>1</sup>

Maximum Monthly Allowances of Supplemental Foods For Infants In Food Packages I, II and III						
	---Fully Formula fed---		---Partially Breastfed---		---Fully Breastfed---	
Foods	Food Packages I and III A: 0-3 months B: 4-5 months	Food Packages II and III 6-11 months	Food Packages I and III A: 0 to 1 month B: 1-3 months C: 4-5 months	Food Packages II and III 6-11 months	Food Package I 0-5 months	Food Package II 6-11 months
WIC Formula	A: 806 fl oz reconstituted liquid concentrate  B: 884 fl oz reconstituted liquid concentrate	624 fl. oz. reconstituted liquid concentrate	A: 1 can powder  B: 364 fl oz reconstituted liquid concentrate  C: 442 fl. oz. reconstituted liquid concentrate	312 fl. oz. reconstituted liquid concentrate		
Infant cereal		24 oz		24 oz		24 oz
Baby food fruits and vegetables		128 oz		128 oz		256 oz
Baby food meat						77.5 oz

<sup>1</sup> Refer to the regulatory requirements at <http://www.fns.usda.gov/wic/benefitsandservices/foodpkg.htm> for the complete provisions and requirements for infant formula and infant foods in the WIC food packages.

(USDA, 2013c)

## **APPENDIX B: TEST YOUR BREASTFEEDING KNOWLEDGE**

**Circle any and all correct answers.**

**Why should I breastfeed?**

1. Because breastfeeding mothers show less postnatal anxiety and depression than artificial feeding mothers
2. Because I will regain my pre-pregnancy weight quicker
3. Because breastfeeding is protective against Sudden Infant Death Syndrome (SIDS)

**What benefits will my baby receive from my milk?**

1. The essential nutrients, vitamins, proteins, fats and antibodies that he needs to develop physically and neurologically
2. Higher IQ
3. Protection against allergies, respiratory infections and diarrhea

**What are the health benefits for me?**

1. I will be less at risk from breast cancer and osteoporosis
2. I will be less at risk from ovarian cancer
3. I will be less at risk from rheumatoid arthritis

**What can I do if my breasts become engorged?**

1. Put cold Savoy cabbage leaves in my bra
2. Express off a little milk to be more comfortable
3. Feed less often

**My baby feeds very often. What should I do?**

1. Make him wait longer
2. Breastfeed frequently when he is well attached
3. Find out whether he needs help to be able to effectively milk the breast

**What if I develop sore nipples?**

1. Have the baby's positioning and attachment at the breast checked by a breastfeeding counselor or lactation consultant
2. Apply a layer of moisture barrier cream to the injured area
3. Stop breastfeeding

**Why has my baby abruptly stopped nursing?**

1. My baby doesn't like me any more
2. My baby is on a nursing strike
3. My baby is teething

**I receive adverse comments when I breastfeed my baby while out. What should I do?**

1. Pack up and leave at once
2. Brazen it out
3. Engage the complainant in a discussion about the natural function of the breasts and the benefits of breast milk

**What should I do if my baby bites?**

1. Scream
2. Pull the baby in close so he needs to open his mouth to breathe
3. Break the suction, take the baby off the breast and tell him not to do it

**How do I know if I have mastitis?**

1. I have a sore, red spot on my breast
2. I feel as if I have flu, and my breast is hot and red
3. I may have a lump in my breast

**How do I know if my baby is getting enough milk?**

1. My baby has six wet nappies and three bowel movements daily
2. My baby is putting on over 113 gms (4oz) a week
3. My baby only asks for a feed every 3 hours

(Lansinoh, 2014)

**APPENDIX C: SELF-PERCEIVED KNOWLEDGE AND COUNSELING SKILLS OF  
BREASTFEEDING SURVEY**

1. How able are you to describe the benefits of breastfeeding for mothers?
2. How able are you to describe the benefits of breastfeeding for infants?
3. How able are you to identify contraindications to breastfeeding in the United States?
4. How able are you to describe the anatomy important to lactation?
5. How able are you to describe the physiology important to lactation?
6. How able are you to identify the nutritional components of breast milk and know the recommendations for supplementation of breastfed infants?
7. How able are you to accurately assess the growth of breastfed infants?
8. How able are you to apply available data on breastfeeding and developmental outcomes when counseling families?
9. How able are you to identify the World Health Organization's "Ten Steps to Successful Breastfeeding?"
10. How able are you to describe the importance of breastfeeding in the developing world?
11. How able are you to give basic instructions about breastfeeding to a mother?
12. How able are you to describe routine breast care for a breastfeeding woman?
13. How able are you to evaluate breastfeeding infants with jaundice?
14. How able are you to treat breastfeeding infants with jaundice?

15. How able are you to recognize breastfeeding infants with poor weight gain?
16. How able are you to evaluate breastfeeding infants with poor weight gain?
17. How able are you to arrange treatment for breastfeeding infants with poor weight gain?
18. How able are you to find accurate information on the use of medications by breastfeeding women?
19. How able are you to apply the knowledge of the use of illicit drugs (including alcohol and smoking) while breastfeeding and apply this knowledge in counseling nursing women?

(Meusch, 2013)

## **APPENDIX D: PRE-NATAL BREASTFEEDING SELF-EFFICACY SCALE**

1. I can always hold my baby comfortably during breastfeeding.
2. I can always position my baby correctly at my breast.
3. I can always focus on getting through one feeding at a time.
4. I can always recognize the signs of a latch.
5. I can always take my baby off the breast without pain to myself.
6. I can always determine that my baby is getting enough breast milk.
7. I can always successfully cope with breastfeeding like I have with other challenging tasks.
8. I can always depend on my family to support my decision to breastfeed.
9. I can always motivate myself to breastfeed successfully.
10. I can always monitor how much breast milk my baby is getting by keeping track of my baby's urine and bowel movements.
11. I can always breastfeed my baby without using formula as a supplement.
12. I can always ensure that my baby is properly latched for the whole feeding.
13. I can always manage the breastfeeding situation to my satisfaction.
14. I can always manage to breastfeed even if my baby is crying.
15. I can always keep my baby awake at my breast during a feeding.
16. I can always maintain my milk supply by using the 'supply and demand' rule.

17. I can always refrain from bottle feeding for the first 4 weeks.
18. I can always feed my baby with breast milk only.
19. I can always stay motivated to breastfeed my baby.
20. I can always count on my friends to support my breast feeding.
21. I can always keep wanting to breastfeed.
22. I can always feed my baby every 2-3 hours.
23. I can always keep feeling that I really want to breastfeed my baby for at least 6 weeks.
24. I can always comfortably breastfeed with my family members present.
25. I can always be satisfied with my breastfeeding experience.
26. I can comfortably breastfeed in public places.
27. I can always deal with the fact that breastfeeding is time consuming.
28. I can always finish feeding my baby on one breast before switching to the other breast.
29. I can always continue to breastfeed my baby for every feeding.
30. I can always feel if my baby is sucking properly at my breast.
31. I can always accept the fact that breastfeeding temporarily limits my freedom.
32. I can always manage to keep up with my baby's breastfeeding demands.
33. I can always tell when my baby is finished breastfeeding.

(Dennis, 2003)

**APPENDIX E: AMB CLINICAL PROTOCOL #21: GUIDELINES FOR  
BREASTFEEDING AND THE DRUG-DEPENDENT WOMAN**

*Women who meet all of the following criteria under the following circumstances should be supported in their decision to breastfeed their infants:*

- Women engaged in substance abuse treatment who have provided their consent to discuss progress in treatment and plans for postpartum treatment with substance abuse treatment counselor
- Women whose counselors endorse that she has been able to achieve and maintain sobriety prenatally; counselor approves of client's plan for breastfeeding
- Women who plan to continue in substance abuse treatment in the postpartum period
- Women who have been abstinent from illicit drug use or licit drug abuse for 90 days prior to delivery and have demonstrated the ability to maintain sobriety in an outpatient setting
- Women who have a negative maternal urine toxicology testing at delivery except for prescribed medications
- Women who received consistent prenatal care
- Women who do not have medical contraindication to breastfeeding (such as HIV)
- Women who are not taking a psychiatric medication that is contraindicated during lactation
- Stable methadone-maintained women wishing to breastfeed should be encouraged to do so regardless of maternal methadone dose.

*Women under the following circumstances should be discouraged from breastfeeding:*

- Women who did not receive prenatal care
- Women who relapsed into illicit drug use or licit substance misuse in the 30-day period prior to delivery
- Women who are not willing to engage in substance abuse treatment or who are engaged in treatment but are not willing to provide consent for contact with the counselor
- Women with positive maternal urine toxicology testing for drugs of abuse or misuse of licit drugs at delivery
- Women who do not have confirmed plans for postpartum substance abuse treatment or pediatric care
- Women who demonstrate behavioral qualities or other indicators of active drug use

*Women under the following circumstances should be carefully evaluated, and a recommendation for suitability or lack of suitability for breastfeeding should be determined by coordinated care plans among perinatal providers and substance abuse treatment providers:*

- Women relapsing to illicit substance use or licit substance misuse in the 90–30-day period prior to delivery, but who maintained abstinence within the 30 days prior to delivery
- Women with concomitant use of other prescription (i.e., psychotropic) medications
- Women who engaged in prenatal care and/or substance abuse treatment during or after the second trimester
- Women who attained sobriety only in an inpatient setting

(Jansson, 2009)

## APPENDIX F: EXECUTIVE SUMMARY OF RECOMMENDATIONS

- Increased funding for peer counseling (especially in African American communities)
- Increased social support (especially in African American communities)
  - ✓ Support groups
  - ✓ Online forums
  - ✓ Social gatherings
  - ✓ Target & include fathers
- Supply breastfeeding tools beyond pumps
  - ✓ Nursing bras
  - ✓ Nursing covers
  - ✓ Storage bottles
  - ✓ Storages covers
- Educate participants on breastfeeding and substance use (see Appendix E)
- Program evaluation of breastfeeding program
  - ✓ Breastfeeding information and materials (see Appendix B)
  - ✓ WIC staff training (see Appendix C)
  - ✓ Peer support (see Appendix D)
  - ✓ Breastfeeding incentives

## BIBLIOGRAPHY

- Anchondo, I., Berkeley, L., Mulla, Z.D., Byrd, T., Nuwayhid, B., Handal, G., & Akins, R. (2012, May). Pediatricians', Obstetricians', Gynecologists', and Family Medicine Physicians' Experiences with and Attitudes about Breast-feeding. *Southern Medical Journal*, 105 (5), 243-248.
- Arora, S., McJunkin, C., Wehrer, J., & Kuhn, P. (2000, November). Major Factors Influencing Breastfeeding Rates: Mother's Perception of Father's Attitude and Milk Supply. *Pediatrics*, 106 (5), e67.
- Balcazar, H., Trier, C.M., & Cobas, J.A. (1995). What Predicts Breastfeeding Intention in Mexican-American and Non-Hispanic White Women? Evidence From a National Survey. *Birth*, 22, 74-80.
- Baumgartel, K.L., & Spatz, D.L. (2013, August). WIC (The Special Supplemental Nutrition Program for Women, Infants, and Children): Policy Versus Practice Regarding Breastfeeding. *Nursing Outlook*, <http://dx.doi.org/10.1016/j.outlook.2013.05.010>
- Bentley, M.E., Dee, D.L., & Jensen, J.L. (2003, January). Breastfeeding Among Low Income, African- American Women: Power, Belief, and Decision Making. *The Journal of Nutrition*, 133 (1), 3055-3095.
- Bonuck, K.A., Trombly, M., Freeman, K., & McKee, D. (2005). Randomized, Controlled Trial of a Prenatal and Postnatal Lactation Consultant Intervention on Duration and Intensity of Breastfeeding Up to 12 Months. *Pediatrics*, 116 (6), 1413-1426.
- Bonuck, K., Stuebe, A., Barnett, J., Labbok, M.H., Fletcher, J., and Bernstein, P.S. (2014, February). Effect of Primary Care Intervention on Breastfeeding Duration and Intensity. *American Journal of Public Health*, 104 (1) 119-127.
- Blyth, R. J., Creedy, D. K., Dennis, C. L., Moyle, W., Pratt, J., & De Vries, S. M. (2004). Breastfeeding Duration in an Australian Population: The Influence of Modifiable Antenatal Factors. *Journal of Human Lactation*, 20 (1), 30– 38.
- Brewer, M.M., Bates, M.R., & Vannoy, L.P. (1989). Postpartum Changes in Maternal Weight and Body Fat Deposits in Lactating vs. Nonlactating Women. *American Journal of Clinical Nursing*, 259 (49).

- Brodribb, W., Fallon, A.B., Hegney, D., & O'Brein, M. (2007, November). Identifying Predictors of the Reasons Women Give for Choosing to Breastfeed. *Journal of Human Lactation*, 23 (4), 338-344.
- Burdette, A.M. (2013, November). Neighborhood Context and Breastfeeding Behaviors Among Urban Mothers. *Journal of Human Lactation*, 29 (4), 597-604.
- Calfield, L., Gross, S., Bentley, M., Bronner, Y., Kessler, L., Jensen, J., & Paige, D. (1998). WIC-Based Interventions to Promote Breastfeeding Among African-American Women in Baltimore: Effects of Breastfeeding Initiation and Continuation. *Journal of Human Lactation*, 14 (1), 15-22.
- Castrucci, B.C., Hoover, K.L., Lim, S., & Maus, K.C. (2006). A Comparison of Breastfeeding Rates in an Urban Birth Cohort Among Women Delivering Infants at Hospitals That Employ and Do Not Employ Lactation Consultants. *Journal of Public Health Management and Practice*, 12 (6), 578-585.
- CDC (2008). Breastfeeding in the United States: Findings from the National Health and Nutrition Examination Survey, 1999-2006. Retrieved April 1, 2013 from <http://www.cdc.gov/nchs/data/databriefs/db05.htm>
- CDC (2012). Breastfeeding Report Card United States, 2012. Retrieved April 1, 2013 from <http://www.cdc.gov/breastfeeding/data/reportcard.htm>
- Chatterji, P., Bonuk, K., Dhawan, S., & Deb, N. (2002). *WIC Participation and the Initiation and Duration of Breastfeeding*. Madison, WI: University of Wisconsin, Madison.
- Chezem, J., Friesen, C., & Boettcher, J. (2003). Breastfeeding Knowledge, Breastfeeding Confidence, and Infant Feeding Plans: Effects on Actual Feeding Practices. *Journal of Obstetrics, Gynecology, and Neonatal Nursing*, 32 (1), 40– 47.
- D'Apolito, K. (2013, March). Breastfeeding and Substance Abuse. *Clinical Obstetrics & Gynecology*, 56 (1), 202-211.
- Demirci, J.R., Bogen, D.L., Holland, C., Tarr, J.A., Rubio, D., Li, J., Nemecek, M., Chang, J.C. (2013, December). Characteristics of Breastfeeding Discussions at the Initial Prenatal Visit. *Obstetrics and Gynecology*, 122 (6), 1263-1270.
- Dennis, C. (2002). Breastfeeding Initiation and Duration: A 1990-2000 Literature Review. *Journal of Obstetric, Gynecologic, and Neonatal Nursing* 31, 12-32.
- Dennis, C.L. (2003). The Breastfeeding Self-Efficacy Scale: Psychometric Assessment of the Short Form. *Journal of Obstetric, Gynecological, and Neonatal Nursing*, 32 (6), 734-744.

- Dermer, A. (2001, August). A Well-Kept Secret Breastfeeding's Benefits to Mothers. *New Beginnings*, 18 (4), 124-127.
- Dettwyler, K. A. (1995). Beauty and the Breast: The Cultural Context of Breastfeeding in the United States. In Stuart-Macadam & P. K. A. Dettwyler (Eds.), *Breastfeeding: Biocultural Perspectives* (pp. 167-215). New York: Aldine De Gruyer.
- DiGirolamo, A., Thompson, N., Martorell, R., Fein, S., & Grummer-Strawn, L. (2005). Intention or Experience? Predictors of Continued Breastfeeding. *Health Education and Behavior*, 32 (2), 208– 226.
- Duckett, L., Henly, S., Avery, M., Potter, S., Hills-Bonczyk, & S., Hulden, R. (1998). A Theory of Planned Behavior-Based Structural Model for Breastfeeding. *Nursing Research*, 47 (6), 325–336.
- Dyson, L., McCormick, F., & Renfrew, M.J. (2005, April). Interventions for Promoting the Initiation of Breastfeeding. *Cochrane Database System Review*, 18 (2).
- Eidelman, A.I., & Schanler, R.J. (2012, March). Breastfeeding and the Use of Human Milk. *Pediatrics*, 129 (3), e827-e841.
- Ertem, I. O., Votto, N., & Leventhal, J. M. (2001). The Timing and Predictors of the Early Termination of Breastfeeding. *Pediatrics*, 107 (3), 543–548.
- Evans, K., Labbok, M., & Abrahams, S.W. (2011, December). WIC and Breastfeeding Support Services: Does the Mix of Services Offered Vary with Race and Ethnicity? *Breastfeeding Medicine*, 6 (6), 401-406.
- Finch, S. (2003). Pregnancy During Residency. *Academy of Medicine*, 78, 418-428.
- Furman, L., Taylor, G., Minich, N., & Hack, M. (2003). The Effect of Maternal Milk on Neonatal Morbidity of Very Low-Birth-Weight Infants. *Archives of Pediatric Adolescent Medicine*, 157(1), 66–71.
- Gross, S. M., Resnik, A. K., Nanda, J. P., Cross-Barnet, C., Augustyn, M., Paige, D. M. (2009). The Differential Impact of WIC Peer Counseling Programs on Breastfeeding Initiation Across the State of Maryland. *Journal of Human Lactation*, 25 (4), 435-443.
- Guttman, N., & Zimmerman, D. R. (2000, May). Low-Income Mothers' Views on Breastfeeding. *Social Science & Medicine*, 50 (10), 1457-1473.
- Hailes, J. F., & Wellard, S. J. (2000). Support for Breastfeeding in the First Postpartum Month: Perceptions of Breastfeeding Women. *Breastfeeding Review* 8, 5-9.

- Hannon, P.R., Willis, S.K., Bishop-Townsend, V., Martinez, I.M., & Scrimshaw, S.C. (2000, June). African-American and Latina Adolescent Mothers' Infant Feeding Decisions and Breastfeeding Practices: A Qualitative Study. *Journal of Adolescent Health, 26* (6), 399-407.
- Haughton, J., Gregorio, D., & Pérez-Escamilla, R. (2010). Factors Associated with Breastfeeding Duration Among Connecticut Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Participants. *Journal of Human Lactation, 26*, 266-273.
- HealthCare.gov (2014). What Are My Breastfeeding Benefits? Retrieved April 17, 2014 from <https://www.healthcare.gov/what-are-my-breastfeeding-benefits/>
- HealthyPeople.gov (2008). Data 2020 Search Results. Retrieved November 11, 2013 from <http://www.healthypeople.gov/2020/Data/SearchResult.aspx?topicid=26&topic=Maternal%2c+Infant%2c+and+Child+Health&objective=MICH-21.1&anchor=102124>
- HealthyPeople.gov (2014). About Healthy People. Retrieved February 15, 2014 from <http://www.healthypeople.gov/2020/about/default.aspx>
- Hedberg, I.C. (2013, July). Barriers to Breastfeeding in the WIC Population. *The American Journal of Maternal/Child Nursing, 38* (4), 244-249.
- Hill, P., & Humenick, S. (1996). Development of the H&H lactation scale. *Nursing Research, 45*, 136– 140.
- Hilton, T.C. (2012, July). Breastfeeding Considerations of Opioid Dependent Mothers and Infants. *The American Journal of Maternal/Child Nursing, 37* (4), 236-240.
- Hintz, S.R., Kendrick, D.E., & Stoll, B.J. (2005). Neurodevelopmental and Growth Outcomes of Extremely Low Birth Weight Infants After Necrotizing Enterocolitis. *Pediatrics, 115* (3), 696–703.
- Holmes, A.V., Chin, N.P., Kaczorowski, J., & Howard, C.R. (2009, March). A Barrier to Exclusive Breastfeeding for WIC Enrollees: Limited Use of Exclusive Breastfeeding Food Package for Mothers. *Breastfeeding Medicine, 4* (1), 25-30.
- Hong, T. M., Callister, L. C., & Schwartz, R. (2003). First Time Mothers' Views of Breastfeeding Support From Nurses. *MCN: American Journal of Maternal/Child Nursing 28*, 10-15.
- Humphreys, A. S., Thompson, N. J., & Miner, K. R. (1998, September). Intention to Breastfeed in Low-Income Pregnant Women: The Role of Social Support and Previous Experience. *Birth: Issues in Perinatal Care, 25* (3), 169-174.
- Hylander, M.A., Strobino, D.M., & Dhanireddy, R. (1998). Human Milk Feedings and Infection Among Very Low Birth Weight Infants. *Pediatrics, 102* (3).

- Ip, S., Chung, M., & Raman, G. (2007). Breastfeeding and Maternal and Infant Health Outcomes in Developed Countries. *Evidence Report Technology Assessment, 153* (153), 1–186.
- Ip, S., Chung, M., Raman, G., Trikalinos, T.A., & Lau, J. (2009). A Summary of the Agency for Healthcare Research and Quality's Evidence Report on Breastfeeding in Developed Countries. *Breastfeeding Medicine, 4* (1), S17–S30.
- Isaacs, E.B., Fischl, B.R., Quinn B.T., Chong, W.K., Gadian, D.G., & Lucas, A. (2010). Impact of Breast Milk on Intelligence Quotient, Brain Size, and White Matter Development. *Pediatric Research, 67* (4), 357-362.
- Jansson, L.M. (2009, December). ABM Clinical Protocol #21: Guidelines for Breastfeeding and the Drug-Dependent Woman. *Breastfeeding Medicine, 4* (4), 225-228.
- Jensen, E., & Labbock, M. (2011). Unintended Consequences of the WIC Formula Rebate Program on Infant Feeding Outcomes: Will the New Food Packages Be Enough? *Breastfeeding Medicine, 6*(3), 145-149.
- Johnson, B., Thorn, B., McGill, B., Suchman, A., Mendelson, M., Patlan K.L., Freeman, B., Gotlieb, R., & Connor, P. (2013, December). WIC Participant and Program Characteristics 2012 Final Report. USDA. Alexandria: VA.
- Khoury, A.J., Moazzem, S.W., Jarjoura, C.M., Carothers, C., & Hinton A. (2005, March). Breast-Feeding Initiation in Low-Income Women: Role of Attitudes, Support, and Perceived Control. *Women's Health Issues, 15* (2), 64-72.
- Kistin, N., Abramson, R., & Dublin, P. (1994). Effect of Peer Counselors on Breastfeeding Initiation, Exclusivity, and Duration Among Low-Income Urban Women. *Journal of Human Lactation, 10* (1), 11-15.
- Landau, T. (2011). Breastfeeding Case Study: New York City—The WIC Program's Vital Role in Breastfeeding Success. *Breastfeeding Medicine, 6* (5), 277-279.
- Lansinoh Laboratories Health Professionals. (2014, February). Test Your Breastfeeding Knowledge. Retrieved February 21, 2014 from <http://www.lansinohprofessional.co.uk/information-sheets>
- Lawrence, R. & Lawrence, R. (1999). *Breastfeeding: A Guide for the Medical Profession*. St. Louis: Mosby.
- Layde, P. (1989). The Independent Association Parity, Age at First Full Term Pregnancy and Duration of Breastfeeding with the Risk of Breast Cancer. *Journal of Clinical Epidemiology, 42* (963).

- Lipworth, L., Bailey, L.R., & Trichopoulos, D. (2000). History of Breastfeeding in Relation to Breast Cancer Risk: A Review of the Epidemiologic Literature. *Journal of National Cancer Institute*, 92 (4), 302–312.
- Lucas, A., & Cole, T.J. (1990). Breast Milk and Neonatal Necrotising Enterocolitis. *Lancet*, 336 (8730), 1519-1523.
- Lucas, A., Morley, R., & Cole T.J. (1998). Randomized Trial of Early Diet in Preterm Babies and Later Intelligence Quotient. *British Medical Journal*, 317 (7171), 1481-1487.
- Marcus, R. (2010, July 14). Lobbying Fight Over Infant Formula Highlights Budget Gridlock. *The Washington Post*. Retrieved April 15, 2014 from <http://www.washingtonpost.com/wp-dyn/content/article/2010/07/13/AR2010071304634.html>
- Marshall, C., Gavin, L., Bish, C., Winter, A., Williams, L., Wesley, M., & Zhang L. (2012, December). WIC Participation and Breastfeeding Among White and Black Mothers: Data from Mississippi. *Journal of Maternal Child Health*.
- McCann, M. F., Baydar, N., & Williams, R. L. (2007). Breastfeeding Attitudes and Reported Problems in a National Sample of WIC Participants. *Journal of Human Lactation*, 23(4), 314-324.
- McCarter-Spaulding, K., & Kearney, M. H. (2001). Parenting Self-Efficacy and Perception on Insufficient Breast Milk. *Journal of Obstetric, Gynecologic and Neonatal Nursing*, 30 (5), 515– 522.
- Meinzen-Derr, J., Poindexter, B., Wrage, L., Morrow, A.L., Stoll, B., & Donovan, E.F. (2009). Role of Human Milk in Extremely Low Birth Weight Infants' Risk of Necrotizing Enterocolitis or Death. *The Journal of Perinatal Education*, 29 (1), 57–62.
- Meusch, S.M., Elliot, E.P., & Fasser C.E. (2013). Physician Assistant Students' Perceived Breastfeeding Knowledge and Counseling Skills Before and After Web-Based Curriculum and Lactation Shadowing Experience. *Journal of Physician Assistant Education*, 24 (3), 31-33.
- Mickens, A.D., Modeste, N., Montgomery, S., & Taylor, M. (2009, May). Peer Support and Breastfeeding Intentions Among Black WIC Participants. *Journal of Human Lactation*, 25 (2), 157-162.
- Miller, N.H., & Miller, D.J. (1996). Breastfeeding Practices Among Resident Physicians. *Pediatrics*, 98 (434).
- Moore, E.R., & Coty, M.B. (2006, January). Prenatal and Postpartum Focus Groups With Primiparas: Breastfeeding Attitudes, Support, Barriers, Self-efficacy, and Intention. *Journal of Pediatric Health Care*, 20 (1), 35-46.

- National WIC Association (2013, December). ACA Basics for the WIC Community. Retrieved April 17, 2014 from <https://www.nwica.org/blog/aca-basics-for-the-wic-community#.U1FBjF7D-Ul>
- Nestle, M. (2011, August). How WIC Enriches Infant Formula Companies. Retrieved April 15, 2014 from <http://www.foodpolitics.com/?s=wic+formula+rebate>
- Newcomb, P. (1994). Lactation and a Reduced Risk of Postmenopausal Breast Cancer. *New England Journal of Medicine*, 81 (330).
- Nyqvist, K.H., Häggkvist, A., Hansen, M.N., Kylberg, E., Frandsen, A.L., Maastrup, R., Ezeonodo, A., Hannula, L., & Haiek, L.N. (2013, August). Expansion of Baby-Friendly Hospital Initiative Ten Steps to Successful Breastfeeding into Neonatal Intensive Care Expert Group Recommendations. *Journal of Human Lactation*, 29 (3), 300-309.
- Okamoto, T., Shirai, M., & Kokubo, M. (2007). Human Milk Reduces the Risk of Retinal Detachment in Extremely Low-Birthweight Infants. *Pediatrics International*, 49 (6), 894-897.
- Oliveira, V., Racine, E., Olmsted, J., & Ghelfi, L. (2002, September). The WIC Program: Background, Trends, and Issues. *United States Department of Agriculture*, 27.
- Park, Y.K., Meier, E.R., & Song, W.O. (2003, February). Characteristics of Teenage Mothers and Predictors of Breastfeeding Initiation in the Michigan WIC Program in 1995. Women, Infants, and Children. *Journal of Human Lactation*, 19 (1), 50-56.
- Pellum, R. (2011). Breastfeeding Among Low-Income Women. *Nurse Practitioners and Physicians Assistants*. Retrieved April 11, 2013 from <http://nurse-practitioners-and-physician-assistants.advanceweb.com/Features/Articles/Breastfeeding-Among-Low-Income-Women.aspx>
- Pennsylvania Department of Health. (2013, December). Pennsylvania Breastfeeding Awareness and Support Program. Retrieved December 29, 2013 from [http://www.portal.state.pa.us/portal/server.pt/community/breastfeeding\\_awareness/14206](http://www.portal.state.pa.us/portal/server.pt/community/breastfeeding_awareness/14206)
- Piper, S., & Parks, P. L. (1996). Predicting the Duration of Lactation: Evidence from a National Survey. *Birth*, 23, 7 – 12.
- Pugh, L. C., Milligan, R. A., Frick, K. D., Spatz, D., & Bronner, Y. (2002, June). Breastfeeding Duration, Costs, and Benefits of a Support Program for Low-Income Breastfeeding Women. *Birth: Issues in Perinatal Care*, 29 (2), 95-100.
- Pugh, L.C., Serwint, J.R., Frick, K.D., Nanda, J.P., Sharps, P.W., Spatz, D.L., & Milligan, R.A. (2010, January). A Randomized Controlled Community-Based Trial to Improve Breastfeeding Rates Among Urban Low-Income Mothers. *Academic Pediatrics*, 10 (1), 14-20.

- Quinn, A., Koepsell, D., & Haller, S. (1997). Breastfeeding Incidence After Early Discharge and Factors Influencing Breastfeeding Cessation. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 26 (3), 289– 294.
- Radford, A. (2014). The Ecological Impact of Bottle Feeding. *ReducePackaging.com*. Retrieved February 27, 2014 from <http://www.reducepackaging.com/impact-bottlefeeding.html>
- Rojjanasrirat, W., & D Sousa, V. D. (2010). Perceptions of Breastfeeding and Planned Return to Work or School Among Low-Income Pregnant Women in the USA. *Journal of Clinical Nursing*, 19, 2014-2022
- Rothman, A. J. (2000). Toward a Theory-Based Analysis of Behavioral Maintenance. *Health Psychology*, 19, 64– 69.
- Sachs, H.C. (2013, September). The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics. *Pediatrics*, 132 (3), 796-809.
- Schanler, R.J., Shulman, R.J., & Lau, C. (1999). Feeding Strategies for Premature Infants: Beneficial Outcomes of Feeding Fortified Human Milk Versus Preterm Formula. *Pediatrics*, 103 (6 ),1150–1157.
- Schwartz, J.B., Popkin, B.M., Tognetti, J., & Zohoori, N. (1995). Does WIC Participation Improve Breast-Feeding Practices? *American Journal of Public Health*, 85, 729-731.
- Segura-Millan, S., Dewey, K. G., & Perez-Escamilla, R. (1994). Factors Associated with Perceived Insufficient Milk in a Low-Income Urban Population in Mexico. *Journal of Nutrition*, 124, 212– 220.
- Shah, D.K., Doyle, L.W., & Anderson, P.J. (2008). Adverse Neurodevelopment in Preterm Infants with Postnatal Sepsis or Necrotizing Enterocolitis is Mediated by White Matter Abnormalities on Magnetic Resonance Imaging at Term. *Journal of Pediatrics*, 153 (2), 170–175.
- Sisk, P.M., Lovelady, C.A., Dillard, R.G., Gruber, K.J., & O’Shea, T.M. (2007). Early Human Milk Feeding is Associated with a Lower Risk of Necrotizing Enterocolitis in Very Low Birth Weight Infants. *The Journal of Perinatal Education*, 27 (7), 428–433.
- Sparks, P.J. (2011, September). Racial/Ethnic Differences in Breastfeeding Duration among WIC-Eligible Families. *Women’s Health Issues*, 21 (5), 374-382.
- Stevens, E.E., Patrick, T. E., & Pickler, R. (2009). A History of Infant Feeding. *The Journal of Perinatal Education*, 18 (2), 32-39.

- Stuebe, A.M., Willett, W.C., Xue, F., & Michels, K.B. (2009). Lactation and Incidence of Premenopausal Breast Cancer: A Longitudinal Study. *Archives of Internal Medicine*, 169 (15), 1364–1371.
- Sullivan, S., Schanler, R.J., & Kim, J.H. (2010). An Exclusively Human Milk-Based Diet is Associated with a Lower Rate of Necrotizing Enterocolitis than a Diet of Human Milk and Bovine Milk-Based Products. *Journal of Pediatrics*, 156 (4), 562–567.
- Thurman, S.E., & Allen, P.J. (2008). Integrating Lactation Consultants into Primary Health Care Services: Are Lactation Consultants Affecting Breastfeeding Success? *Pediatric Nursing*, 34 (5), 419-425.
- USDA. (2013a). About WIC – WIC at a Glance. Retrieved November 11, 2013, from <http://www.fns.usda.gov/wic/aboutwic/wicataglance.htm>
- USDA. (2013b). WIC Benefits and Services. Retrieved November 16, 2013, from <http://www.fns.usda.gov/wic/benefitsandservices/>
- USDA. (2013c). WIC Food Packages. Retrieved December 29, 2013 from <http://www.fns.usda.gov/wic/wic-food-packages>
- U.S. National Library of Medicine (NLM) – National Institutes of Health (NIH). (2014). Medline Plus. Retrieved February 17, 2014 from <http://www.nlm.nih.gov/medlineplus/medlineplus.html>
- Volpe, E., & Bear, M. (2000). Enhancing Breastfeeding Initiation in Adolescent Mothers Through the Breastfeeding Educated and Supported Teen (BEST) Club. *Journal of Human Lactation*, 16 (3), 196-200.
- Wachman, E.M., Byun, J., & Philipp, B.L. (2010, August). Breastfeeding Rates Among Mothers of Infants with Neonatal Abstinence Syndrome. *Breastfeeding Medicine*, 5 (4), 159-164.
- Walsh, A., Gold, M., & Jensen, P. (2005). Motherhood During Residency Training. *Canadian Family Physician*, 51, 991-997.
- Wambach, K. A. (1997). Breastfeeding Intention and Outcome: A Test of the Theory of Planned Behavior. *Research in Nursing and Health*, 20, 51– 59.
- Wambach, K.A., & Cohen, S.M. (2009, August). Breastfeeding Experiences of Urban Adolescent Mothers. *Journal of Pediatric Nursing*, 24 (4), 244-254.
- Wambach, K., Aaronson, L., Breedlove, G., Domian, E. W., Rojjanasrirat, W., & Yeh, H. W. (2010). A Randomized Controlled Trial of Breastfeeding Support and Education for Adolescent Mothers. *Western Journal of Nursing Research*, 33 (4), 486-505.

- WHO. (2009). Acceptable Medical Reasons for Use of Breast-Milk Substitutes. (2009). Retrieved November 16, 2013, from [http://www.who.int/maternal\\_child\\_adolescent/documents/WHO\\_FCH\\_CAH\\_09.01/en/index.html](http://www.who.int/maternal_child_adolescent/documents/WHO_FCH_CAH_09.01/en/index.html).
- WHO. (2013, September). Infant and Young Child Feeding. Retrieved November 16, 2013, from <http://www.who.int/mediacentre/factsheets/fs342/en/index.html>
- Wilhelm, S., Rodehorst, T.K., Flanders-Stepans, M.B., Hertzog, M., & Berens, C. (2008, August). Influence of Intention and Self-Efficacy Levels on Duration of Breastfeeding for Midwest Rural Mothers. *Applied Nursing Research*, 21 (3), 123-130.
- Witt, A.M., Smith, S., Mason, M.J., Flocke, S.A. (2012). Integrating Routine Lactation Consultant Support into a Pediatric Practice. *Breastfeeding Medicine*, 7 (1), 38-42.
- Wojcicki, J. M., Gugig, R., Tran, C., Kathiravan, S., Holbrook, K., & Heyman, M. B. (2010). Early Exclusive Breastfeeding and Maternal Attitudes Towards Infant Feeding in a Population of New Mothers in San Francisco, California. *Breastfeeding Medicine*, 5(1), 9-15.
- Wright, A., & Schanler, R. (2001, February). The Resurgence of Breastfeeding at the End of the Second Millennium. *The Journal of Nutrition*, 131 (2), 4215-4255.
- Yun, S., Qian, L., Mertzlufft, K., Kruse, C., White, M., Fuller, P. & Zhu, B. (2009). Evaluation of the Missouri WIC (Special Supplemental Nutrition Program for Women, Infants and Children) Breast-Feeding Peer Counseling Program. *Public Health Nutrition*, 13 (2), 229-237.
- Ziol-Guest, K. & Hernandez, D. (2010, May). First and Second-Trimester WIC Participation is Associated with Lower Rates of Breastfeeding and Early Introduction of Cow's Milk During Infancy. *Journal of the American Dietetic Association*, 110 (5), 702-709.