

ABSTRACT

Macro-Level Modifiable Variables Affecting Breastfeeding Rates

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The World Health Organization (WHO) and the American Academy of Pediatrics (AAP) recommend 6 months of exclusive breastfeeding followed by at least six additional months of complementary feedings. Current rates in the United States are well below recommended levels. This thesis reviews the literature surrounding modifiable macro-level variables affecting breastfeeding rates, using the Ecological Model of Health Promotion as a theoretical framework. Major recommendations include initiating paid maternity leave at the national level, restricting formula marketing practices, and making hospital breastfeeding rates publically available.

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by

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CHAPTER ONE

Introduction

Breastfeeding is the physiological norm for infant feeding (N. J. Berry & Gribble, 2008) with risks of not breastfeeding established in the literature. If an infant consumes any formula in the first 3 to 6 months, the risk of otitis media is double that of exclusively breastfed babies (McNiel, Labbok, & Abrahams, 2010). Other risks of exclusively formula fed infants include increased risk for diarrhea and vomiting from gastrointestinal infection: babies receiving only formula face over 2.75 times the risk when compared to exclusively breastfed infants (Chien & Howie, 2001; Plenge-Bönig et al., 2010; Walker, 2010). Babies receiving no breastmilk face triple the risk of being hospitalized for respiratory tract illness at some point during the first year of life compared to babies exclusively breastfed for four months (V. R. Bachrach, Schwarz, & Bachrach, 2003). Additional risks include sudden infant death syndrome (56% higher in formula fed babies), higher rates of type 1 and 2 diabetes, childhood obesity, and childhood leukemia (Ip et al., 2007; Stuebe, 2009). Benefits of breastfeeding include lower rates of fever after immunizations (Pisacane et al., 2010), reduction in overall hospitalization rates for infants (Paricio Talayero et al., 2006), and significantly fewer missed days of work for parents (American Academy of Family Physicians, 2008; Mills, 2009). Finally, mothers who breastfeed have lower rates of breast and ovarian cancer, in addition to lower rates of metabolic syndrome, a precursor to type 2 diabetes (Stuebe, 2009).

Breastfeeding rates in the United States are far below Healthy People 2020 goals. Though 74% of women initiate breastfeeding, by three months, only 33.6% are still

breastfeeding exclusively. By six months, 43.5% of mothers continue to breastfeed, but only 14.1% continue to breastfeed exclusively, as is the recommendation of the American Academy of Pediatrics (AAP), the World Health Organization (WHO), and the American Public Health Association (APHA) (American Public Health Association, 2007; Gartner et al., 2005; World Health Organization, 2009). By twelve months, only 22.7% of mothers are still breastfeeding, even though the AAP, WHO, and APHA all recommend complementary breastfeeding to continue until children are at least one year old.

Breastfeeding goals in Healthy People 2020 fall under the category —Maternal, Infant, and Child Health (MICH), ” including objectives 21-24 (U.S. Department of Health and Human Services, 2010). MICH-21 contains goals for breastfeeding rates, MICH-22 relates to worksite lactation support, and MICH-23 and MICH-24 relate to hospital practices impacting breastfeeding rates (see Table 1).

A recent cost analysis of the impact of lower than recommended breastfeeding rates suggests that if rates approached WHO and AAP recommendations with 90% of infants breastfeeding exclusively for 6 months, the United States would save \$13 billion per year and prevent 911 deaths (Bartick & Reinhold, 2010). Savings include direct and indirect costs of the pediatric diseases that could be prevented by achieving optimal breastfeeding rates. This study used established risk ratios relevant to breastfeeding for pediatric diseases reported by the Agency for Healthcare Research and Quality (AHRQ), including otitis media, sudden infant death syndrome, type 1 diabetes, and 6 other pediatric diseases. The cost analysis did not include any costs related to maternal diseases impacted by suboptimal breastfeeding rates, such as ovarian and breast cancer.

Table 1

Healthy People 2020 Breastfeeding Objectives

Number	Objective	Baseline % / Year Measured	Healthy People 2020 Target %
MICH-21	Increase the proportion of infants who are breastfed:	(2006 births)	
MICH-21.1	Ever	74.0	81.9
MICH-21.2	At 6 months	43.5	60.6
MICH-21.3	At 1 year	22.7	34.1
MICH-21.4	Exclusively through 3 months	33.6	46.2
MICH-21.5	Exclusively through 6 months	14.1	25.5
MICH-22	Increase the proportion of employers that have worksite lactation support programs	25.0 (2009)	38.0
MICH-23	Reduce the proportion of breastfed newborns who receive formula supplementation within the first 2 days of life	24.2 (2006 births)	14.2
MICH-24	Increase the proportion of live births that occur in facilities that provide recommended care for lactating mothers and their babies	2.9 (2009)	8.1

The related costs of type 2 diabetes in children were also excluded, as the risk ratios have yet to be firmly established in the literature (Bartick, 2010).

Current breastfeeding rates fall short of Healthy People 2020 goals, but reflect some of the highest breastfeeding patterns of the past century. Breastfeeding saw a steady decline in the early 1900s, becoming even more pronounced in the 1930s because of improved sanitation and availability of cow's milk (J. H. Wolf, 2003) and because of changes in birth practices, with more women delivering babies in hospitals (Thulier, 2009). In hospitals, mothers had little access to their newborn babies often for over a week, which made breastfeeding an unlikely outcome. Due to advancements in formula composition, by the 1950s, the medical profession viewed formula feeding as the superior

option over breastfeeding. Unhelpful breastfeeding advice given by experts such as Dr. Spock compounded the problem (Thulier, 2009), and by 1971, breastfeeding rates hit their all-time low in the United States, with only 24% of mothers initiating breastfeeding (Ryan, Rush, Krieger, & Lewandowski, 1991) and even fewer making it beyond a few weeks. In 1970, only 8% of infants were still breastfed at 3 months (Thulier, 2009). Many mothers today continue to experience breastfeeding difficulties based on advice that stems from hospital-recommended formula feeding patterns and schedules (Wiessinger, West, & Pitman, 2010).

Though low-birth weight and preterm birth are attributed as the significant causes for the racial disparities seen in infant mortality rates (Alexander, Wingate, Bader, & Kogan, 2008; Schempf, Branum, Lukacs, & Schoendorf, 2007), differences in breastfeeding rates are also a key factor (Alio et al., 2009; Forste, Weiss, & Lippincott, 2001). Black women are less likely to initiate breastfeeding on average than the general population, and tend to breastfeed less exclusively and for a shorter duration when they do initiate breastfeeding (Centers for Disease Control and Prevention, 2010). Comfort with the idea of formula feeding has been found as a primary factor explaining racial differences in breastfeeding rates. Black women associated formula feeding with a greater opportunity for older children to contribute to infant care responsibilities, and viewed formula feeding as something familiar and comforting (Nommsen-Rivers, Chantry, Cohen, & Dewey, 2010). Women are less likely to breastfeed if they have not been exposed to a friend or family member who has breastfed (Kingston, Dennis, & Sword, 2007); this further reduces the likelihood of an individual black woman viewing breastfeeding as a viable option. Additionally, women of lower socioeconomic status,

regardless of race/ethnicity, are less likely to breastfeed (Thulier & Mercer, 2009; U.S. Department of Health and Human Services, 2011a).

Challenges in Breastfeeding Research

Comparing studies about breastfeeding can be exceedingly challenging. Studies use a variety of definitions for breastfeeding; some studies compare babies who have ever received breastmilk to those who never received breastmilk. Some studies use duration of breastfeeding as the variable of interest, but don't take breastfeeding exclusivity (sometimes termed "intensity") into consideration (Thulier, 2010). This is problematic, as breastfeeding involves a dose-response relationship, with some benefits only being seen for exclusively breastfed infants, and some benefits only occurring for babies breastfed for a minimum length of duration (Thulier, 2010).

Many researchers rely on categories outlined by Lobbok and Krasovec, but this schema encourages the use of the term "full breastfeeding," a combination of exclusive and almost exclusive breastfeeding, without clear definitions of these categories (M. Lobbok & Krasovec, 1990; Thulier, 2010). Studies typically rely on maternal recall to measure breastfeeding duration and exclusivity. If asked within a three-year period of breastfeeding cessation, mothers can accurately recall the length of breastfeeding, but responses about exclusivity may be less accurate, especially over time (Li, Scanlon, & Serdula, 2005) with the wording of questions leading to inaccurate answers. Some babies may receive only breastmilk, but if a mother gives her baby exclusively pumped breastmilk, she may not categorize this as "breastfeeding" (Thulier, 2010).

Additionally, almost all breastfeeding studies are observational studies with causality unable to be determined, leading to establishing associations between variables.

Though some studies incorporate an element of randomized control trials (such as randomizing which mothers receive a breastfeeding education intervention), not only is randomizing which infants will receive breastmilk considered unethical, it is unlikely that mothers would adhere to group assignment.

There is also a myriad of confounding factors. Even though almost all studies control for maternal education, race, maternal employment, and socioeconomic factors, it is difficult to rule out all possible confounders. Not only do potential differences exist in what makes one mother chose to breastfeed and another choose to formula feed, the very act of breastfeeding is multi-faceted.

If breastfeeding is reported to make a difference in a study, it is still not fully clear what about breastfeeding contributed to the difference (J. B. Wolf, 2007). Beyond the nutritional content of breastmilk, there are benefits caused by the increased time of physical contact between the mother and child, such as improved maternal response to crying and increases in bonding (Baxter, & Smith, 2009). Furthermore, some researchers contend that beyond increased physical contact, hormones are also released during breastfeeding which increase maternal sensitivity to their baby's cries (Kim et al., 2011). Some researchers have found that the angle at which breastfed babies tend to be held helps reduce ear infections (J. B. Wolf, 2007). Babies have increased control over the amount consumed and often the timing of feedings, which has been argued as a component of breastfeeding's protective effect on childhood obesity (Brown, Raynor, & Lee, 2011). This benefit of breastfeeding may only be present for babies directly breastfeeding, as opposed to babies fed expressed milk from a bottle, as bottle feeding (whether the bottle contains formula or breastmilk) may encourage a baby to consume

more milk than needed, as babies swallow what comes out of a bottle to avoid choking (Disantis, Collins, Fisher, & Davey, 2011). Additionally, even the necessity of alternating breasts (and thus changing the direction the baby views its immediate environment) may have a key developmental impact as the baby receives cross lateral stimulation (Vervloed, Hendriks, & van den Eijnde, 2011). Some of these benefits could be simulated by mothers choosing to formula feed a child in a manner as similar as possible to breastfeeding, with the baby always being held during feedings and alternating arms used to hold the baby.

Purpose

The purpose of this thesis is to synthesize the literature examining factors affecting breastfeeding rates that are modifiable by intervention at the population level. Understanding the effects of demographic factors on breastfeeding rates is important, but public health professionals should look to areas where changes in institutions, the community, and policy can help raise breastfeeding rates in all groups.

Significance of the Problem

Though documents exist that aim to give some overview to modifiable breastfeeding factors, such as the *Surgeon General's Call to Action on Breastfeeding* (U.S. Department of Health and Human Services, 2011a), these serve primarily as action points. Baby-Friendly Hospital Initiative research delves into many hospital-related factors, but still excludes several key variables. This thesis will serve to fill in the gaps by examining critical population level factors influencing breastfeeding rates in the United States.

Supporting Theory

This thesis draws on McLeroy and colleagues' Ecological Model for Health Promotion to understand what will be needed to see improvement in overall breastfeeding rates (McLeroy, Bibeau, Steckler, & Glanz, 1988). McLeroy outlines five levels of influence: 1) intrapersonal factors, 2) interpersonal processes and primary groups, 3) institutional factors, 4) community factors, and 5) public policy. Factors interact across levels in influencing behavior change, with consensus building across levels important to affect lasting change.

At the intrapersonal level, some factors such as socioeconomic variables and marital status are not easily changeable. There are numerous modifiable factors influencing breastfeeding rates at the intrapersonal level, including breastfeeding self-efficacy, faith in breastmilk, and perceived insufficient milk (C. L. Dennis, 1999; O'Brien, Buikstra, Fallon, & Hegney, 2009; Otsuka, Dennis, Tatsuoka, & Jimba, 2008). A woman's breastfeeding self-efficacy is defined as the confidence she has in her capacity to breastfeed and to continue breastfeeding despite facing challenges. Many studies find breastfeeding self-efficacy to be more predictive of breastfeeding rates than any demographic factor (C.-L. Dennis, Heaman, & Mossman, 2011; McCarter-Spaulding & Gore, 2009; Otsuka et al., 2008). A woman's faith in breastmilk has been defined as believing that breastmilk is unique and is ideally made for her infant; women with high levels of faith in breastmilk tend to breastfeed for longer durations (O'Brien et al., 2009). Perceived insufficient milk is the most frequently given cause for discontinuation of breastfeeding (Eksioglu & Ceber, 2010; Otsuka et al., 2008), but low milk supply is often caused by breastfeeding mismanagement, and not usually an unalterable state

(Wiessinger et al., 2010). Additionally, many women are concerned about having insufficient milk when their baby is actually gaining sufficient weight, indicating a stable milk supply (Wilhelm, Rodehorst-Weber, Flanders Stepan, & Hertzog, 2010).

At the interpersonal level, the support of the mother of a woman who has given birth is a salient component of breastfeeding success. If the grandmother is not supportive of breastfeeding, new mothers are less likely to have confidence in their ability to breastfeed, and tend to breastfeed for a shorter duration (Grassley & Eschiti, 2008). Being exposed to friends who breastfeed, or even just having seen breastfeeding also contributes to a woman's willingness to initiate and continue breastfeeding (Kingston et al., 2007).

Though intrapersonal and interpersonal levels of influence are key factors in breastfeeding behavior, this thesis aims to examine modifiable factors influencing breastfeeding rates at the macro level. In broad public health interventions, the question —what can be changed at the institutional, community, and policy level in order to better enable women to succeed in breastfeeding?” needs to be considered.

In this thesis, institutional factors, community factors, and public policy will be grouped together as macro-level factors, and macro-level factors will be split into two major sections: factors surrounding hospital practices impacting breastfeeding rates, and non-hospital factors influencing breastfeeding rates, including maternity leave and worksite lactation support.

Delimitations

Delimitations included articles published within the last five years (unless a seminal article) relevant to the United States about macro-level modifiable factors

influencing breastfeeding rates. Studies concerning preterm infants, infants with complications affecting breastfeeding, and breastfeeding concerns specific to the developing world were excluded. Further delimitations include article relevance to population-wide applicability. Factors affecting breastfeeding rates that are not reasonably modifiable were not included in the literature review. These factors include race/ethnicity, age, socioeconomic status, educational attainment, parity, and marital status. Below, factors are defined and divided into sections: hospital-related factors and non-hospital factors.

Limitations

There are several limitations to this thesis. Many factors included are somewhat “hidden” factors, such as “rooming-in.” Searching a database with the terms “breastfeeding AND rooming-in” will yield extremely few articles, though this factor comes up again and again as a small but significant factor influencing breastfeeding rates. It could be that the author is missing other such variables that don’t readily appear when using search terms to mine for articles. The author relied on the expert opinion of Dr. Susan Landers, a member of the executive committee section on breastfeeding of the American Academy of Pediatrics (AAP) to validate the list of included variables, but there could be several key variables that are still missing.

Another limitation of this thesis is the interplay of variables on breastfeeding outcomes. None of the variables included is independent; at the individual level, a woman may experience extremely unsupportive hospital policies, lack worksite support, and have no paid maternity leave, and still exceed WHO and AAP breastfeeding recommendations due to the strength of her intrapersonal breastfeeding beliefs and

interpersonal support. A hospital may have high cesarean rates, but provide excellent lactation support to help women overcome the usual negative association between cesarean deliveries and breastfeeding rates.

Additionally, several included factors are currently moving targets. By the time this thesis is completed, there may be changes in insurance reimbursement policies for outpatient lactation consultants, worksite lactation support may continue to increase across the nation, and more breastfeeding legislation may pass at the state and national level. These factors limit this thesis to being a snapshot in time.

Definitions

Hospital-related Factors

Cesarean rates. Percent of newborns delivered by cesarean section, a surgery to remove the baby through the abdomen as opposed to vaginal birth.

IBCLC availability/lactation specific training for staff. International Board Certified Lactation Consultants (IBCLC) pass a board exam, fulfill educational requirements, complete clinical hours, and participate in continuing education in order to be certified. Not all hospitals have IBCLCs available or provide lactation-specific training to their staff.

mPINC scores. The Maternity Practices in Infant Nutrition and Care (mPINC) survey was created in 2007 and is conducted every 2 years by the CDC to evaluate maternity care practices at hospitals with maternity services.

Drugs used during labor. In vaginal deliveries, drugs are used during labor for three purposes: to induce and augment labor, to reduce postpartum hemorrhaging, and/or to manage pain. Drugs are also used during cesarean deliveries to provide anesthesia.

Skin to skin contact. Skin to skin contact is defined as immediate skin to skin contact between the mother and newborn baby. The baby should be wearing nothing but a diaper (and possibly a hat for warmth), with the mother-baby dyad covered by a blanket. If the mother is unavailable, the father or other caregiver can also provide skin to skin contact, though this is less ideal.

Rooming-in. Mother and baby are together a minimum of 23 out of 24 hours per day while in the hospital.

Hospital discharge bags containing formula samples. These are discharge bags containing formula samples, formula coupons, and literature from formula companies.

Supplementation rates. Percent of babies receiving formula supplementation in the hospital within the first two days of life.

Baby-Friendly Hospital Initiative. The Baby-Friendly Hospital Initiative (BFHI) was developed by the WHO and UNICEF, and involves a hospital certification process which monitors implementation of the BFHI's 10 Steps to Successful Breastfeeding.

Other Macro Factors

Lactation consultant availability post hospital discharge. This factor indicates whether there is access to lactation consultants outside of the hospital.

Maternity leave. Paid leave from employment provided for mothers after the birth (or adoption) of a child. Most employed mothers are eligible for 12 weeks of unpaid leave through the Family Medical Leave Act (FMLA).

Worksite lactation support. Worksite lactation support includes at a minimum providing a private, sanitary place for pumping milk and working with the mother to enable her to take regular pumping breaks.

Clinician support/knowledge of breastfeeding. This factor includes clinician knowledge about breastfeeding, confidence in providing breastfeeding support to mothers, and lactation specific education that the clinician has received.

Breastfeeding legislation. Examples of breastfeeding legislation include the right for a mother to breastfeed anywhere she has the right to be located, protection for discrimination based on breastfeeding, specific laws pertaining to worksite lactation requirements, and exemption from jury duty.

Mother-to-mother support availability. Mother-to-mother support involves women with experience in breastfeeding providing peer support to new mothers. La Leche League, Baby Cafes, and peer counseling programs are examples.

Special Supplemental Nutrition Program for Women, Infant, and Children (WIC): peer counseling & breastfeeding support. All WIC clinics are required to provide breastfeeding support to new mothers, with some providing peer counselors. These are women who have been on WIC who have successfully breastfeed at least one child who provide breastfeeding education and support to moms on WIC.

Formula factors outside of the hospital. This includes formula marketing, direct distribution of formula samples, claims made about formula, and formula company-sponsored literature provided through prenatal clinics.

This thesis will provide an in-depth review of the literature surrounding the above factors and their impact on breastfeeding rates.

CHAPTER TWO

Methodology

Articles

Articles published within the last five years (unless a seminal article) relevant to the United States about macro-level modifiable factors influencing breastfeeding rates were considered for inclusion. Studies concerning preterm infants, infants with complications affecting breastfeeding, and breastfeeding concerns specific to the developing world were excluded. Further delimitations include article relevance to population-wide applicability. Factors affecting breastfeeding rates that are not reasonably modifiable were briefly discussed in the introduction but are not included in the literature review. These factors include race/ethnicity, age, socioeconomic status, educational attainment, parity, and marital status. One hundred and thirty-one articles met the inclusion criteria. Forty-nine articles were excluded: 12 were excluded due to a focus on preterm infants, 4 were excluded because they examined the implementation of Baby-Friendly hospitals in the context of countries with nationalized health insurance, 30 were excluded because of a developing world context, and 3 were excluded because infants in the studies had complications affecting breastfeeding rates.

Selection Criteria for Modifiable Factors

The list of proposed modifiable factors affecting breastfeeding rates was validated by Dr. Susan Landers, the chairman of the executive committee of the Texas

Breastfeeding Coalition. Dr. Landers is a neonatologist and a member of the executive committee section on breastfeeding of the American Academy of Pediatrics (AAP).

Modifiable factors are listed below, followed by search terms. Terms were searched using Web of Knowledge and PubMed databases.

Hospital-related Factors:

Cesarean rates

IBCLC availability/lactation specific training for staff

mPINC scores

Drugs used during labor

Skin to skin contact

Formula bags

Supplementation rates

Rooming-in

Baby-Friendly Hospital Initiative

Other Macro Factors:

Lactation consultant availability post hospital discharge

Maternity leave

Worksite Lactation Support

Clinician support/knowledge of breastfeeding

Breastfeeding legislation

Mother-to-mother support availability

WIC: peer counseling & breastfeeding support

Formula factors outside of the hospital

Search Terms

Search terms included: Breastfe*,¹ lactation, hospital, work, labor, birth, formula, breastfeeding rates, breastfeeding disparit*, Baby-Friendly Hospital, mPINC, IBCLC, lactation consultant, induction, maternity leave, WIC, peer counsel*, supplement*, cesarean, pediatrician, obstetric*, skin to skin, breastfeeding exclusivity, breastfeeding duration, breastfeeding initiation, breastfeeding support, lactation support.

Searches were focused on articles published in the Journal of Pediatrics, the Journal of Obstetric, Gynecological, & Neonatal Nursing, the Journal of Human Lactation, government reports, and Breastfeeding Medicine.

Relevant articles were reviewed, including randomized control trials, comparison studies, secondary analyses, cohort studies, pilot studies, government reports, policy analyses, position papers, and qualitative studies. Articles are included in tables by factor in Appendix A.

¹ Asterisks within search terms allow for the inclusion of all possible word endings within the search engine.

CHAPTER THREE

Modifiable Hospital Macro Variables Affecting Breastfeeding Rates

As 99.1% of births in the United States occur in hospitals (MacDorman, Menacker, & Declercq, 2010), hospital related macro-level factors likely affect the breastfeeding practices of the vast majority of American mothers. Furthermore, hospital-level factors are relevant to breastfeeding rates of all socioeconomic and racial/ethnic groups. Therefore, working towards improving birth care practices should influence breastfeeding rates in all groups (D. A. Forster & McLachlan, 2007; Murray, Ricketts, & Dellaport, 2007), which in turn holds promise for narrowing affected health outcome disparities (Palmer et al., 2011). This chapter outlines macro-level variables affecting breastfeeding rates relevant to the hospital setting, beginning with the Baby-Friendly Hospital Initiative and related factors, and continuing to other key hospital-level variables.

Baby-Friendly Hospital Initiative and Related Factors

Baby-Friendly Hospital Initiative

The Surgeon General and Healthy People 2020 recommend an increase in the percentage of babies born in Baby-Friendly certified hospitals (U.S. Department of Health and Human Services, 2010, 2011a), which are the international standard for optimal maternity care practices supportive of breastfeeding. The Baby-Friendly Hospital Initiative, developed by the WHO and UNICEF, began in 1991 (Heinig, 2010) and offers recognition to approved hospitals, monitors quality improvement, and assures

policies helpful to establishing breastfeeding (MacEnroe, 2010). Currently, 4.53% of births in the U.S. occur in Baby-Friendly facilities (U.S. Department of Health and Human Services, 2011b) which can have profound effects on breastfeeding rates since mothers whose infants are born in Baby-Friendly facilities have improved breastfeeding outcomes (Heinig, 2010). To achieve Baby-Friendly designation, hospitals must go through a certification process in which their adherence to the Ten Steps to Successful Breastfeeding is monitored. The Ten Steps are as follows in Table 2 (United Nations Children's Fund & World Health Organization, 2010):

Table 2
The Ten Steps to Successful Breastfeeding

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

U.S. hospitals that have achieved Baby-Friendly designation have higher breastfeeding initiation and exclusivity rates, outpacing other hospitals at both the national and regional levels (Merewood, Mehta, Chamberlain, Philipp, & Bauchner, 2005). This positive effect remains, even when these Baby-Friendly hospitals serve populations that usually have lower breastfeeding rates (California WIC Association & UC Davis Human Lactation Center, 2011; Merewood et al., 2005). Additionally, Baby-Friendly hospitals also have higher rates of patient satisfaction (Bohling-Smith & Peters, 2011), a finding which may motivate hospitals to work toward Baby-Friendly designation.

A recent cost-analysis comparing Baby-Friendly and non-Baby-Friendly hospitals in the U.S. using matched pairs found that Baby-Friendly facilities averaged \$35 more per delivery, though this difference was not statistically significant (DelliFraine et al., 2011). The cost of a hospital purchasing its own formula is frequently given as a deterrent for entering the Baby-Friendly certification process yet, this study demonstrates that these costs are minimal.

IBCLC Availability/Lactation Specific Training for Staff

Step 2 of the Baby-Friendly Hospital Initiative's Ten Steps to Successful Breastfeeding involves staff training (United Nations Children's Fund & World Health Organization, 2010). Lactation-specific training is both a key element of Baby-Friendly Hospitals, and a factor influencing breastfeeding rates in its own right.

Internationally Board Certified Lactation Consultants (IBCLCs) are the only health professionals who specialize in clinical lactation management. To become certified, IBCLCs must demonstrate sufficient academic preparation, pass a board exam,

participate in clinical hours, and complete ongoing continuing education hours (U.S. Department of Health and Human Services, 2011a). Hospitals that employ Internationally Board Certified Lactation Consultants (IBCLCs) have 2.28 times higher rates of breastfeeding at hospital discharge, with a threefold increase in breastfeeding rates found in women on Medicaid (Castrucci, Hoover, Lim, & Maus, 2006). Employing more IBCLCs at more hospitals may help narrow breastfeeding disparities. The more hours that IBCLCs are available to provide services, the higher the breastfeeding rates (Castrucci et al., 2006). Despite these positive effects, many hospitals have no IBCLCs available, or have part-time IBCLCs with limited availability. The Surgeon General recommends greater IBCLC availability and encourages hospitals to increase provision of IBCLC services in addition to providing more extensive breastfeeding specific training for all clinicians interacting with new mothers (U.S. Department of Health and Human Services, 2011a).

In addition to IBCLCs, nurses are frequently relied on to provide lactation support, though many nurses still view formula feeding as the norm for infant feeding, which can make using nurses as breastfeeding support personnel counterproductive (Cricco-Lizza, 2009). After receiving lactation-specific training, nurses report an increase in self-efficacy in helping mothers with breastfeeding (Ingram, Johnson, & Condon, 2011). As many hospitals rely solely on nurses to give breastfeeding support, providing lactation-specific education to nurses is crucial, especially since nurses report receiving limited training on breastfeeding during their nursing education (Cricco-Lizza, 2009). Receiving a minimum of 15 content-specific sessions of lactation support training in addition to 5 hours of supervised clinical experience for all hospital staff caring for

new mothers and babies is also a requirement to receive designation as a Baby-Friendly Hospital (Baby-Friendly USA, 2010).

Rooming-in

Constant access to a newborn baby by the mother facilitates the establishment of a good milk supply (Murray et al., 2007), and is one of the 10 steps to Successful Breastfeeding established by the WHO and UNICEF Baby-Friendly Hospital Initiative, as well as the recommendation of the Academy of Breastfeeding Medicine (MacEnroe, 2010; Wright et al., 2009). Many hospitals in the United States continue the practice of routinely separating mothers and babies for extended periods of time, which is detrimental to breastfeeding. If rooming-in during the night is not feasible at a hospital, bringing the baby to the mother for regular night feedings can mitigate the negative impact of separating the mother-baby dyad (DiGirolamo, Grummer-Strawn, & Fein, 2008). Increased access to a newborn throughout the day and night improves the likelihood of feeding the infant on demand and increasing the frequency of breastfeeds, which leads to the establishment of a good milk supply. This is all the more important in mothers who have experienced a cesarean delivery and may be at risk for delays in milk production (Lin, Lee, Yang, & Gau, 2011).

Supplementation Rates

Almost 25% of all breastfed babies in the United States receive formula supplementation during the first two days of life (U.S. Department of Health and Human Services, 2011b). Supplementation frequently happens without the mother's knowledge (Crivelli-Kovach & Chung, 2011) during routine care visits to the nursery. Mothers

whose babies receive supplemental formula or water in the hospital are less likely to achieve their breastfeeding goals (E. R. Declercq, Lobbok, Sakala, & O'Hara, 2009) and more likely to view themselves as unable to produce milk sufficient for their baby's needs (Kaplan & Graff, 2008). Mothers may also believe that if supplementation occurs in the hospital setting that they should continue the practice at home (Holmes, Chin, Kaczorowski, & Howard, 2009; Wright et al., 2009). Babies receiving formula on their first day have shorter durations of breastfeeding than babies receiving only breastmilk (Bolton, Chow, Benton, & Olson, 2009) and those receiving formula supplementation before hospital discharge have lower rates of breastfeeding exclusivity (Semenic, Loiselle, & Gottlieb, 2008). Primiparas (first time mothers) were 4.4 times and multiparas 8.8 times more likely to breastfeed exclusively as intended if their babies did not receive formula or water supplementation while in the hospital (E. R. Declercq et al., 2009). Babies born by cesarean section have higher rates of in-hospital formula supplementation (Biro, Sutherland, Yelland, Hardy, & Brown, 2011). Furthermore, mothers whose babies receive supplementation experience less stimulation to produce milk unless pumping occurs concurrently to the supplementation. Early supplementation using a bottle can negatively affect a baby's latch while breastfeeding leading to pain for the mother and/or ineffective sucking (Y.-Y. Huang, Gau, Huang, & Lee, 2009). The combination of early supplementation by a bottle (as opposed to a syringe or cup) and a lack of stimulation to produce milk may lead to a difficult beginning for the breastfeeding mother.

Supplementation is at times medically indicated for a newborn, but is often a part of routine care for newborns without a real medical need (Wright et al., 2009). The

Academy of Breastfeeding Medicine recommends hospitals to only supplement babies if ordered by an attending physician (Wright et al., 2009); however, 24% of hospitals in the U.S. routinely supplement over 50% of healthy full term breastfed infants before hospital discharge (Centers for Disease Control and Prevention, 2008).

Other Hospital Factors

Beyond the factors included in the Baby-Friendly Hospital Initiative, five additional major factors are indicated in the literature: skin-to-skin contact, cesarean surgeries, drugs used during labor, hospital discharge bags containing formula samples, and mPINC scores. Skin-to-skin contact is key for the early initiation of breastfeeding, but is not widely supported in most U.S. hospitals (Romano & Lothian, 2008). The United States has some of the highest cesarean rates in the world (Betrán et al., 2007); part of this is because the vast majority of births are attended by obstetricians who specialize in performing surgery (Simonds, Rothman, & Norman, 2006). The use of drugs during labor is far more common in the United States than in most other developed countries; scholars have argued that there is a birth culture of “managing” birth that leads to inducing and augmenting labor and unnecessary cesarean deliveries (Romano & Lothian, 2008). Allowing formula companies to distribute formula samples violates WHO policy (Merewood et al., 2010) and is not permitted in WHO-compliant countries (World Health Organization, 2009). Additionally, the mPINC survey, administered by the CDC, is unique to the United States.

Skin to Skin Contact

Best practices for maternal and newborn care include immediate skin-to-skin contact. This involves placing the bare just-born baby on the mother’s chest, between her

breasts, and then covering the dyad with warm blankets. Early skin-to-skin contact requires delaying routine newborn care practices such as immediate cleaning and weighing of the infant. Skin-to-skin contact provides a more effective way of keeping a newborn baby warm, with improved fetal outcomes over babies placed in warmers. Additionally, skin-to-skin contact is associated with reductions in maternal postpartum depressive symptoms (C. A. Ogbuanu et al., 2009). Delaying routine procedures, such as weighing and cleaning the infant, and providing immediate skin-to-skin contact instead lowers the risk of infection in the newborn (Sobel, Silvestre, Mantaring III, Oliveros, & Nyunt- U, 2011). Early skin-to-skin contact between a mother and newly born baby has a dose-response relationship to exclusive breastfeeding rates (Bramson et al., 2010) and additionally reduces the time until effective breastfeeding is established (Mahmood, Jamal, & Khan, 2011).

It is best if babies are permitted to initiate breastfeeding at their own pace. Many infants are not ready or interested to breastfeed immediately after birth, and should be given time to adjust before assistance in latching on is provided. Self-attachment to the breast may take 45 minutes after an unmedicated birth, but this time is well spent, as allowing self-attachment reduces the establishment of latch problems (Widström et al., 2011). Prior to the first skin-to-skin contact, neither the baby nor the mother's breasts should be washed, as the baby's sense of smell helps locate the nipples and encourages self-attachment (Widström et al., 2011). Skin-to-skin contact may additionally help mitigate some of the negative impact of drugs that may have been used during labor and delivery by helping lower cortisol levels in the mother (Handlin et al., 2009). Because of the range of benefits provided to both mothers and newborns, the time immediately

following birth should be protected for all stable infants to experience skin-to-skin contact. It is therefore of concern that only 1 out of 3 mothers report their babies being in their arms for most of the first hour after birth (E. R. Declercq, Corry, & Applebaum, 2006).

Cesarean Rates

Both elective and emergency cesarean births are associated with lower rates of exclusive breastfeeding (E. R. Declercq et al., 2009; Zanardo et al., 2010). Though some cesarean deliveries are life-saving or medically necessary, cesarean rates in the United States are high, with 32.8% of all babies born by cesarean in 2010 (Hamilton, Martin, & Ventura, 2011). The WHO recommends cesarean rates for developed countries to be between 10-15%, based on rates in countries with the lowest infant and maternal mortality rates, and best fetal outcomes (Gibbons et al., 2010; World Health Organization, 1985). Some researchers have found that the impact of cesarean deliveries on breastfeeding is not necessarily more severe than the impact of epidurals used during most vaginal deliveries (DiGirolamo et al., 2008), though other studies find a significant difference (Semenic et al., 2008; Zanardo et al., 2010). This may in part be due to a longer separation of mother and baby following a cesarean delivery resulting in a delayed initiation of breastfeeding. Cesarean deliveries are additionally associated with a delayed onset of lactogenesis, in part because of the longer separation of the mother-baby dyad (Lin et al., 2011; Zanardo et al., 2010). Earlier onset of lactation is associated with longer duration of breastfeeding at six weeks (Gross et al., 2011). If early initiation of breastfeeding is possible after a cesarean section, breastfeeding outcomes are improved. Additionally, women experiencing cesarean delivery whose babies did not receive

formula supplementation within the first 72 hours after birth report a higher perceived milk supply than women whose babies were supplemented (Lin et al., 2011). This last point is especially important since perceived insufficient milk supply is a primary reason given for weaning (Eksioglu & Ceber, 2010; Otsuka et al., 2008).

Drugs Used During Labor

Babies exposed to no drugs during labor have better breastfeeding rates, and the exposure to drugs in the delivery process has been attributed by some researchers as part of the cause of the negative impact of cesarean birth on breastfeeding outcomes (DiGirolamo et al., 2008). In vaginal deliveries, drugs are used during labor for three purposes: to induce and augment labor, to reduce postpartum hemorrhaging, and/or to manage pain (Jordan et al., 2009). Drug use for all categories have been found to reduce breastfeeding rates, with the exception of using nitrous oxide (with oxygen) for pain management, which yields slight improvement in breastfeeding rates. This is attributed to its short half-life, which affects the fetus/newborn baby for a much shorter duration (Jordan et al., 2009).

Epidurals may have a dose-response effect on breastfeeding; lower doses appear to have less of an impact on breastfeeding outcomes, with higher doses resulting in shorter duration of breastfeeding (Beilin et al., 2005), with earlier introduction of epidurals having a more negative impact than epidurals initiated late in labor (Romano & Lothian, 2008). Higher breastfeeding exclusivity rates have been found in infants not exposed to an epidural (E. R. Declercq et al., 2009). In the infant, the aftermath of drugs used during labor can affect the muscular support needed for the baby to successfully breastfeed, in addition to lowering infant alertness (L. J. Smith, 2007). In the mother,

labor and delivery drugs may also cause a delay in lactogenesis, in addition to lowering the production of maternal endorphins. This in turn lowers the endorphin content of breastmilk, which may result in newborns receiving milk that is less pain reducing than that of unmedicated women (L. J. Smith, 2007).

Additionally, using an IV during labor to either administer drugs, or because a hospital does not allow oral hydration, can cause excess weight loss in a newborn baby, as the baby sheds the excessive fluids absorbed because of the IV fluids (Chantry, Nommsen-Rivers, Pearson, Cohen, & Dewey, 2011). This can lead to unnecessary formula supplementation, as clinicians become concerned about a baby's rapid weight loss without attributing it to the shedding of unnecessary IV fluids. IV use during labor can also cause edema in the mother's breasts, making latching on for the infant difficult (L. J. Smith, 2007). Women using drugs during labor may benefit from receiving additional breastfeeding support (D. A. Forster & McLachlan, 2007).

Hospital Discharge Bags Containing Formula Samples

The formula industry has long provided free formula to hospitals in exchange for hospitals exclusively using their brand. Ninety-one percent of hospitals in the United States provide discharge bags to mothers supplied by formula companies (Merewood et al., 2010), including formula samples, formula coupons, and literature created by formula companies about breastfeeding that subtly undermines a woman's confidence in her ability to breastfeed. This literature emphasizes the difficulties women may encounter when breastfeeding, describing various painful possibilities. Women who receive a hospital discharge bag containing formula samples are less likely to breastfeed exclusively (DiGirolamo et al., 2008; K. D. Rosenberg, Eastham, Kasehagen, &

Sandoval, 2008). Distributing formula samples of any kind is against the WHO Code of Marketing of Breast-milk Substitutes (Sadacharan, Grossman, Sanchez, & Merewood, 2011), and also counter to the recommendations of the CDC and the AAP (Gartner et al., 2005; Shealy, Li, Benton-Davis, & Grummer-Strawn, 2005). Hospital staff may feel that they are helping new mothers by freely distributing formula samples, even if the mother has stated an intention of exclusively breastfeeding (Bartick, 2011).

This type of marketing access and exclusive product placement within a hospital—directly to a hospital’s clientele—is not permitted within other wards of a hospital, and would raise ethical concerns in comparable settings (Merewood et al., 2010; Revai & Huston, 2009). Finally, there are no laws in the United States banning this marketing practice.

mPINC Scores

The Maternity Practices in Infant Nutrition and Care (mPINC) survey, created in 2007, is conducted every 2 years by the CDC to evaluate maternity care practices at hospitals with maternity services (Centers for Disease Control and Prevention, 2011; Edwards & Philipp, 2010), with the intention of educating hospital administrators by providing a comparison of an individual hospital’s score with state and national averages (Bartick, Stuebe, Shealy, Walker, & Grummer-Strawn, 2009). Only two surveys (2007 and 2009) have been published, with data taking over a year to be released (Centers for Disease Control and Prevention, Division of Nutrition, Physical Activity, and Obesity, 2011). As current breastfeeding rates compiled in the 2011 Breastfeeding Report Card for the United States use data from 2008 births (U.S. Department of Health and Human

Services, 2011b), potential impact from the initiation of the mPINC survey has yet to be seen, though this is anticipated.

Currently, mPINC scores are available by state at the aggregate level. Public reporting of individual hospital's mPINC scores could help affect hospital policy changes, since potential patients would have data to compare the practices of hospitals instead of only anecdotal evidence. Currently, California and New York make exclusive breastfeeding rates at hospital discharge of individual hospitals available through publically accessible websites (California Breastfeeding Coalition, 2009; Dennison & FitzPatrick, 2011). After the initiation of public reporting of breastfeeding outcomes, 17 California hospitals at least doubled their rates of exclusive breastfeeding (Bartick et al., 2009). Allowing public access to individual hospital data has been a catalyst for change by creating competition between hospitals for patients seeking top rated maternity care. Publishing mPINC on hospitals with all states data via a publically accessible website would be a low cost avenue to improve maternity care at hospitals, with the potential to contribute to increasing breastfeeding rates across the nation.

CHAPTER FOUR

Non-hospital Macro Variables Affecting Breastfeeding Rates

After mothers leave the hospital, they often continue to face additional breastfeeding challenges. During the first two weeks, breastfeeding rates drop off, as mothers encounter difficulties with engorgement, painful latches, and lack sufficient support from clinicians, peers, and family (Brand, Kothari, & Stark, 2011). Pediatricians are frequently not oriented toward troubleshooting breastfeeding problems, and may prematurely recommend formula supplementation (Taveras et al., 2004). Furthermore, most women currently do not have insurance coverage to meet with a lactation consultant outside of the hospital (U.S. Department of Health and Human Services, 2011a). Many women have limited time available to spend at home with their baby, as they frequently have no paid maternity leave (Laughlin, 2011). Once women return to work, many work for employers that provide little to no lactation support, frequently making continuing to breastfeed an insurmountable challenge (Murtagh & Moulton, 2011). Formula companies utilize aggressive marketing approaches, including sending unrequested formula samples to the mailboxes of mothers with newborns (Bartick, 2011; Fentiman, 2009). In addition to these factors, some states do not protect the right of women to breastfeed in public, and women may face social disapproval or be asked to leave when feeding their babies outside the home (Kogan, Singh, Dee, Belanoff, & Grummer-Strawn, 2008). Peer support is an important buffer to factors known to undermine successful breastfeeding, but breastfeeding peer support may or may not be available in a given community. Women on WIC may or may not have peer breastfeeding counselors

available to them at their local WIC office. The above factors represent the kinds of contexts in which many American women attempt to breastfeed, making achieving the six months of exclusive breastfeeding recommended by the WHO and AAP a difficult task.

IBCLC Availability Post Hospital Discharge

Most breastfeeding difficulties do not occur until after a woman is discharged from the hospital as many women have yet to even have their milk supply come in before they leave the hospital. In the first days of breastfeeding, the baby receives small amounts of colostrum, which is available prior to lactogenesis. Once a women's milk supply comes in, women encounter different challenges to breastfeeding than experienced with colostrum. Women struggle with engorgement, painful latches, and insecurities about whether their baby is getting enough milk (Brand et al., 2011; Thulier & Mercer, 2009). Patients who meet with an outpatient lactation consultant have a longer duration of breastfeeding than those who do not (Lukac, Riley, & Humphrey, 2006), as many of these early breastfeeding struggles can be easily resolved with help. However, most insurance companies do not cover lactation support services post hospital discharge, even though this type of support is recommended by the Surgeon General (U.S. Department of Health and Human Services, 2011a).

Clinician Support/Knowledge of Breastfeeding

Clinicians report a lack of time and confidence to address the breastfeeding concerns and problems of new mothers (Taveras et al., 2004). Pediatricians receive limited training on lactation and may feel uncomfortable addressing mothers' concerns (Osband, Altman, Patrick, & Edwards, 2011). This may lead to hasty recommendations

of formula supplementation, as the clinician is not prepared to help the mother understand how to increase her milk supply.

Mother-baby dyads with physicians that do not tend to recommend supplementation have higher breastfeeding rates (Taveras et al., 2004). If clinicians have not been equipped with lactation specific education, anecdotal incidents and inaccurate information may be the basis of their recommendations to mothers (A. L. Watkins & Dodgson, 2010). Clinicians' personal experience with breastfeeding also influences the support offered to a mother as nurses who view their prior breastfeeding experiences as unsuccessful feel hesitant in promoting breastfeeding to patients (Cricco-Lizza, 2009). This suggests that emotional tension involving breastfeeding represents an area needing attention when clinicians receive lactation-specific education. Informing mothers about the benefits of breastfeeding is not enough. Mothers who report receiving no specific instruction on how to breastfeed from their child's pediatrician experience lower rates of breastfeeding, as do women not encouraged to breastfeed by their doctor (Hannula, Kaunonen, & Tarkka, 2008; Racine, Frick, Guthrie, & Strobino, 2009).

Additionally, the WHO recommends that clinicians adopt the WHO growth standards based on the growth patterns of infants fed according to WHO and AAP recommendations (Michaelsen, 2010). The AAP endorses the use of the WHO growth charts for children 0-23 months, though most pediatricians in the United States still use growth standards based on formula fed babies. Breastfed babies exhibit different growth patterns than formula fed infants, typically putting on more weight in the early months, and then leaning out in later infancy (Michaelsen, 2010). This difference can cause some infants to be categorized as failure to thrive when in actuality they are growing according

a normal pattern for a breastfed infant (Hosseini, Borzouei, & Vahabian, 2011; Olsen, 2006).

Maternity Leave

Currently, the U.S. has no national paid maternity leave, though 12 weeks of unpaid leave are provided by the Family Medical Leave Act of 1993 (FMLA) to some working women (Laughlin, 2011). This unpaid leave is only available to women who have worked at their place of employment for at least 1 year and a minimum of 1250 hours, and are employed by a business with a minimum of 50 employees (Calnen, 2007).

Women in the United States tend to return to work much more rapidly than women in other developed countries (Daku, Raub, & Heymann, 2012; Earle, Mokomane, & Heymann, 2011); this is not surprising as paid time off, if available, tends to be relatively limited, with unpaid leave capped at 12 weeks (Laughlin, 2011). In 2006-2008, 41% of first time mothers received some paid maternity leave (Laughlin, 2011), though employers offering maternity leave may only provide a week or less of paid leave. If some paid leave is available (whether maternity, paid vacation days, or paid sick days), many women combine this time with the unpaid leave provided by FMLA. Women of higher educational attainment are more likely to have paid maternity leave available to them through their employer (Laughlin, 2011). The lack of paid maternity leave widens the breastfeeding gap between socioeconomic groups (Bartick, 2011). California, one of five states with paid maternity leave, saw median breastfeeding duration rates rise from from 5 weeks to 11 weeks in women who used the paid leave after it became mandated (Appelbaum & Milkman, 2011). New Jersey, Hawaii, New York, and Rhode Island also have paid maternity leave (Bird & Rieker, 2008).

Maternity leave is crucial not only for healing after birth and bonding with an infant, but also for establishing a milk supply. Women who delay returning to work until or beyond 13 weeks after birth breastfeed longer and more exclusively (Guendelman et al., 2009; C. Ogbuanu et al., 2011). Within the first 12 weeks after birth fall several growth spurts at 3 weeks, 9 weeks, and 12 weeks. During these growth spurts, infants tend to nurse more frequently and for longer periods of time which increases the mother's milk supply. If mother and baby are separated during these growth spurts, it is difficult for a woman's milk supply to catch up to her infant's increasing need, as a woman's milk supply adjusts to the infant demands (Wiessinger et al., 2010; Wright et al., 2009).

Additionally, women with inflexible jobs or who are in non-managerial roles have lower rates of breastfeeding success (Guendelman et al., 2009). Women in managerial roles tend to have greater control over their schedules and may not need to have specific break times approved by a supervisor, or may be able to pump breastmilk in their office while they continue to work.

Worksite Lactation Support

Breastfeeding mothers in the workforce face substantial challenges, including discrimination. Breastfeeding mothers have been found to be viewed as less competent than other employees (J. L. Smith, Hawkinson, & Paull, 2011). Breastfeeding mothers are currently not legally protected from being discriminated against in the workplace (Murtagh & Moulton, 2011). Mothers juggling working and breastfeeding may have difficulty maintaining an adequate milk supply if not able to pump as frequently as they would nurse if present with the baby. Barriers in the workplace, such as not being permitted flexible break times and a private place to pump milk, contribute to lower

breastfeeding rates (Murtagh & Moulton, 2011). A supportive work environment can mitigate many of these challenges. Worksite lactation support increases the duration and exclusivity of breastfeeding in working mothers, improves employee satisfaction and retention, and reduces employee absenteeism (Balkam, Cadwell, & Fein, 2010; Mills, 2009; U.S. Department of Health and Human Services, 2011a). Many women are not aware of worksite or school lactation policies, and feel hesitant to discuss needed lactation accommodations with their employers (Dabritz, Hinton, & Babb, 2009). Women aware of lactation related policies breastfeed for a longer duration; because of this, some researchers suggest a requirement for lactation accommodation information to be provided to all women before maternity leave begins (Dabritz et al., 2009).

To keep up a healthy milk supply, pumping breaks may need to vary from one woman to the next. Some women may be able to maintain their supply pumping only once or twice a day; others may need to pump three times or more during the work day. Perplexingly, many employers are more accommodating to smokers in providing flexible break times than to breastfeeding mothers (Phelps, 2011). Section 4207 of the Patient Protection and Affordable Care Act of 2010 requires employers to provide reasonable break time and a private space that is not a bathroom for pumping purposes ("Patient Protection and Affordable Care Act," 2010). These breaks are not required to be paid, and businesses with less than 50 employees are exempt. The private space can be as simple as a closet of adequate size for pumping, or a screened-off cubicle. Employers are not required to provide a breast pump which may widen the gap for poor women unable to afford an effective breast pump. Employee views of whether a supervisor would be supportive of combining breastfeeding with work may influence whether a woman is

willing to ask for the accommodations provided for by section 4207 (Tan Chow, Smithey Fulmer, & Olson, 2011). Though section 4207 marks significant improvement in protection for working mothers, there remains no requirement of employers to allow mothers to directly breastfeed their children during the work day, even though this is more time effective than pumping, and promotes longer duration and exclusivity of breastfeeding (U.S. Department of Health and Human Services, 2011a).

Onsite daycare that gives mothers access to their breastfeeding infants during their break times would offer substantial reduction in the time needed to maintain lactation, while improving employee satisfaction. This also alleviates concerns a mother may have about extending the workday due to pumping breaks, thus being away from her infant for a longer period of time. Employee-sponsored daycare increases the chance a working mother will still be breastfeeding at 6 months by 47% (Jacknowitz, 2008).

Finally, flexible work time is another key component of worksite support. If a mother is permitted to work 8 hours per week from home, the chance of both initiating breastfeeding and continuing to breastfeed through at least 6 months increases by 8% and 16.8% respectively, with greater increases seen if more than 8 hours per week can be worked from home (Jacknowitz, 2008).

Formula Factors Outside of the Hospital

Formula marketing has a negative influence on breastfeeding rates (Kaplan & Graff, 2008), with many women believing all claims asserted in formula advertisements (N. J. Berry, Jones, & Iverson, 2011, 2010). For most of the twentieth century, formula companies advertised their products only through the medical community, with direct advertising to consumers not a part of the marketing strategy. The first TV commercial

about infant formula aired in 1989, marking the transition to direct marketing to consumers, in addition to advertising through the medical system (Kaplan & Graff, 2008). Women who receive materials written by formula companies during their first prenatal appointment are more likely to discontinue breastfeeding before hospital discharge (Kaplan & Graff, 2008).

Formula companies are under the regulatory oversight of the Food and Drug Administration (FDA) for the nutritional contents of their products, but are not required to have their products or advertising approved by the FDA (Parrilla-Rodríguez & Gorrín-Peralta, 2008; U.S. Food and Drug Administration, 2009). Formula companies frequently sponsor research to promote their products, which is said to encourage doctors and scientists to be favorably disposed to infant formula (Beasley & Amir, 2007). This could present a conflict of interest, even when such sponsorship is declared.

Formula companies receive substantial advertising indirectly through the WIC program, as each state's WIC program contracts with one formula company for all participant formula in exchange for substantial rebates, which provide a significant portion of each state's WIC budget (Bartick, 2011; Drago, 2011). Mothers tend to be extremely brand loyal, and as WIC no longer provides all formula needed to feed a child, the contracting formula company stands to make a significant profit as a result of a state WIC contract (Drago, 2011).

Breastfeeding Legislation

Infants in states without legislation protecting breastfeeding are less likely to be breastfed (Kogan et al., 2008). This may be because breastfeeding legislation represents a broader cultural climate more supportive of breastfeeding, which shapes a mother's

choice to breastfeed and to continue breastfeeding. Legislation may include protection from indecency laws, protection of the right to breastfeed in all places the mother has a right to be, exemption from jury duty, and/or worksite lactation legislation (Kogan et al., 2008; Wilson-Clay et al., 2005). Some scholars contend that the most important piece of legislation to increase breastfeeding rates would be to protect breastfeeding as a civil right (Phelps, 2011).

Mother-to-Mother Support Availability

Peer support is crucial for women to succeed in breastfeeding goals (Thulier & Mercer, 2009). One measure for the availability of peer support is the number of available La Leche League Leaders per 1000 live births (U.S. Department of Health and Human Services, 2011b). Receiving help from other mothers who have successfully breastfed increases breastfeeding rates and instills hope that reaching one's breastfeeding goals is achievable (Thomson, Crossland, & Dykes, 2011). Peer support in the first six weeks postpartum has been found to be both effective at increasing breastfeeding rates and appreciated by new mothers (Hannula et al., 2008). In the early postpartum period, peer support reduces perceived insufficient milk supply in new mothers, which is crucial for preventing premature weaning (Gross et al., 2011). Peer support may help new mothers in other areas beyond breastfeeding with breastfeeding mothers reporting improvements in dietary choices, increased self-esteem, and better mental health as a result of interactions with breastfeeding peers (Wade, Haining, & Day, 2009).

Different communities may require differing settings for peer support. Immigrant mothers often have high rates of breastfeeding in their home countries, but with the loss of community support, experience drastically reduced breastfeeding rates in the United

States (L. Noble, Rivera-Todaro, Hand, & Noble, 2010). Peer support interventions may need to be customized for particular cultural groups to be effective. Community Based Participatory Research can be effective at revealing the breastfeeding peer support needs of different communities (L. Noble et al., 2010).

WIC: Peer Counseling & Breastfeeding Support

Over 50% of infants in the U.S. receive WIC benefits (U.S. Department of Agriculture, 2011). WIC is simultaneously one of the largest providers of breastfeeding education and the largest distributor of infant formula in the United States (Drago, 2011; Jiang, Foster, & Gibson-Davis, 2010). Participants view WIC as being supportive of breastfeeding, while at the same time, supportive of supplementing breastfeeding infants with formula (Holmes et al., 2009). WIC status is associated with lower breastfeeding rates, but this is influenced by confounding demographic factors, as women on WIC are less likely to be married, have lower educational attainment, and lower socioeconomic status (Jiang et al., 2010). However, a recent state and regional level analysis, after controlling for demographic factors such as marital status and education, found lower rates of duration of breastfeeding in every state when comparing WIC participants to WIC-eligible non-participants (Jensen, 2011). WIC offers more robust food packages for mothers of exclusively breastfeeding infants lasting for one year postpartum (as compared to sparse food packages offered for six months postpartum for mothers of formula fed infants), but these packages are not viewed as valuable as the formula packages, because the market value for the formula is significantly higher (Holmes et al., 2009; Racine et al., 2009).

Women on WIC exposed to WIC's breastfeeding peer counselors have higher rates of breastfeeding initiation and duration than non-exposed WIC participants (Bolton et al., 2009). WIC peer counselors are women who have successfully breastfed and who are either current or past WIC participants. Peer counselors have been shown to be effective even when not ethnically/racially matched to clients, and are well received by WIC participants (Gross et al., 2009). The 2010 WIC reauthorization act included funds to expand peer counseling services, which should improve WIC breastfeeding rates (Drago, 2011). Prenatal exposure to WIC peer counselors in the first trimester has been shown to increase breastfeeding initiation rates (Gross et al., 2009). Allowing peer counselors access to mothers while still in the hospital is crucial because preventing unnecessary formula supplementation in the early days of life is key to lengthen breastfeeding duration (Bolton et al., 2009). Peer counselors can provide needed encouragement and education to help mothers understand infant needs. Additionally, increasing access to breast pumps through WIC may help reduce barriers for working mothers on WIC who want to continue breastfeeding (Haughton, Gregorio, & Pérez-Escamilla, 2010). WIC has significant potential to influence breastfeeding rates in groups currently experiencing the lowest rates.

CHAPTER FIVE

Discussion

Breastfeeding rates in the United States are below both WHO and AAP recommendations and Healthy People 2020 goals (Gartner et al., 2005; U.S. Department of Health and Human Services, 2010; World Health Organization, 2009). Also troubling are the persistent differences in breastfeeding rates between racial and ethnic groups in the United States (Centers for Disease Control and Prevention, 2010). Modifiable macro-level variables represent one area for change, with potentially far-reaching effects on American breastfeeding rates. Improvements in institutional, community and public policy factors hold promise for decreasing breastfeeding disparities in America's increasingly diverse population. Improving American's overall rates of breastfeeding and closing the gap between racial and ethnic groups should contribute to positive health outcomes for children and adults alike.

This thesis examined major macro-level modifiable variables influencing breastfeeding rates in the hospital setting, including the following: the Baby-Friendly Hospital Initiative, lactation-specific training for hospital staff, skin-to-skin contact, rooming-in, supplementation rates, cesarean deliveries, drugs used during labor and delivery, hospital discharge bags containing formula products, and mPINC scores, and factors outside of the hospital setting, including IBCLC availability post-hospital discharge, clinician knowledge/support of breastfeeding, paid maternity leave, worksite lactation support, formula influence outside of the hospital, legislation, peer support, and WIC breastfeeding support.

As McLeroy and colleagues suggest, interventions must span the ecological spectrum for behavior change to be effective (McLeroy et al., 1988). Significant change with smoking rates wasn't achieved until national policies supported individual behavior change; the same is likely to be true for breastfeeding (Chehimi, Cohen, & Valdovinos, 2011). Though all macro-level factors mentioned are important, it is more likely that a variety of combinations of these factors affects breastfeeding rates.

To affect hospital maternity policy across the United States, it is likely that multiple pressure points will be needed to bring about a change. Social media campaigns can help raise consumer awareness to demand evidenced-based policies and practices supportive of breastfeeding. Breastfeeding coalitions may help gather momentum, both through raising awareness in mothers, and garnering stakeholder support. Incentives must exist for hospitals to be willing to change. Publishing hospitals' mPINC scores, as discussed in Chapter 3, is one possible motivation for hospitals to make policies more favorable toward breastfeeding success. Other possibilities include Quality Improvement (QI) initiatives. Many hospitals may not be adequately motivated to change maternal and infant care practices based on possible benefits to breastfeeding outcomes, but are highly interested in QI initiatives. As an example, one such QI project involved 12 Vermont hospitals focusing on a variety of newborn preventive services, such as car seat safety, along with improving breastfeeding rates (Mercier et al., 2007). These hospitals made marked improvement in breastfeeding assessment after the introduction of the QI initiative. Additionally, a hospital's exclusive breastfeeding rate could be a part of pay for performance (P4P) initiative. P4P initiatives provide additional money from health plans or Medicare for hospitals or physicians showing improvement in or exceeding

performance measures (Bodenheimer & Grumbach, 2009). Researchers have suggested that optimal maternity care practices could be an ideal target for P4P cost incentives, as many factors, such as in-hospital supplementation rates, rooming-in, and cesarean deliveries, are clearly measureable, with significance well documented in the literature (Bartick et al., 2009). Though the results of P4P initiatives are at times mixed in the literature, evidence-based breastfeeding practices lend themselves to be evaluated by P4P standards, as outcomes such as breastfeeding exclusivity at hospital discharge can be clearly measured (Bartick et al., 2009; Bodenheimer & Grumbach, 2009).

Additionally, the Joint Commission's Perinatal Care Core Measure Set (JCPCCM) may become an impetus for quality improvement in maternity care. The JCPCCM may improve care because breastfeeding exclusivity, elective inductions, and cesarean rates are now three of the five indicators used in the measure set, as of 2010 (Milton, 2010; The Joint Commission, 2010).

Hospitals may also be motivated to implement changes if pressure from patients is mobilized and exerted. The Illinois State Breastfeeding Task Force recently developed a hospital advocacy initiative providing mothers with tools to give feedback about their hospital experience. The tools include a letter expressing disappointment in the hospital experience, with specific boxes for mothers to mark on the letter to reflect their personal experience. Room for additional comments is also provided. A "please" letter has also been developed, giving the mother an opportunity to affirm hospitals with good practices. Both letters are based on the WHO/UNICEF Ten Steps to Successful Breastfeeding (Illinois State Breastfeeding Task Force, 2011). The Texas Breastfeeding Coalition is currently developing a similar initiative based on the Illinois State Breastfeeding Task

Force's project, with Spanish language versions slated to be made available in the near future (Landers, 2011). Both coalitions hope that involving new mothers will be a powerful motivator for hospitals to embrace change and improve rates of breastfeeding among mothers in their care.

Research repeatedly demonstrates that breastfeeding rates drop dramatically after women leave the hospital (Brand et al., 2011; Gross et al., 2011). Many factors encourage premature weaning, the unavailability of paid maternity leave being a major factor (Bartick, 2011). The lack of paid maternity leave inhibits the establishment of a healthy milk supply in many women, and perpetuates socioeconomic and racial/ethnic disparities in breastfeeding rates. The creation of a national paid maternity leave is needed in the U.S., not only to facilitate increased breastfeeding rates, but also for maternal healing and to improve bonding between mothers and infants. Lawmakers should look to California and the four other states which have successfully implemented paid maternity leave to find possible solutions that could be replicated in other states or at the national level.

A socioeconomic gap in breastfeeding exists in America (Centers for Disease Control and Prevention, 2010). Women of higher socioeconomic status are more likely to be provided with lactation support when returning to work, and are more likely to have colleagues supportive of breastfeeding efforts. These socioeconomic differences likely further the socioeconomic divide in breastfeeding as well as related health outcomes (Dabritz et al., 2009; Murtagh & Moulton, 2011). Working towards establishing worksite lactation support is another venue in which state breastfeeding coalitions may be able to

help influence employers (Bunik, 2010) and help reduce socioeconomic disparities in breastfeeding.

Clinicians unprepared to help women with breastfeeding difficulties may encourage formula supplementation, which has a deleterious effect on a mother's success in breastfeeding. To curtail possible obstructions to successful breastfeeding, more time needs to be spent in lactation-specific training in the education of all clinicians working with breastfeeding mothers. The AAP has created a free online Breastfeeding Residency Curriculum that can be used during one rotation, throughout a year, or over the course of the entire residency (American Academy of Pediatrics, 2011). The curriculum is intended not just for pediatric residents, but also for obstetrics, family practice, internal medicine, and preventive medicine residency programs. Implementing this resource should contribute toward assuring that clinicians have an adequate exposure to a fundamental understanding of human lactation and knowledge of how to support breastfeeding mothers.

Beyond QI initiatives at the hospital level, the AAP now requires physicians to participate in a Quality Improvement (QI) project in order to maintain specialty and subspecialty certifications (Landers, 2010). One of the approved QI projects focuses on providing breastfeeding support (American Academy of Pediatrics, 2009), and emphasizes improvements in the hospital and physician office settings leading to increased breastfeeding rates.

Insurance company policy is another way that breastfeeding is deterred. Since most insurance companies currently do not provide coverage for lactation support outside of the hospital, women facing difficulties with breastfeeding who find no help from their

health clinicians and cannot afford out of pocket expenses for a lactation consultant may be quickly deterred from continuing to breastfeeding. This should soon change. The Affordable Care Act requires insurance companies to provide coverage without copays for comprehensive lactation support services, both in and outside of the hospital, beginning in August 2012 for all new insurance plans, though women covered by existing plans may still encounter difficulty in getting lactation support services reimbursed (Health Resources and Services Administration, 2011).

Women are faced with a variety of challenges. Formula company practices routinely undermine breastfeeding. Mothers may or may not have legislative protection to breastfeed and to be protective from discrimination in the work place, and may not be able to find local peer support for breastfeeding challenges. If a woman is a WIC participant, she will be exposed to the availability of free formula, while at the same time, may receive quality breastfeeding support.

Future studies could build upon this thesis in a variety of ways. Further understanding of how additional lactation support may help mitigate factors associated with reduced breastfeeding rates (such as cesarean deliveries) is also needed. Ideally, more randomized controlled trials are needed to influence hospital policies. Currently, studies concerning rooming-in and skin-to-skin contact are primarily observational studies with comparison groups; conducting randomized control trials in hospitals where the current practice is to not support rooming-in or skin-to-skin contact could be valuable not only in further establishing the effectiveness of these practices, but also in motivating change at individual institutions.

In closing, an inexpensive first step towards improving breastfeeding rates at the macro level would be to publish mPINC scores on a publically accessible website. These data already exist; granting the public access to these data could provide incentive for hospitals to improve practices related to breastfeeding rates. Additionally, more effective regulations could be developed concerning practices of formula companies that undermine breastfeeding success. Finally, the United States could join the rest of the developed world in providing women with paid maternity leave. Breastfeeding rates improve with paid maternity leave, as would the health of many women and children.

APPENDIX

Appendix A

Table A1

The Baby-Friendly Hospital Initiative

Year	Author	Source	Content
2010	U.S. Department of Health and Human Services	<i>Healthy People 2020</i>	Recommends an increased proportion of births occurring at Baby-Friendly facilities
2011	U.S. Department of Health and Human Services	<i>Surgeon General's Call to Action on Breastfeeding</i>	Recommends an increased proportion of births occurring at Baby-Friendly facilities
2010	Heinig, M. J.	<i>Journal of Human Lactation</i>	Improved breastfeeding outcomes in Baby-Friendly facilities
2010	MacEnroe, T.	<i>Breastfeeding Medicine</i>	Background on the Baby-Friendly Hospital Initiative
2011	U.S. Department of Health and Human Services	<i>Breastfeeding Report Card--United States, 2011</i>	4.53% of U.S. births occur in Baby-Friendly facilities
2005	Merewood et al.	<i>Pediatrics</i>	Baby-Friendly facilities have high initiation and exclusivity rates
2011	California WIC Association & U.C. Davis Lactation Center	<i>California WIC Association & U.C. Davis Lactation Center</i>	Baby-Friendly facilities increase breastfeeding rates in lower SES groups
2011	Bohling-Smith & Peters	<i>JOGYNN</i>	Baby-Friendly hospitals have higher patient satisfaction rates
2011	DelliFraine et al.	<i>Pediatrics</i>	Cost difference between Baby-Friendly and non-Baby-Friendly hospitals is not statistically significant
2010	UNICEF & WHO	<i>Baby-Friendly USA</i>	The Ten Steps to Successful Breastfeeding

Table A2

IBCLC availability/lactation specific training for staff

Year	Author	Source	Content
2010	UNICEF & WHO	<i>Baby-Friendly USA</i>	The Ten Steps to Successful Breastfeeding
2011	U.S. Department of Health and Human Services	<i>Surgeon General's Call to Action on Breastfeeding</i>	Qualifications of an IBCLC; recommends greater IBCLC availability
2006	Castrucci, Hoover, Lim, & Maus	<i>Journal of Public Health Management and Practice</i>	Hospitals employing IBCLCs have higher rates of breastfeeding at discharge
2009	Cricco-Lizza	<i>American Journal of Maternal Child Nursing</i>	Many nurses view formula feeding as norm for infant feeding; nurses report limited lactation training in education
2011	Ingram, Johnson, & Condon	<i>Primary Health Care Research & Development</i>	Lactation-specific training increases self-efficacy in nurses helping mothers

Table A3

Rooming-in

Year	Author	Source	Content
2010	UNICEF & WHO	<i>Baby-Friendly USA</i>	The Ten Steps to Successful Breastfeeding
2007	Murry et al.	<i>Birth</i>	Constant access to newborn key to a good milk supply
2010	MacEnroe	<i>Breastfeeding Medicine</i>	Academy of Breastfeeding Medicine (ABM) recommends rooming-in
2009	Wright et al.	<i>Breastfeeding Medicine</i>	ABM clinical protocols
2008	DiGirolamo, Grummer-Stawn, & Fein	<i>Pediatrics</i>	Bringing baby to mother in the night can mitigate negative impact of nighttime separation
2011	Lin et al.	<i>Journal of Nursing Research</i>	Constant access to newborn especially important after cesarean deliveries to establish milk supply

Table A4

Supplementation rates

Year	Author	Source	Content
2011	U.S. Department of Health and Human Services	<i>Breastfeeding Report Card-United States, 2011</i>	24.5% of breastfed babies receive formula supplementation during first two days
2011	Crivellie-Kovach & Chung	<i>Breastfeeding Medicine</i>	Mothers are frequently not aware supplementation occurs
2009	Declercq et al.	<i>American Journal of Public Health</i>	Women are less likely to achieve breastfeeding goals if babies are supplemented in the hospital
2008	Kaplan & Graff	<i>Journal of Urban Health</i>	Mothers are more likely to believe they cannot produce sufficient milk if their babies are supplemented in the hospital
2009	Holmes et al.	<i>Breastfeeding Medicine</i>	Mothers often believe supplementation should occur at home if it happens in the hospital
2009	Wright et al.	<i>Breastfeeding Medicine</i>	ABM clinical protocols
2009	Bolton et al.	<i>Journal of Human Lactation</i>	Babies receiving formula on first day have shorter durations of breastfeeding
2008	Semenic, Loiselle, & Gottlieb	<i>Research in Nursing & Health</i>	Babies receiving formula before hospital discharge have lower rates of breastfeeding exclusivity
2011	Biro et al.	<i>Birth</i>	Babies born by cesarean have higher in-hospital supplementation rates
2009	Huang et al.	<i>Chang Guna Medical Journal</i>	Early supplementation with a bottle can negatively affect a baby's latch and lead to pain for the mother
2008	Centers for Disease Control and Prevention	<i>Morbidity and Mortality Weekly Report</i>	24% of U.S. hospitals routinely supplement over 50% of healthy full term breastfed infants before discharge

Table A5

Skin-to-skin contact

Year	Author	Source	Content
2008	Romano & Lothian	<i>JOGYNN</i>	Skin-to-skin contact key for early initiation of breastfeeding
2009	Ogbuanu et al.	<i>Women's Health Issues</i>	Skin-to-skin associated with reduction in maternal postpartum depressive symptoms
2011	Sobel et al.	<i>Acta Paediatrica</i>	Immediate skin-to-skin contact lowers risk of infection to infant
2010	Bramson et al.	<i>Journal of Human Lactation</i>	Skin-to-skin contact has a dose-response relationship to exclusive breastfeeding rates
2011	Mahmood, Jamal, & Khan	<i>Journal of the College of Physicians and Surgeons—Pakistan</i>	Skin-to-skin contact reduces time needed to establish effective breastfeeding
2011	Widstrom et al.	<i>Acta Paediatrica</i>	Allowing self-attachment reduces latch problems;
2009	Handlin et al.	<i>Breastfeeding Medicine</i>	Skin-to-skin contact may reduce negative impact of drugs used during labor on breastfeeding
2006	Declercq, Corry, & Applebaum	<i>Listening to Mothers II: Report of the second national U.S. survey of women's childbearing experiences</i>	1 out of 3 mothers report their baby spent more of the first hour after birth in their arms

Table A6

Cesarean rates

Year	Author	Source	Content
2009	Declercq et al.	<i>American Journal of Public Health</i>	Cesarean sections associated with lower exclusive breastfeeding rates
2010	Zanardo et al.	<i>Birth</i>	Elective cesareans associated with lower rates of exclusive breastfeeding
2011	Hamilton, Martin, & Ventura	<i>National Vital Statistics Report</i>	32.8% of U.S. babies born by cesarean in 2010
2010	Gibbons et al.	<i>World Health Organization</i>	Cesarean rates for developed countries should be between 10-15%
1985	World Health Organization	<i>World Health Organization</i>	Best fetal and maternal outcomes come from countries with cesarean rates close to 10%
2008	DiGirolamo et a.	<i>Pediatrics</i>	Impact of cesarean delivers on breastfeeding not more than the impact of vaginal delivers using epidurals
2008	Semenic et al.	<i>Research in Nursing & Health</i>	Cesarean deliveries negatively impact breastfeeding rates
2010	Zanardo et al.	<i>Birth</i>	Cesarean deliveries negatively impact breastfeeding rates and are associated with delays in lactogenesis
2011	Lin et al.	<i>Journal of Nursing Research</i>	Cesarean deliveries are associated with delays in lactogenesis. Babies born by cesarean not supplemented in the first 72 hours have mothers with higher perceived milk supply
2011	Gross et al.	<i>Breastfeeding Medicine</i>	Early onset of lactation associated with longer breastfeeding duration
2010	Eksioglu & Ceber	<i>Midwifery</i>	Perceived insufficient milk supply a primary reason given for weaning
2008	Otsuka et al.	<i>JOGYNN</i>	Perceived insufficient milk supply a primary reason given for weaning

Table A7

Drugs used during labor

Year	Author	Source	Content
2008	DiGirolamo et al.	<i>Pediatrics</i>	Babies exposed to no drugs during labor have better breastfeeding rates; drugs used during cesarean deliveries negatively impact breastfeeding
2009	Jordan et al.	<i>International Journal of Obstetrics & Gynaecology</i>	Drugs used during vaginal deliveries are used to induce and augment labor, reduce/manage pain, and/or reduce postpartum hemorrhaging. Nitrous oxide is the only labor and delivery drug with a positive impact on breastfeeding.
2005	Beilin et al.	<i>Anesthesiology</i>	Higher doses of epidurals associated with shorter durations of breastfeeding
2008	Romano & Lothian	<i>JOGYNN</i>	Epidurals initiated earlier in labor have a more negative impact on breastfeeding than those initiated later in labor
2009	Declercq et al.	<i>American Journal of Public Health</i>	Higher breastfeeding exclusivity rates found in infants not exposed to an epidural
2007	Smith	<i>Journal of Midwifery & Women's Health</i>	Drugs used during labor can affect an infant's muscular support needed to breastfeed, lower infant alertness, cause a delay in lactogenesis, and lower endorphin content of breastmilk
2011	Chantry et al.	<i>Pediatrics</i>	IV fluids administered during labor can cause excess weight loss in newborn, which leads to unneeded supplementation
2007	Forster & McLachlan	<i>Journal of Midwifery & Women's Health</i>	Women using drugs during labor may benefit from additional breastfeeding support

Table A8

Hospital discharge bags containing formula samples

Year	Author	Source	Content
2010	Merewood et al.	<i>Journal of Human Lactation</i>	91% of U.S. hospitals give discharge bags provided by formula companies to new mothers; formula samples should raise ethical concerns
2008	DiGirolamo et al.	<i>Pediatrics</i>	Mothers who receive a hospital discharge bag are less likely to breastfeed exclusively
2008	Rosenberg et al.	<i>American Journal of Public Health</i>	Mothers who receive a hospital discharge bag are less likely to breastfeed exclusively
2011	Sadacharan et al.	<i>Pediatrics</i>	Distributing formula samples is against the WHO Code of Marketing of Breast-milk Substitutes
2005	Gartner et al.	<i>Pediatrics (AAP Position Paper)</i>	AAP recommends no formula samples be given
2005	Shealy et al.	<i>The CDC Guide to Breastfeeding Interventions</i>	CDC recommends no formula samples be given
2011	Bartick	<i>Breastfeeding Medicine</i>	Hospital staff may feel they are helping new mothers by distributing formula samples, even if mother intends to exclusively breastfeed
2009	Revai & Huston	<i>Breastfeeding Medicine</i>	Marketing access given to formula companies in hospitals should raise ethical concerns

Table A9

mPINC scores

Year	Author	Source	Content
2011	Centers for Disease Control and Prevention	<i>Morbidity and Mortality Weekly Report</i>	Background on mPINC survey
2010	Edwards & Philipp	<i>Journal of Human Lactation</i>	Background on mPINC survey
2009	Bartick et al.	<i>Pediatrics</i>	mPINC serves to educate hospital administrators; many California hospital rates more than doubled after initiation of public reporting of exclusive breastfeeding rates
2011	Centers for Disease Control and Prevention	<i>National Survey of Maternity Practices in Infant Nutrition and Care (mPINC)</i>	Years mPINC administered, mPINC process
2011	U.S. Department of Health and Human Services	<i>Breastfeeding Report Card—United States, 2011</i>	2011 breastfeeding rates compiled from 2008 data
2009	California Breastfeeding Coalition	<i>Birth and Beyond—California</i>	California hospital exclusive breastfeeding rates available through a publically accessible website
2011	Dennis & FitzPatrick	<i>Breastfeeding Medicine</i>	New York hospital exclusive breastfeeding rates available through a publically accessible website

Table A10

IBCLC availability post hospital discharge

Year	Author	Source	Content
2011	Brand et al.	<i>Journal of Perinatal Education</i>	Early difficulties of breastfeeding post hospital discharge
2009	Thulier & Mercer	<i>JOGYNN</i>	Insecurities about milk supply come after hospital discharge
2006	Lukac, Riley, & Humphrey	<i>Journal of Human Lactation</i>	Patients who meet with an outpatient lactation consultant have longer duration of breastfeeding
2011	U.S. Department of Health and Human Services	<i>Surgeon General's Call to Action on Breastfeeding</i>	Surgeon General recommends insurance companies to cover lactation support services post hospital discharge

Table A11

Clinician Support/Knowledge of Breastfeeding

Year	Author	Source	Content
2004	Taveras et al.	<i>Pediatrics</i>	Clinicians report lack of time and confidence to address breastfeeding problems; physicians that do not recommend supplementation have patients with higher breastfeeding rates
2011	Osband et al.	<i>Academic Pediatrics</i>	Pediatricians receive limited training in lactation and may feel uncomfortable addressing concerns
2010	Watkins & Dodgson	<i>Journal for Specialists in Pediatric Nursing</i>	Without adequate training, clinicians may rely on anecdotal incidents and inaccurate information in regards to breastfeeding
2009	Cricco-Lizza	<i>American Journal of Maternal Child Nursing</i>	Nurses who view their personal breastfeeding experience as unsuccessful may feel hesitant in promoting breastfeeding
2009	Hannula, Kaunonen, Tarkka	<i>Journal of Clinical Nursing</i>	Mothers receiving no information from child's pediatrician about breastfeeding report lower rates of breastfeeding
2009	Racine et al.	<i>Maternal and Child Health Journal</i>	Mothers not encouraged by their clinician to breastfeed have lower rates of breastfeeding
2010	Michaelson	<i>Journal of Pediatric Gastroenterology and Nutrition</i>	WHO recommends adoption of WHO growth standards, which are based on breastfed infants according to WHO and AAP guidelines, as breastfed babies exhibit differing growth patterns from formula fed babies.
2006	Olson	<i>Clinical Pediatrics</i>	Failure to thrive can be an issue of definition, at times not an actual problem

Table A12

Maternity Leave

Year	Author	Source	Content
2011	Laughlin	<i>Current Population Report</i>	Unpaid leave capped at 12 weeks (FMLA). Higher educated women are more likely to have paid maternity leave available to them through their employer
2007	Calnen	<i>Breastfeeding Medicine</i>	Parameters of FMLA
2012	Daku, Raub, & Heymann	<i>Social Science & Medicine</i>	Women in the U.S. return to work more rapidly than women in other developed countries
2011	Bartick	<i>Breastfeeding Medicine</i>	Lack of paid maternity leave widens the breastfeeding gap between socioeconomic groups
2011	Appelbaum & Milkman	<i>Center for Economic and Policy Research</i>	California saw median breastfeeding rates double after paid leave became mandated
2008	Bird & Rieker	<i>Gender & Health</i>	California, Hawaii, New Jersey, New York, and Rhode Island have paid maternity leave.
2009	Guendelman et al.	<i>Pediatrics</i>	Women who delay returning to work until or after 13 weeks after birth breastfeed longer and more exclusively
2011	Ogbuanu et al.	<i>Pediatrics</i>	Delaying return to work for three months increases length and exclusivity of breastfeeding

Table A13

Worksite Lactation Support

Year	Author	Source	Content
2011	Smith, Hawkinson, & Paull	<i>Personality and Social Psychology Bulletin</i>	Breastfeeding mothers have been viewed as less competent than other employees
2011	Murtagh & Moulton	<i>American Journal of Public Health</i>	Breastfeeding mothers are not protected from discrimination in the workplace
2010	Balkam, Cadwell, & Fein	<i>Maternal and Child Health Journal</i>	Worksite lactation support increases breastfeeding rates and improves employee satisfaction
2011	U.S. Department of Health and Human Services	<i>Surgeon General's Call to Action on Breastfeeding</i>	Worksite lactation support reduces employee absenteeism and improves employee satisfaction; there is currently no requirement to allow mothers to directly breastfeeding their children during the work day
2009	Dabritz, Hinton, & Babb	<i>Journal of Human Lactation</i>	Employees are often not aware of lactation policies and are hesitant to inquire. Women aware of lactation policies breastfeed for a longer duration.
2011	Phelps	<i>Breastfeeding Medicine</i>	Employers are often more accommodating to smokers than to lactating employees
2011	Chow et al.	<i>Journal of Human Lactation</i>	Employee views about her supervisor may influence whether she is willing to ask for a legally required accommodation
2008	Jacknowitz	<i>Women & Health</i>	Employee-sponsored daycare where women can breastfeed their children during the workday increases breastfeeding duration; flexible work time increases rates of initiation and duration if at least 8 hours per week can be worked from home

Table A14

Formula Factors Outside of the Hospital

Year	Author	Source	Content
2008	Kaplan & Graff	<i>Journal of Urban Health</i>	Formula marketing has a negative impact on breastfeeding rates; women who receive materials from formula companies during their first prenatal appointment are more likely to discontinue breastfeeding before hospital discharge
2011	Berry, Jones, & Iverson	<i>Breastfeeding Review</i>	Many women believe all claims made in formula advertisements
2009	U.S. Food and Drug Administration	<i>Is it Really FDA Approved?</i>	Formula companies do not have to have their products or advertising approved by the FDA and are only regulated for the nutritional contents of their products.
2007	Beasley & Amir	<i>International Breastfeeding Journal</i>	Formula company sponsored research presents a conflict of interest
2011	Bartick	<i>Breastfeeding Medicine</i>	Formula companies receive indirect advertising through WIC. Each state contracts with one company for all participant formula in exchange for rebates
2011	Drago	<i>Breastfeeding Medicine</i>	Formula companies make a substantial profit from WIC contracts as mothers are brand loyal and WIC does not provide all needed formula.

Table A15

Breastfeeding Legislation

Year	Author	Source	Content
2008	Kogan et al.	<i>American Journal of Public Health</i>	Infants in states without breastfeeding legislation are less likely to be breastfed
2005	Wilson-Clay et al.	<i>Journal of Human Lactation</i>	Types of breastfeeding legislation
2011	Phelps	<i>Breastfeeding Medicine</i>	Breastfeeding protection as a civil right is the most needed legislation

Table A16

Mother-to-Mother Support Availability

Year	Author	Source	Content
2009	Thulier & Mercer	<i>JOGYNN</i>	Peer support crucial for women to succeed in breastfeeding goals
2011	U.S. Department of Health and Human Services	<i>Breastfeeding Report Card—United States, 2011</i>	La Leche League leaders per thousand a measure of available peer support
2011	Thomson, Crossland, & Dykes	<i>Maternal and Child Nutrition</i>	Peer support increases breastfeeding rates and instills hope that reaching personal breastfeeding goals is achievable
2008	Hannula et al.	<i>Journal of Clinical Nursing</i>	Peer support during the first 6 weeks postpartum increases breastfeeding rates; peer support found to be appreciated by mothers
2011	Gross et al.	<i>Breastfeeding Medicine</i>	Peer support reduces the perception of insufficient milk supply
2009	Wade, Haining, & Day	<i>Community Practitioner</i>	Peer support provides a variety of health benefits beyond increased breastfeeding rates
2010	Noble et al.	<i>Breastfeeding Medicine</i>	Peer support crucial for immigrant groups; Community Based Participatory Research needed to determine what types of peer support are helpful for different groups

Table A17

WIC: Peer Counseling & Breastfeeding Support

Year	Author	Source	Content
2011	U.S. Department of Agriculture	<i>About WIC</i>	Over 50% of infants in U.S. receive WIC benefits
2011	Drago	<i>Breastfeeding Medicine</i>	WIC both provides breastfeeding education and support and is the largest distributor of infant formula in the U.S.; 2010 WIC reauthorization act included funds to expand peer counseling services
2010	Jiang, Foster, & Gibson-Davis	<i>Child and Youth Services Review</i>	WIC both provides breastfeeding education and support and is the largest distributor of infant formula in the U.S.; WIC status associated with lower breastfeeding rates but also with lower socioeconomic status, educational attainment, and a lower likelihood of being married
2009	Holmes et al.	<i>Breastfeeding Medicine</i>	WIC participants view WIC as supporting breastfeeding and also supporting supplementing infants with formula
2011	Jensen	<i>Maternal and Child Health Journal</i>	After controlling for demographic factors, WIC participants had lower breastfeeding rates in every state when compared to WIC-eligible non-participants
2009	Racine et al.	<i>Maternal and Child Health Journal</i>	WIC participants view breastfeeding food packages as less valuable than formula packages
2009	Bolton et al.	<i>Journal of Human Lactation</i>	WIC participants exposed to WIC breastfeeding peer counselors have higher initiation rates than non-exposed participants; allowing peer counselor access in the hospital is key to prevent unnecessary formula supplementation
2009	Gross et al.	<i>Journal of Human Lactation</i>	WIC peer counselors are effective even when not ethically/racially matched to WIC participants, and are well received; prenatal exposure to WIC peer counselors in the first trimester is associated with an increase in breastfeeding initiation rates
2010	Haughton, Gregorio, & Perez-Escamilla	<i>Journal of Human Lactation</i>	Increasing access to breast pumps through WIC may help reduce barriers to working WIC participants wanting to continue breastfeeding

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