



# **Achieving Exclusive Breastfeeding in the United States: Findings and Recommendations**

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MATERNAL  
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<b>TABLE OF CONTENTS</b>	<b>PAGE</b>
<b>ABBREVIATIONS/ACRONYMS</b>	<b>4</b>
<b>EXECUTIVE SUMMARY</b>	<b>5</b>
<b>INTRODUCTION</b>	<b>8</b>
<b>CONCEPTUAL FRAMEWORK:</b> Obstacles and constraints occur over time and as a result of 1) Health Care System and Providers; 2) Social, Economic, and Political Factors; and 3) Media and Marketing Practices.	<b>13</b>
<b>METHODS</b>	<b>15</b>
<b>FINDINGS</b>	<b>16</b>
What can be derived from the literature concerning the obstacles and constraints to exclusive breastfeeding that may be addressed as they occur at the following points in time?	
Preconception/Interconception	16
Antenatal	17
Perinatal (Birth)	18
Immediate Postpartum (Hospital Stay: Day 0 – Day 2 or 3)	20
Days 3 – 12	23
Day 12 – Week 6	24
Weeks 6 – 12	25
Months 4 – 6	26
<b>LIMITATIONS</b>	<b>27</b>
<b>DISCUSSION</b>	<b>28</b>
Gaps in the Literature	28
Potential Areas for Intervention: Recommendations for Action	29
Programmatic Recommendations Suggested by This Review	32
<b>ANNOTATED BIBLIOGRAPHY (in matrix format)</b>	<b>35</b>
Health Care System and Providers	35
Social, Economic, and Political Factors	41
Media and Marketing Practices	48
<b>REFERENCES</b>	<b>50</b>

## ABBREVIATIONS/ACRONYMS

ANC	antenatal care
BF	breastfed/breastfeed/breastfeeding
BFHI	Baby-Friendly Hospital Initiative
d(s)	day(s)
DHHS	United States Department of Health and Human Services
EBF	exclusively breastfed/exclusively breastfeed/exclusive breastfeeding
GAO	United States Government Accountability Office
hr(s)	hour(s)
IBCLC	International Board Certified Lactation Consultant
LAM	Lactational Amenorrhea Method
LBW	low birth weight
mo(s)	month(s)
NGO	non-governmental organization
NICU	neonatal intensive care unit
OR	odds ratio
PBF	predominant breastfeeding
pp	postpartum
SES	socioeconomic status
sig.	significant
UNICEF	United Nations Children's Fund
USBC	United States Breastfeeding Committee
VBAC	vaginal birth after caesarean section
w/	with
w/o	without
WHO	World Health Organization
wk(s)	week(s)
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children
y.o.	years old
yr(s)	year(s)

## EXECUTIVE SUMMARY

**Background:** Exclusive breastfeeding for the first six months of life is strongly associated with optimal health outcomes for mother and child, in the short and long term. Yet exclusive breastfeeding is practiced by a minority of families, and the duration rates of both any and exclusive breastfeeding at six months are well below the United States Department of Health and Human Services Healthy People 2010 objectives.

**Conceptual Framework and Methods:** The literature on factors shown to influence rates of exclusive breastfeeding is explored using a conceptual framework that includes the impact of 1) health care system and providers; 2) social, economic, and political factors; and 3) media and marketing practices. Each of these was examined to assess the varying obstacles and constraints that arise at different points in time during the decision-making and behavior continuum associated with exclusive breastfeeding. The literature review, for the most part, is limited to those articles that specifically address exclusive breastfeeding. While every effort was made to include only those studies carried out in developed settings, a few exceptions were made where findings were complementary. Findings are summarized as matrices and explored for obstacles and constraints unique to support for exclusive breastfeeding.

**Findings:** Many of the interventions supported in the literature as having impact on initiation and duration of breastfeeding also affect initiation and duration of exclusive breastfeeding, including hospital practices, provider skills, social and workplace support, and media and marketing. Increased awareness and attention to the importance of exclusive breastfeeding by health care, socioeconomic, political, and media sectors will help achieve exclusive breastfeeding.

Obstacles and constraints specific to exclusive breastfeeding included:

### Health care system and providers

- Limited provider awareness, knowledge, skills, and practices and limited self-awareness;
- Unnecessary use of medical interventions during labor and delivery;
- Insufficient attention to immediate skin-to-skin contact at birth and evidence-based breastfeeding support practices, such as safe co-sleeping; and
- Insufficient numbers of providers skilled in both clinical and social support.

### Social, economic, and political factors

- Limited community, political, legislative, and regulatory awareness of the public health impact and concomitant limited attention to action;
- Misperceptions and fears due to lack of societal awareness and support;
- Limited third party payment for sufficient support;
- Rarity of public health programming in support of exclusive breastfeeding outside of WIC, and limitations within WIC;
- Lack of paid maternity leave/brevity of any leave; and
- Lack of workplace support.

### Media and marketing practices

- Aggressive marketing of formula (samples, gifts, coupons) to mothers through hospitals and clinicians' offices;
- Public misperceptions secondary to aggressive marketing to the public; and
- Lack of media representation in television and cinema of exclusive breastfeeding as normative behavior.

**Interventions and Recommendations for Action:** Identified gaps and areas for potential change are outlined by timing and type of intervention. From this process, a set of recommendations emerges. The interventions recommended primarily address the need for increased awareness, skills, and support for exclusive breastfeeding within all ongoing services and programming. The unique aspects required for successful intervention to support exclusive breastfeeding include substantial increases in:

- awareness of the issue among providers and the general public;
- development of breastfeeding-specific clinical and counseling skills;
- attention to and planning for family and social support and work accommodations needed to reach a tipping point to establish exclusive breastfeeding as normative behavior;
- funding for research to elucidate how best to support exclusive breastfeeding for all mothers in all settings;
- protection of the public from misinformation and the misconception that “some” formula carries no risks; and
- attention to development of self-regulation and/or governmental regulation of advertising, marketing, and media practices.

Ten program-related recommended actions emerge from this process:

### Health care system and providers

1. Develop undergraduate curricula for all health care workers that include lactation support and counseling skills, addressing delays in lactogenesis, appropriate use of banked donor human milk, and introduction of family planning during breastfeeding, while continuing efforts to implement breastfeeding-friendly hospital practices.
2. Expand and revise third party payment structure to cover all aspects of breastfeeding support.

### Social and economic factors

3. Initiate social marketing for demand creation for all recommendations in support of exclusive breastfeeding, including improved health services, social and legislative support, and media and marketing practices.
4. Develop community social marketing approaches for exclusive breastfeeding based on formative research for sub-populations, including: a) addressing inequities in early access to quality care, b) creating demand for reimbursement from third party payers, c) emphasizing maternal self-efficacy, d) supporting mother/baby care together to reduce excess health care utilization, and e) overcoming social and economic obstacles to exclusive breastfeeding.

### Political factors

5. Promulgate federal and state legislation and regulation regarding aggressive marketing, legality of breastfeeding wherever mothers can legally be present, tax incentives for child care/day care and for employers that provide paid maternity leave and workplace accommodations, and others, as needs arise.
6. Establish and/or improve monitoring where legislation or regulation currently exists: third party coverage, medical facility adherence to the Ten Steps to Successful Breastfeeding, and WIC.

Media and marketing practices

7. Eliminate the distribution of free formula samples, gifts, and coupons to the public, with special attention to the impact of such activities at health care facilities and marketing at points of sale.
8. Encourage or mandate regulation/self-regulation and monitoring by commercial formula manufacturers.
9. Encourage or mandate self-regulation and monitoring by major broadcasting companies.
10. Develop a series of public service announcements.

**Conclusions:** The USBC and federal and state governments must encourage and support these actions in order to decrease infectious and chronic illnesses, their resultant medical costs, and excess mortality, as well as to achieve Healthy People 2010 goals.

## INTRODUCTION

### What Is Exclusive Breastfeeding?

Human milk is the only food fully adapted to the physiology of human infants.<sup>1 2</sup> Optimal breastfeeding is defined as initiating breastfeeding immediately after birth,<sup>3</sup> exclusively breastfeeding until six months of age, and continuing breastfeeding up to two years of age or longer, with age-appropriate introduction of complementary foods.<sup>1</sup>

The World Health Organization defines exclusive breastfeeding (EBF) as providing infants with only “breast milk from the mother or a wet nurse, or expressed breast milk and no other liquids or solids with the exception of drops or syrups consisting of vitamins, mineral supplements, or medicines.”<sup>4</sup> Exclusive breastfeeding differs from predominant breastfeeding (PBF), wherein breast milk constitutes infants’ primary nutritional source, but infants also are given other liquids such as water, tea, juices, oral rehydration salt solutions, or ritual fluids. Other definitions in the literature differentiate between exclusive breastfeeding and exclusive breast milk feeding, since the physiological impact on both the mother and the child with milk expression and feeding of expressed milk differs from that of direct breastfeeding.<sup>5</sup>

### Why Is Exclusive Breastfeeding Supported?

Exclusive breastfeeding is the most effective global public health intervention for child survival.<sup>1 2 6</sup> Therefore, while any breastfeeding is physiologically normal for optimal health outcomes,<sup>7</sup> early initiation and exclusive breastfeeding in the first six months are optimal due to the resultant infant and child survival, growth, and development, and maternal health.<sup>8 9</sup> Human milk generally provides all of the nutrient requirements for infants less than six months of age, about half of their energy requirement from 6 – 12 months, and approximately one-third throughout the child’s second year of life.<sup>10</sup> When mothers are adequately nourished, human milk includes nearly all of the water, vitamins, minerals, carbohydrates, fats, proteins, digestive enzymes, and hormones that a developing child needs.<sup>11</sup> The specific composition of human milk varies during each feed and on a daily basis, accommodating for fluctuating needs, with the specific nutrients needed taken from the mothers’ stores. Human milk also provides immuno-protective factors for infants, selectively recruiting valuable antibodies and other factors from the mother.

While commercial infant formula manufacturers may attempt to replicate the nutritional components of human milk, there are many factors in human milk that cannot be reproduced. Other factors cannot be successfully incorporated into a commercially viable human milk substitute based on non-human milk.<sup>12</sup> Breastfeeding provides both a food and a biologically based interaction between two individuals, both achieving a healthy, normal physiological milieu. Lactation/breastfeeding also is associated with lower maternal risk of breast and ovarian cancers, type 2 diabetes, and postpartum depression.<sup>7</sup>

Exclusive breastfeeding also contributes to cost-effective pregnancy spacing. Hence, the use of any commercial infant feeding substitutes increases the drain on family and population resources. Although no data exist that specifically address the costs and savings associated with exclusive breastfeeding, per se, it has been estimated that breastfeeding costs approximately \$600 annually in additional foods for the mother, whereas the cost of commercial formula alone, without bottles and other related supplies, is approximately \$1,500 annually (in 1997 dollars).<sup>13</sup> On a population level, commercial formula feeding has been shown to increase health care spending by \$331-\$475 per never-breastfed infant in the first year of life.<sup>14</sup> Finally, there are environmental costs with the use of human milk substitutes; it was reported in 1991 that 86,000 tons of tin and 1,230 tons of paper were consumed annually in the packaging of

formula.<sup>15</sup> The production of the formula itself causes unnecessary damage to and consumption of environmental resources,<sup>16</sup> including dairy industry waste, deforestation, soil erosion, pesticide contamination, and water pollution.

## **Which Organizations and Policies Support Exclusive Breastfeeding?**

The United States Breastfeeding Committee recommends that healthy full-term infants be exclusively breastfed for about six months.<sup>17</sup> This recommendation also is supported by expert opinions such as those expressed by the World Health Organization,<sup>1</sup> UNICEF,<sup>18</sup> United States Department of Health and Human Services,<sup>19</sup> United States Agency for International Development,<sup>20</sup> American Academy of Pediatrics,<sup>21</sup> American Academy of Family Physicians,<sup>22</sup> Academy of Breastfeeding Medicine,<sup>23</sup> American Dietetic Association,<sup>24</sup> American College of Obstetricians and Gynecologists,<sup>25</sup> National Association of Pediatric Nurse Practitioners,<sup>26</sup> and others.

Due to the overwhelming evidence of exclusive breastfeeding's positive impact on health, economics, and the environment, the United States government developed policies and objectives for increasing exclusive breastfeeding. The Healthy People 2010 framework provides health goals for the nation. In 2007, Healthy People 2010 expanded its breastfeeding objectives to include targets for breastfeeding exclusivity. The new objectives are to increase the proportion of mothers who breastfeed exclusively through three months of age to 40% (from 30.5% of infants born in 2004), and through six months of age to 17% (from 11.3% of infants born in 2004).<sup>27</sup> An estimated \$3.6 billion (in 1997 dollars) in health care costs for just three diseases—otitis media, gastroenteritis, and necrotizing enterocolitis—could be saved annually if these breastfeeding targets were met.<sup>28</sup> Strategies for accomplishing these targets include supporting families, protecting breastfeeding in the workplace, and working within health services agencies, communities, and society at large to enhance the culture of breastfeeding.<sup>19</sup>

The Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding was produced and adopted at the WHO/UNICEF policymakers' meeting, "Breastfeeding in the 1990s: A Global Initiative" (1990) and signed by Dr. Audrey Nora, formerly Chief of the DHHS Health Resources and Services Administration's Maternal and Child Health Bureau. It envisions "an environment that enables mothers, families and other caregivers to make informed decisions about optimal feeding and provides the skilled support needed to achieve the highest attainable standard of health and development for infants and young children."<sup>29</sup> The declaration called for the creation or reinforcement of a "breastfeeding culture," which requires a strong rejection of "bottle-feeding culture." Those present at the meeting believed that this could occur through social mobilization led by societal leaders from multiple venues. Four goals were established for member nations:<sup>30</sup>

- Appoint a national breastfeeding coordinator and establish a multisectoral national breastfeeding committee.
- Adopt and enforce the Ten Steps to Successful Breastfeeding (later the Baby-Friendly Hospital Initiative) in maternity service facilities.
- Enforce the International Code of Marketing of Breast-milk Substitutes.
- Develop legislation protecting the breastfeeding rights of working women.

## **What are the Rates and Trends in Exclusive Breastfeeding in the United States?**

Among children born in 2004 whose caregivers were interviewed in 2006, nearly 74% were breastfed, however, only 30.5% were exclusively breastfed through three months and 11.3% were exclusively breastfed through six months of age. Only ten states met one or both of the Healthy People 2010 objectives for exclusive breastfeeding.

Rates vary by marital status and age, with married women exclusively breastfeeding to six months twice as frequently as unmarried women (13% v. 6%). Rates of exclusive breastfeeding to six months increase as maternal age increases: from about 6% of mothers under 20 years of age to nearly 14% among mothers older than 30. Rates also vary by geographical location, suggesting social influences on exclusive breastfeeding practices. Rates are lowest in the Southeastern region of the country and in rural areas in general. (*See Table 1*)

Additional demographic factors, including socioeconomic status, nationality, race/ethnicity and maternal educational attainment are strongly correlated with exclusive breastfeeding. While Asian or Pacific Islander and Hispanic/Latino populations have the highest initial breastfeeding rates, only the Asian or Pacific Islander group retains the highest exclusive breastfeeding rates at six months. All other ethnic groups average about 11-12% exclusively breastfeeding at six months with the notable exception of African-American women who demonstrate the lowest levels of initiation and only about 8% exclusively breastfeeding at six months.

Mothers not enrolled in WIC, whether eligible or not, are nearly two times as likely to exclusively breastfeed as WIC-enrolled mothers (14-15% v. 8%). Nationality and race/ethnicity are associated with exclusive breastfeeding, and level of educational attainment is highly correlated to initiation and duration of exclusive breastfeeding.<sup>31 32</sup> (*See Table 1 and Figure 1*)<sup>27</sup> Family and maternal income are correlated with exclusive breastfeeding, with persons with higher incomes demonstrating higher rates of breastfeeding initiation and exclusive breastfeeding duration.<sup>33</sup>

In sum, exclusive breastfeeding rates are lowest among non-Hispanic black mothers, those living in the South, those enrolled in WIC, and those who are unmarried. In addition, there is a positive gradient in rates of exclusive breastfeeding at six months with increased maternal age, income level, and level of education above high school. Exclusive breastfeeding drops off more rapidly than the rate of any breastfeeding, especially during the period of 4-6 months of age. (*See Table 1 and Figure 1*)

**Table 1. Breastfeeding Rates by Socio-demographic Factors among Children Born in 2004<sup>27</sup>**  
(Percent +/- half 95% Confidence Interval)

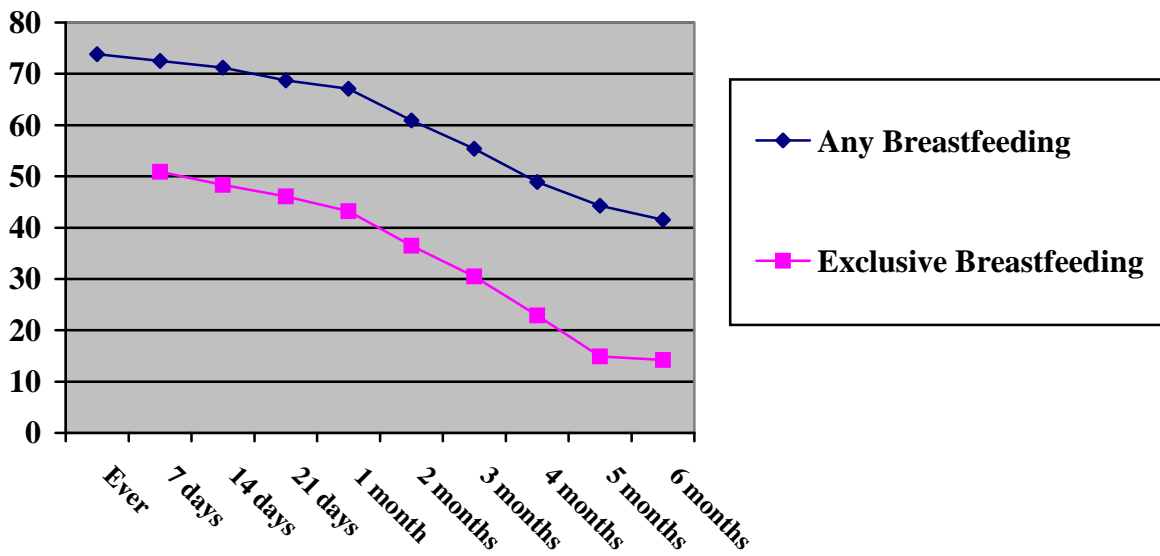
Socio-demographic Factors	Ever Breastfeeding	Exclusive Breastfeeding <sup>1</sup> through 3 months	Exclusive Breastfeeding <sup>a</sup> through 6 months
<b>2010 Goals</b>	75	40	17
<b>US National</b>	73.8±1.0	30.5±1.1	11.3±0.8
<b>Sex</b>			
Male	73.6±1.4	30.7±1.6	10.8±1.0
Female	73.9±1.4	30.3±1.6	11.7±1.2
<b>Race/ethnicity</b>			
American Indian or Alaska	77.5±4.9	28.4±6.3	11.4±4.2
Asian or Pacific Islander	81.7±3.4	33.4±4.4	15.8±3.5
Asian	81.3±3.6	34.1±4.7	16.1±3.7
Native Hawaiian and other	85.4±7.9	26.1±10.4	13.5±7.9
Black or African American	60.9±2.7	22.0±2.5	7.9±1.5
White	76.1±1.1	31.9±1.3	11.7±0.9
Hispanic or Latino	81.0±1.9	30.9±2.5	11.6±1.8
Not Hispanic or Latino (NH)	70.7±1.2	30.3±1.2	11.1±0.8
NH Black or African American	56.2±3.0	20.1±2.6	7.5±1.6
NH White	73.9±1.3	32.6±1.4	11.8±0.9
<b>Birth Order</b>			
First Born	73.5±1.4	31.0±1.6	11.9±1.1
Not First Born	74.1±1.5	29.9±1.6	10.5±1.1
<b>Receiving Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)</b>			
Yes	66.9±1.6	23.4±1.6	8.1±1.0
No, but eligible	78.6±4.2	40.2±5.3	14.7±3.6
Ineligible	82.1±1.2	38.7±1.7	14.4±1.2
<b>Maternal Age, Years</b>			
<20	55.8±7.0	16.8±6.5	6.1±4.6
20-29	69.8±1.7	26.2±1.8	8.4±1.1
≥30	77.9±1.2	34.6±1.4	13.8±1.1
<b>Maternal Education</b>			
Not a High School Graduate	67.7±2.8	23.9±2.9	9.1±2.0
High School Graduate	65.7±2.1	22.9±2.0	8.2±1.2
Some College	75.2±2.1	32.8±2.5	12.3±2.1
College Graduate	85.3±1.1	41.5±1.8	15.4±1.3
<b>Maternal Marital Status</b>			
Married	79.6±1.1	35.4±1.4	13.4±1.0
Unmarried <sup>2</sup>	60.0±2.2	18.8±1.9	6.1±1.1

<sup>1</sup> Exclusive breastfeeding information is from 2006 National Immunization Survey (NIS) data only and is defined as ONLY breast milk—NO solids, no water, and no other liquids.

<sup>2</sup> Unmarried includes never married, widowed, separated, divorced.

<b>Residence</b>			
MSA <sup>3</sup> , Central City	75.0±1.5	30.7±1.7	11.7±1.2
MSA, Non-Central City	76.1±1.6	32.8±1.9	12.1±1.3
Non-MSA	64.6±2.6	23.9±2.1	8.2±1.3
<b>Poverty Income Ratio<sup>4</sup>, %</b>			
<100%	65.9±2.5	23.9±2.3	8.3±1.4
100%-184%	70.8±2.6	26.6±2.8	8.9±1.7
185%-349%	75.1±2.1	33.2±2.3	11.8±1.5
≥350%	81.5±1.5	37.7±2.0	14.0±1.4

**Figure 1. Any and Exclusive Breastfeeding Rates in Percent, by Age, among Children Born in 2004 (produced from data found in Reference 27)**



<sup>3</sup> MSA = Metropolitan Statistical Area defined by the Census Bureau.

<sup>4</sup> Poverty Income Ratio = Ratio of self-reported family income to the federal poverty threshold value depending on the number of people in the household.

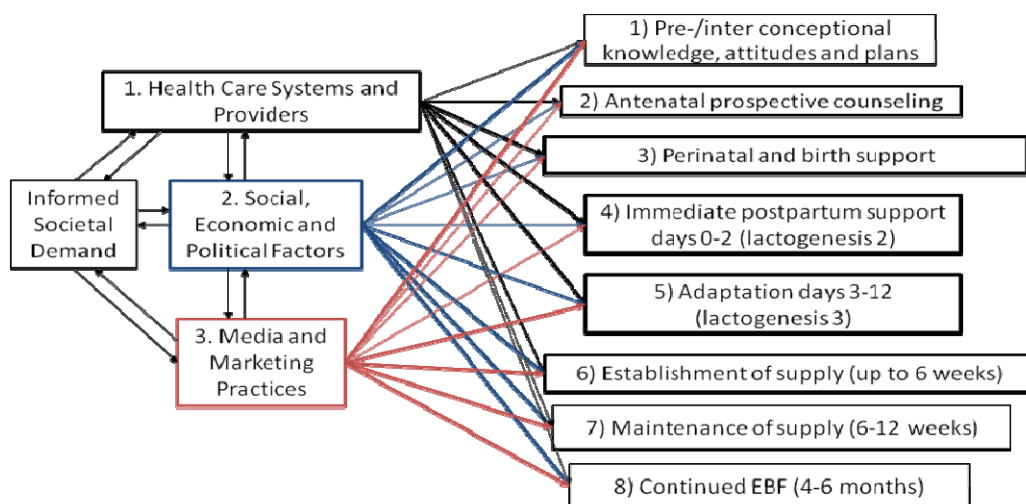
## CONCEPTUAL FRAMEWORK

In this paper, three primary areas of influence are identified as presenting obstacles and constraints to exclusive breastfeeding. These include: 1) health care system and providers; 2) social, economic and political factors; and 3) media and marketing practices. The impact of each of these may differ depending on the time of contact. Eight potentially critical time periods are identified, based on those originally outlined by a DHHS expert committee to assess influences on breastfeeding in general.<sup>34</sup> (See Table 2 and Figures 2 and 3)

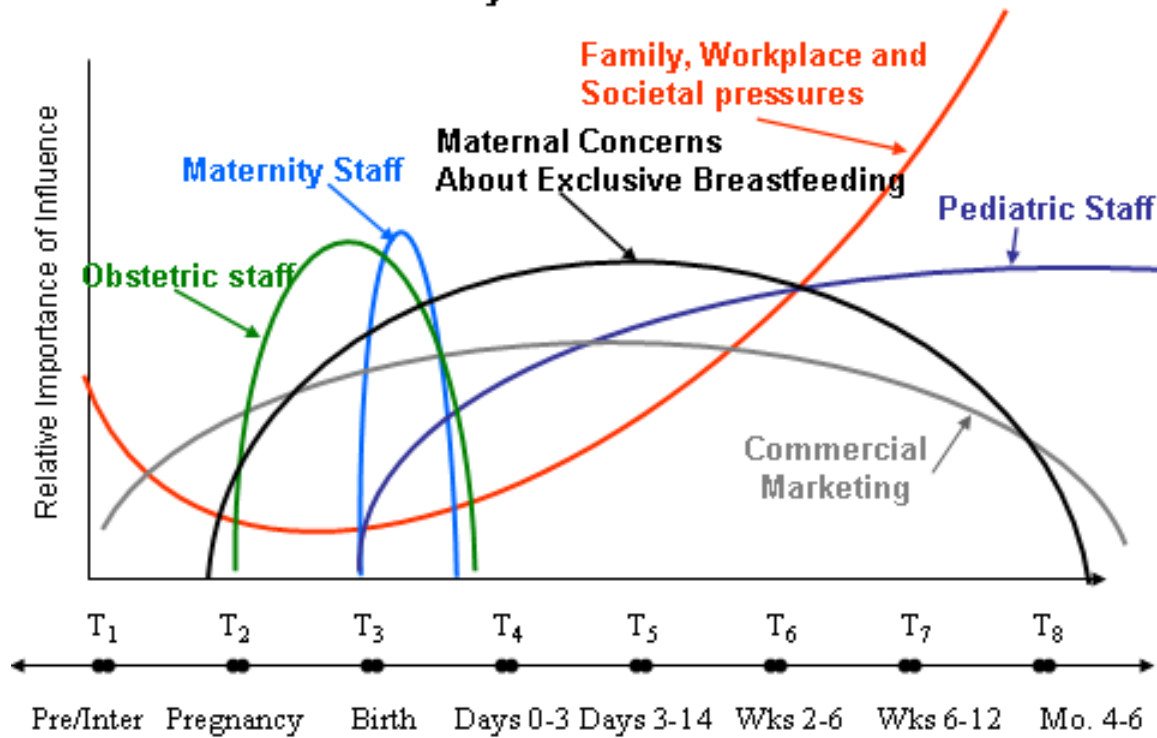
<b>Time Period</b>	<b>Rationale for Identification as a Critical Period for Exclusive Breastfeeding</b>
Preconception/Interconception	Knowledge development and planning by mother/family
Antenatal	Prospective counseling during period of high interest
Perinatal (Birth)	Aspects of the birthing process influence breastfeeding initiation, duration, and exclusivity
Immediate Postpartum (Hospital Stay: Day 0 – Day 2 or 3)	Establishment of the dyad; breastfeeding initiated
Days 3 – 12	Milk “comes in”, adaptation following maternity discharge
Day 12 – Week 6	Establishment of mother/baby interaction and sufficiency of milk production
Weeks 6 – 12	Maintenance of sufficient milk production; period of maternal and infant physiological adaptations
Months 4 – 6	Drop-off in rates of exclusive breastfeeding; adaptation to social influences and health worker inputs

**Figure 2. Conceptual Framework**

There are three primary areas of influence where interventions may be proposed. Each may have a greater or lesser impact at the eight identified time periods of the mother/baby continuum. The actions needed, as well as the target group for change, will vary across the continuum. Heavier lines in the schema below indicate the possibility that greater influence may be associated with successful interventions. Bolded time periods indicate those on which current programs concentrate.



**Figure 3. Potential Obstacles or Supports for Exclusive Breastfeeding, by Time Period**



## METHODS: Identification and selection of materials for inclusion

The literature review included five components: 1) searching the published literature for EBF-specific publications, 2) assessing the applicability of the evidence to this model and for the United States, 3) organizing evidence into the above-noted conceptual model by timing of the potential intervention, 4) extrapolating themes and possible recommendations, and 5) seeking review by those with experiential inputs. MEDLINE, PUBMED, ASSIA, and CINAHL search engines were employed, using broad-based search terms to maximize results. (See Table 3)

<b>Table 3. Search Terms</b>	
Exclusive breastfeeding OR Full breastfeeding	
	+ Sociology
	+ Psychology
	+ Socioeconomic Status
	+ Maternal Factors
	+ Maternity Care
	+ Advertising
	+ Marketing Human Milk Substitutes
	+ Time
	+ Health Care Systems
	+ Hospital
	+ Birth
	+ Postpartum Support
	+ Lactation Consultants
	+ Nurse
	+ Midwife
	+ Obstetrician
	+ Pediatrician
	+ Policies
	+ Media
	+ Income
	+ Educational Attainment
	+ Demographics
	+ Analgesia
	+ Age
	+ Cesarean
	+ Epidural
	+ Pregnancy
	+ Preconception
	+ Bedsharing/co-sleeping
	+ Employment
	+ Workplace

The vast majority of studies identified and included in this review are studies from industrialized settings. The few exceptions were included due to consistency of findings with those from industrialized settings.

## FINDINGS

### General Findings

This report highlights areas that may be considered for design and implementation of interventions. Therefore, demographics are presented only in the introduction, as these are not amenable to change. However, recognition of demographic differences allows for targeting the interventions that emerge from this analysis to those populations who may be most in need of support.

### Preconception/Interconception

Women and their families may be very open to interventions during pre- and inter-conceptual periods, especially those that target biomedical, behavioral, and social factors influencing health and pregnancy outcomes.<sup>35</sup> This is commonly a time when women and their immediate social networks are developing and planning parenting strategies, including plans to exclusively breastfeed.<sup>36 37</sup>

#### *Health Care System and Provider Influences on EBF in the Pre- and Inter-conceptual Period*

Well-woman care during the pre- and inter-conceptual stages of women's lives typically occurs on an annual basis or less often. During pregnancy, however, the average middle-income woman sees her provider 13 times over 40 weeks.<sup>38</sup> After birth, most health care interactions focus on well-child care.<sup>39</sup> Since research suggests that women are highly receptive to health information as they plan their pregnancies, providers may be missing a valuable opportunity at that time to educate women about the risks and benefits of infant feeding decisions.<sup>40</sup> This is especially important as women's pre- or inter-conceptual commitment to breastfeeding is positively associated with increased rates of EBF initiation and duration.

#### *Social, Economic, and Political Influences on EBF in the Pre- and Inter-conceptual Period*

Studies have not focused on pre- or inter-conceptual exposure to social, economic, and political factors that may influence later exclusive breastfeeding. However, there is literature relevant to exclusive and continued breastfeeding that involves studying whether the pregnancy is intended, demographic factors, socioeconomic status, health beliefs and behaviors, and subsequent breastfeeding success.

Health education and beliefs have a demonstrated effect on rates of exclusive breastfeeding. First, maternal doubts about the benefits, feasibility, and adequacy of breastfeeding significantly affect EBF choices;<sup>41 42</sup> the more women know about exclusive breastfeeding before pregnancy, the more likely they are to practice it.<sup>43</sup> In addition, the source of the EBF information is important.<sup>44</sup> Maternal, paternal, and maternal grandmother's attitudes regarding breastfeeding are positively associated with EBF<sup>41</sup> and maternal empowerment and confidence predict higher rates of EBF.<sup>44</sup> Health behaviors such as smoking and overnutrition are associated with later choice not to practice EBF.<sup>41 45</sup>

#### *Media and Marketing Influences on EBF in the Pre- and Inter-conceptual Period*

No study on the impact of marketing of human milk substitutes during this period on later EBF was identified. However, infant feeding decisions are generally reported to be made prior to pregnancy. Therefore, it is likely that exposure to media and marketing will have measurable impact on later behaviors.<sup>42</sup> This is further supported by the documented influence of breastfeeding counseling in this period on subsequent rates of EBF.<sup>46 47 48 49</sup>

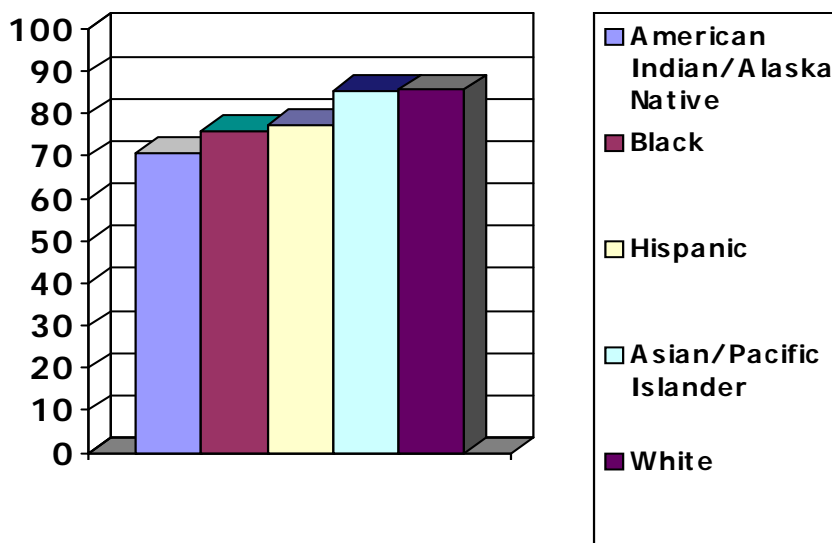
## Antenatal

### *Health Care System and Provider Influences on EBF in the Antenatal Period*

Women experience vastly increased frequency of exposure to health care providers, preventive health measures, and other forms of health education during the antenatal period and are likely to make positive health decisions and/or modify adverse health behaviors during this time.<sup>50 51</sup> Eighty-four percent of pregnant women receive formal antenatal care within the first trimester, and all but 3.6% receive at least some antenatal contact by the third trimester.<sup>52</sup> The majority of women experience 11 – 14 visits per pregnancy.<sup>53</sup> Antenatal care visits include multiple surveillance techniques designed for early identification of adverse pregnancy and birth outcomes, including screening for sexually transmitted infections and testing fetuses for birth defects and proper growth and development. Therefore, this is an important and appropriate time to maximize attention on support of the development of breastfeeding commitment.

Given the evidence that antenatal care can positively influence breastfeeding rates, health inequities in access to and use of antenatal care arguably are related to the disparities in breastfeeding rates.<sup>54</sup> (See Figure 4)

**Figure 4. Percentage of Women Receiving Any Care in First Trimester of Pregnancy**



Studies show that counseling pregnant women on the benefits and techniques of breastfeeding during antenatal visits is highly correlated with rates of EBF.<sup>48 50</sup> However, as surveillance practices increase, time spent on counseling is reportedly waning.<sup>40</sup> Further, obstetricians, who attend the vast majority of births in the United States, often fail to counsel their patients appropriately regarding EBF because they lack the necessary knowledge to do so (e.g., regarding milk production and breastfeeding techniques).<sup>55</sup> Culturally competent counseling has also been associated with increased EBF.<sup>54</sup>

### *Social, Economic, and Political Influences on EBF in the Antenatal Period*

Many of the same social, economic, and political forces influencing EBF in the pre- and inter-conceptional periods continue to do so in the antenatal period, including knowledge and beliefs about the health rationale and ease of practice of exclusive breastfeeding, maternal empowerment and confidence, career considerations, and health behaviors such as smoking and diet. This is a critical period for decision making, so it is logical to hypothesize that perceived norms have significant impact on decisions made at

this time. Additional research is needed on how best to address misperceptions and misconceptions regarding EBF and breastfeeding more generally, as these clearly have been demonstrated to have negative impact on breastfeeding outcomes.<sup>33</sup>

**Media and Marketing Influences on EBF in the Antenatal Period**

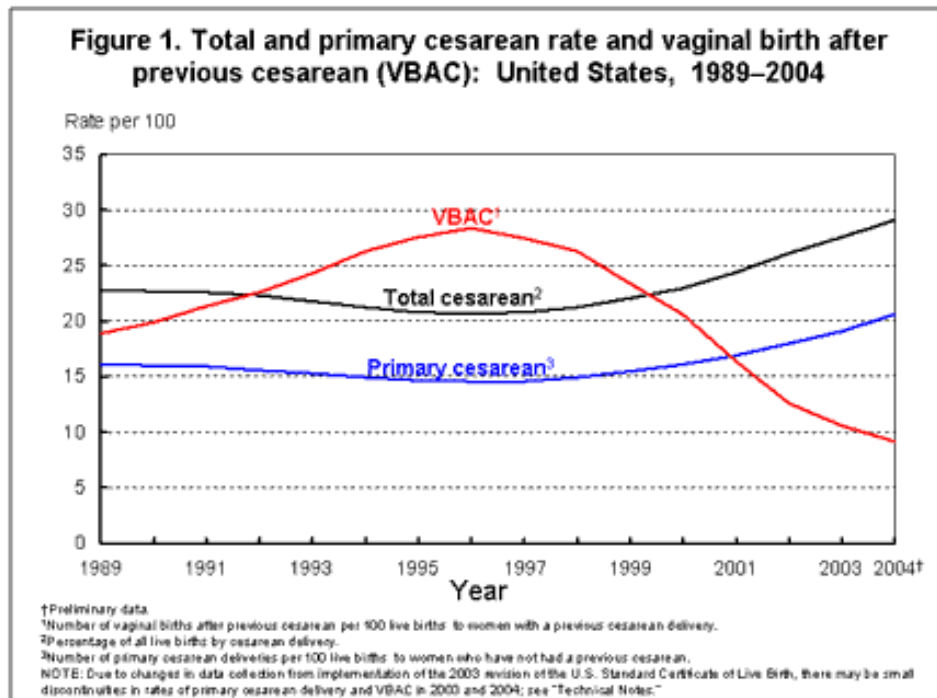
Exposure to human milk substitute advertising adversely affects breastfeeding patterns and rates. In fact, research demonstrates that later rates of breastfeeding exclusivity and duration decrease as levels of exposure to formula advertising increase.<sup>56</sup> The influence of advertising is more intense when women’s breastfeeding goals are not clearly defined; positive guidance and support for these decisions during the antenatal period is potentially highly influential.<sup>57</sup> Commercial advertisers are also aware of this potential; formula advertisements and samples are available in 73% of family practice offices, 54% of obstetrician/gynecologist offices, and 36% of nurse-midwife offices.<sup>58</sup>

**Perinatal (Birth)**

**Health Care System and Provider Influences on EBF in the Perinatal Period**

The policies, training, protocols, and practices of health care personnel at the site and time of birth are highly associated with establishment and duration of EBF. There is a risk of change in breastfeeding rates if rates of invasive procedures such as cesarean section continue to increase. (See Figure 5)

**Figure 5. Recent Rapid Increase in Rates of Cesarean Section<sup>59</sup>**



Multiple studies show that exclusive breastfeeding initiation and duration rates increase when babies are born in Baby-Friendly hospitals.<sup>46 60 61</sup> The Baby-Friendly hospital certification is granted when there is evaluated adherence to the Ten Steps to Successful Breastfeeding (*See Box 1*)

### **Box 1. Ten Steps to Successful Breastfeeding<sup>3</sup>**

1. Maintain 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 infants no food or drink other than breastmilk, unless medically indicated.
7. Practice “rooming-in”—allow mothers and infants to remain together 24 hours a day.
8. Encourage unrestricted breastfeeding.
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.

Babies born in Baby-Friendly facilities are 28% more likely to be exclusively breastfed when compared to babies born at hospitals in the process of becoming Baby-Friendly certified, or those with no efforts towards certification, and they experience a doubling of average EBF duration from six to 12 weeks.<sup>46 61</sup> Baby-Friendly maternity facilities where nurses received additional breastfeeding training beyond the basic course may experience even more significant increases in rates of EBF.<sup>62</sup> However, there are only about 75 Baby-Friendly facilities in the United States,<sup>63</sup> a certification rate of less than 2% of maternity facilities.

Exclusive breastfeeding is also associated with mode of delivery.<sup>64 65</sup> Medical intervention during labor and delivery has risen drastically over the last 15 – 20 years, introducing multiple factors with potential influence on exclusive breastfeeding. For example, the rate of labor induction in the United States rose 123% in 14 years—from 9.5% in 1990 to 21.2% in 2004.<sup>53</sup> Receiving anesthesia during labor and delivery, especially in the form of epidurals, is significantly associated with earlier cessation of EBF.<sup>66</sup> In 2004, 99% of all births occurred in hospitals, and 91.5% occurring with physicians attending. This rate has remained more or less stable for several decades.<sup>53</sup> Concurrently, midwife-attended births, assumed to be associated with fewer medical interventions, have nearly doubled since 1991 (5.7%), with 11.1% of vaginal births in 2004 attended by midwives.<sup>53</sup>

The rate of exclusive breastfeeding is significantly lower among mothers giving birth by cesarean section (as compared to mothers giving birth vaginally).<sup>32 66</sup> While the rate of cesarean deliveries declined between 1989 (22.8%) and 1996 (20.7%), it has risen steadily to 29.1% in 2004.<sup>53</sup> (*See Figure 5*) This increased rate of intervention, higher than the level generally medically indicated, may be contributing to declining APGAR scores; the percentage of babies with “excellent” 5-minute scores has decreased to 88.8%, after having slowly risen from 88.6% to 91.1% between 1978 and 2003.<sup>53</sup> The increase in cesarean births is also likely to affect the rates of exclusive breastfeeding. In fact, mothers giving birth vaginally are more than one and one half (1.5) times more likely to initiate exclusive breastfeeding.<sup>43</sup> This association may be due to the impact of the surgery and length of hospital stay, use of anesthesia, lack of physiologically complete labor, or a combination of these (and other) potential factors.<sup>34 65 66</sup>

There is little published research on NICU or non-hospital births and exclusive breastfeeding, per se. One relevant finding is the observation of J. Morton, MD on colostrum use in the NICU. She has found that

hand expression combined with later pump use yields a greater usable supply of colostrum (unpublished data, September 2007). Thus, the proper expression and use of colostrum may have an additive impact for breastfeeding success following NICU hospitalization.

### ***Social, Economic, and Political Influences on EBF in the Perinatal Period***

No study was found that addressed social, economic, or political influences on the impact birthing practices would have on exclusivity of breastfeeding, although there is a considerable literature on cultural and traditional birthing practices, birth attendants, and length of labor, and possible associations with breastfeeding in general.

### ***Media and Marketing Influences on EBF in the Perinatal Period***

No study was identified.

## **Immediate Postpartum (Hospital Stay: Day 0 through Day 2 or 3)**

The events of the immediate postpartum period are highly associated with initiation and duration of breastfeeding and exclusive breastfeeding. Ninety-nine percent of births in the United States occur in hospitals, where the average length of stay following uncomplicated vaginal delivery is 2.0 days, and 3.3 days following cesarean section (2004).<sup>67</sup>

### ***Health Care System and Provider Influences on EBF in the Immediate Postpartum Period***

Lack of sufficient milk production in the early postpartum period may result from pre-existing conditions such as maternal diabetes, obesity, blood transfusions, prolonged and/or complicated labor, etc. There are also rare cases of low to no maternal milk production associated with conditions such as polycystic ovarian syndrome, breast reduction surgery, etc.<sup>64 68</sup> These conditions and situations can be addressed by the health care system. For example, skilled providers and availability of banked donor human milk can be vital in adequately addressing such obstacles.

Research suggests that selected issues found in the Ten Steps to Successful Breastfeeding can have particularly strong impact on rates of EBF. There are many factors with potential to disrupt the maternal-infant bond, including: very low birth weight infants (8.2% of births);<sup>69</sup> severely ill infants; cesarean births (30.2% of all births); and postpartum depression (following 8-20% of births).<sup>70</sup> These can be overcome, at least in part, by active support for the mother/baby relationship. For example, mothers and babies who room-in during their hospital stay have significantly higher rates of EBF.<sup>43</sup> Immediate skin-to-skin contact and early breastfeeding on demand are proven to heavily influence EBF success because normal establishment of feeding and frequency of feeds correlate with establishment of sufficient milk supply,<sup>31 43</sup> which in turn can decrease early complications due to lack of milk removal (milk stasis). Unfortunately, breastfeeding on demand is commonly discouraged in American hospitals, with the explanation being a stated desire to facilitate mothers' rest before returning home.<sup>31</sup>

There is strong evidence that the introduction of human milk substitutes without medical indication has deleterious effects on exclusive breastfeeding success.<sup>55 71 72 73 74</sup> Wright and colleagues found that regularly administering supplementary feeds leads to a tenfold increase in the odds of women ceasing breastfeeding by hospital discharge.<sup>71</sup> Commonly cited reasons for feeding infant formula in the hospital are "poor weight gain," "problems with the latch," or "mother needs rest."<sup>31 55</sup> In addition, unnecessary administration of human milk substitutes reinforces one of the most commonly cited reasons for not exclusively breastfeeding: concerns about milk supply.<sup>75</sup> Women's perceptions that they are likely to fail are validated when hospital providers distribute discharge bags containing human milk substitutes. In fact, according to an April 2006 letter from L. Grummer-Strawn, PhD, Centers for Disease Control and

Prevention, to the Massachusetts Public Health Council, new mothers often believe that their providers are endorsing human milk substitutes. In a recent study, racial/ethnic groups reported differing levels of in-hospital supplementation, with varying percentages continuing exclusive breastfeeding at one month postpartum. (See Table 4)

EBF rates also would appear to decline with early use of pacifiers,<sup>76 77</sup> a common practice in hospitals (44%).<sup>78</sup>

Beyond the specifics of the Ten Steps, the presence of knowledgeable breastfeeding advocates on staff and breastfeeding counseling in the early postpartum period are critical to EBF rates.<sup>48 50</sup> In fact, when support comes from lay advocates in private hospitals there appears to be an even greater effect on EBF rates than on partial breastfeeding rates.<sup>79 80</sup> In retrospective analysis, mothers reported that lack of staff support would have led to early cessation of EBF.<sup>75</sup> Thus, hospitals not ensuring that there are knowledgeable breastfeeding advocates available may be presenting a significant constraint to EBF.

**Table 4. Data derived from New Jersey study<sup>74</sup> with additional calculations and rounding**

<b>Column 1</b> <b>Race/ethnicity</b> % (n)	<b>Column 2</b> <b>Percent of each race/ethnicity EBF in hospital</b> % (n)	<b>Column 3</b> <b>Percent of each race/ethnicity EBF at one month</b> % (n)	<b>Column 3.1</b> <b>Of those reporting EBF in hospital (Col. 2, n=157), percent EBF at one month</b> % (n)	<b>Column 3.2</b> <b>Of those reporting <u>not</u> EBF in hospital (100%-Col. 2, n=150), percent EBF at one month</b> % (n)
White 54.1 (166)	54.2 (90)	34.9 (58)	55.6 (50)	10.5 (8)
Black 10.1 (31)	38.7 (12)	29.0 (9)	50.0 (6)	15.8 (3)
Asian 20.5 (63)	54.0 (34)	41.3 (26)	58.9 (20)	20.7 (6)
Hispanic 15.3 (47)	44.7 (21)	10.7 (5)	19.1 (4)	3.9 (1)
<b>Total 100 (307)</b>	<b>51.1 (157)</b>	<b>32.0 (98)</b>	<b>50.9 (80)</b>	<b>12.0 (18)</b>

A recent article estimated the staff full-time equivalents (FTEs) needed for sufficient lactation consultant support in a tertiary care medical center.<sup>81</sup> Assuming that an effective lactation program should offer the following, then it may be possible to calculate the appropriate numbers of lactation consultant FTEs.

1. Clinical Services: inpatient consults, outpatient consults, and telephone consults
2. Education Services: staff/physician education (including IBCLCs), student education (nursing, medical), and preceptorships
3. Research: process improvement, product/equipment trials, and clinical research
4. Program Development/Administration: policies, procedures, documentation, staffing, personnel management, patient information, statistics/productivity, quality assurance, and hospital leadership

(See Table 5)

**Table 5. Ratios for calculating the numbers of full-time equivalent (FTE) lactation consultants necessary in a hospital setting<sup>81</sup>**

Service	FTE Ratio Needed
Mother/baby coverage (inpatient)	1:783 breastfeeding couples
Neonatal Intensive Care Unit (NICU) coverage (inpatient)	1:235 infant admissions
Post-discharge coverage	
Mother/baby outpatients	1:1292 breastfeeding couples
Mother/baby telephone follow-up	1:3915 breastfeeding couples
NICU outpatients	1:818 breastfeeding infants
NICU telephone follow-up	1:3915 breastfeeding infants
Education	0.1:1000 deliveries
Program development/administration	0.1:1000 deliveries
Research	0.1-0.2 FTE total

It is proposed that, rather than utilizing one “global” ratio for calculating staffing, the ratios in Table 5 guide hospital administrators in calculating lactation consultant staffing based on the number of deliveries, breastfeeding rates, and extent of services desired.

Hormonal contraception by injection in the immediate postpartum period is a commonly reported practice. One study suggests that early breastfeeding is not affected by progestin-only contraception administered before hospital discharge when compared with use of non-hormonal methods.<sup>82</sup> However, other issues related to unnecessary administration of a drug, and its potential side effects during a period when exclusively breastfeeding mothers will not produce an adequate ovulation, should be considered, as well as the anecdotal reports of negative outcomes. In addition, one meta-analysis concluded that the existing randomized controlled trials are insufficient to establish an effect of hormonal contraception on milk quality and quantity.<sup>103</sup>

### ***Social, Economic, and Political Influences on EBF in the Immediate Postpartum Period***

Women’s decisions concerning return to the workplace have considerable influence on their rates of breastfeeding.<sup>83 84 85 86</sup> Women who intend to return to work will have lower initiation rates that are directly associated with the length of maternity leave. The largest influence is among women who must return to work for financial reasons.<sup>87</sup> Moreover, women in more routine jobs are considerably less likely to exclusively breastfeed their infants at one and four months as compared to women in higher managerial positions.<sup>88</sup> Maternal employment is currently about 50%; if this rate continues to increase, maternal employment will become an increasingly influential factor in EBF decisions and success.

### ***Media and Marketing Influences on EBF in the Immediate Postpartum Period***

There is a strong inverse association between marketing of human milk substitutes in the immediate postpartum period and rates of exclusive breastfeeding.<sup>56 89 90</sup> This relationship was the basis of the acceptance of the WHO International Code of Marketing of Breast-milk Substitutes (1981) articles that state that substitutes should not be marketed in ways that interfere with breastfeeding.<sup>91</sup> The United States was the only nation to vote against adoption of the Code at that time.<sup>89</sup> The inverse relationship between advertising of formula and EBF rates is higher among women who are uncertain about their goals for

breastfeeding as compared to women who are committed to exclusively breastfeeding before exposure to formula advertising.<sup>57</sup>

It is reported that hospitals in the United States may enter into agreements with formula companies wherein they receive discounted or free infant formula in exchange for distributing marketing materials to new mothers in the form of free hospital discharge bags<sup>92</sup> that contain formula samples, information on formula feeding, and discount coupons for future purchases of formula. Research demonstrates that women who receive these gift bags discontinue EBF earlier than those who do not receive the bags.<sup>73</sup> One study compared EBF rates among mothers who received traditional formula-filled discharge bags with mothers who received bags with a pump and no formula; women who received the pump and no formula exclusively breastfed approximately one and one half (1.5) times as long as women who received the free formula (4.18 weeks vs. 2.78 weeks).<sup>90</sup> Another study found that women who did not receive discharge packs at all were more likely to be exclusively breastfeeding at three weeks postpartum.<sup>89</sup>

## **Days Three through Twelve**

Days three through twelve are of critical importance to exclusive breastfeeding success for two primary reasons: mothers are just returning home and establishing routines with their new babies, and milk supply is still being established (lactogenesis II-III). Once home, women's contact with health care providers is decreased.

### ***Health Care System and Provider Influences on EBF in Days Three through Twelve***

Professionally facilitated group counseling, lay counseling, and peer counseling in the first few weeks postpartum all have beneficial effects on EBF rates. The benefit increases as frequency of visits increase.<sup>49</sup> Morrow and colleagues compared three levels of counseling to see how frequency of counseling influenced rates of EBF. They found that breastfeeding duration and exclusivity increased as frequency of counseling sessions increased, with 67% of mothers practicing EBF in the six-visit group, 50% in the three-visit group, and only 12% in the group with no counseling.<sup>47</sup>

In this time period, mothers express concerns regarding adequacy of weight gain, fear of milk insufficiency, and breastfeeding problems.<sup>55 64 75</sup> Women with concerns about breastfeeding problems in the first four weeks are nearly twice as likely to cease breastfeeding as mothers who do not report problems, and these women should be counseled accordingly.<sup>77</sup> Women also turn to pediatricians for breastfeeding support during this time period, especially when they are the only health care providers with whom mothers are in contact.<sup>93</sup> Hence, the duration of EBF is significantly associated with pediatrician counseling.<sup>94</sup> However, pediatricians often lack the knowledge needed to effectively counsel mothers on breastfeeding problems and techniques.<sup>54 93</sup>

### ***Social, Economic, and Political Influences on EBF in Days Three through Twelve***

As women leave the hospital and return home with their new babies, their social sphere changes; the frequency of health care interactions decreases, and more intimate interactions with family and friends become more important.<sup>95</sup> The major socioeconomic and political influences in days three through twelve are therefore family support and mother-infant bonding. Planning for return to work is also an often-cited factor.

Successful exclusive breastfeeding often involves mother-child bonding as well as family support, especially from the parenting partner.<sup>44 96</sup> Research shows that rates of exclusive breastfeeding are increased when the family, especially the father, has a supportive attitude.<sup>40 94</sup> Survey respondents in one study reported the negative attitude of the baby's father toward breastfeeding as the number one reason to

introduce formula.<sup>40</sup> Supportive fathers typically offer encouragement in the more difficult moments of breastfeeding; approval, admiration, and appreciation; and practical support in terms of the household balance of labor. Paternal support may encourage maternal pride and confidence, which have been proven to increase duration of EBF.<sup>44</sup> Securing and maintaining a strong bond between mother and infant is critical to the continuation of exclusive breastfeeding at this phase. Research demonstrates that optimal bonding in the mother-child dyad increases duration of EBF.<sup>96</sup>

### ***Media and Marketing Influences on EBF in Days Three through Twelve***

No study was identified.

### **Day Twelve through Week Six**

Rates of exclusive breastfeeding continue to drop rapidly between day twelve and week six. Milk supply is established during this period. This time is also unique in that most women are consistently alone with their babies for the first time as family and friends return to their daily routines. Fathers typically take vacation time, or unpaid time off from work for 1-2 weeks, but then return to work (varying, of course, by occupation).<sup>97</sup> Thus women use day twelve through week six to establish routines of parenting—most importantly, sleeping and infant feeding patterns.

### ***Health Care System and Provider Influences on EBF in Day Twelve through Week Six***

Women who have breastfeeding problems in the first four weeks postpartum are nearly twice as likely to discontinue exclusive breastfeeding prematurely.<sup>40</sup> Breastfed infants who do not receive pacifiers are more than three times as likely to be fully breastfeeding at six months, when compared to those who did not receive pacifiers (23.3% vs. 7.1%, respectively).<sup>77</sup> Both breastfeeding problems and introduction of pacifiers are constraints to EBF that can be mediated by knowledgeable breastfeeding counselors, trained peers, or visiting nurses.<sup>48 49 77</sup> Thus, continued health care interaction focusing on the mother is beneficial to increasing success rates of EBF during this period.

This is also time when family planning is often considered. Given that some methods have been shown to compromise milk supply, inclusion of EBF support in family planning counseling is essential. EBF can be actively supported by the inclusion of the Lactational Amenorrhea Method (LAM) as an option among family planning choices discussed.

### ***Social, Economic, and Political Influences on EBF in Day Twelve through Week Six***

There is also strong evidence suggesting that significant proportions of the U.S. adult population have negative attitudes related to breastfeeding. For example, 45% said that breastfeeding mothers had to give up too many lifestyle choices,<sup>33</sup> and 31% of American adults surveyed believe that one-year-olds should not be breastfed. Women's confidence and sense of personal empowerment is critical to continuation of exclusive breastfeeding in this time period.<sup>44</sup> Widespread lack of societal support for breastfeeding is likely to diminish women's sense of confidence in their infant feeding choices, and could potentially be a factor in the significant decline in EBF at this critical period.

Li and colleagues surveyed a sample representative of the American adult population and found that 27% consider public breastfeeding an embarrassment. This belief was especially prominent among individuals younger than 30 and older than 65, those with lower income, and those with less education.<sup>33</sup> In this scenario, exclusively breastfeeding women either are subjected to public "embarrassment" for feeding their infants or are relegated to private spaces with limited personal contact. The social stigma associated with public breastfeeding is likely to deter women from breastfeeding in public, making exclusive breastfeeding much more difficult.

Return to work can also exert a negative influence on later continuation of breastfeeding<sup>31</sup> and presumably EBF.

### ***Media and Marketing Influences on EBF in Day Twelve through Week Six***

No study was identified.

## **Weeks Six through Twelve**

### ***Health Care System and Provider Influences on EBF in Weeks Six through Twelve***

There are many common misperceptions regarding breastfeeding in the U.S. adult population.<sup>42</sup> For example, 31% thought that babies should be fed cereal or baby food by three months of age. Further, a study in Philadelphia found that individuals did not consider water, juice, or baby foods to be solids or “other than breastfeeding” (unpublished data, September 2007). Health care personnel and parents should be aware that introduction of solids and introduction of formula can have very different consequences for continuation of any or exclusive breastfeeding; introduction of any formula can have a greater negative impact on the continuation of intensive breastfeeding than the introduction of a solid.<sup>98</sup>

Moreover, research shows that misperceptions have only worsened in the last decade, with the percentage of respondents who believed that infant formula is as good as human milk increasing from 14.3% in 1999 to 25.7% in 2003.<sup>42</sup> Such erroneous beliefs regarding the inadequacy of breastfeeding (and the adequacy of formula) may be partially responsible for the high rates of premature introduction of complementary foods and use of human milk substitutes. Such misperceptions were most commonly documented among non-whites, people aged 30 – 65 years, and those with low socioeconomic status (SES).<sup>33</sup>

Among exclusively breastfeeding women, conception will not occur in the first six weeks. While there is a strong inverse association between unwanted pregnancies and breastfeeding among white women living in the United States,<sup>99</sup> breastfeeding *per se* cannot be efficaciously used as a form of family planning. The method of family planning based on breastfeeding physiology is known as the Lactational Amenorrhea Method (LAM). The pattern of frequent infant suckling at the breast results in suppression of ovulation, delaying the return of menses in the postpartum period.<sup>100</sup> LAM is 99.5% effective with perfect use, and 98% effective with typical use during the first six months.<sup>101</sup> LAM may provide additional motivation to practice optimal infant feeding after week six, but only if women are aware of its efficacy and how to use it. There are indications that most American women and most health care providers are not aware of LAM or the exact criteria for its use.

### ***Social, Economic, and Political Influences on EBF in Weeks Six through Twelve***

No study was identified for this period specifically. However, returning to work has been cited as an issue for breastfeeding in general at this time, and an impact on exclusive breastfeeding may be assumed.

### ***Media and Marketing Influences on EBF in Weeks Six through Twelve***

No study was identified.

## **Months Four through Six**

Months four through six are defined as a critical period in the continuation of exclusive breastfeeding because a significant proportion of women prematurely wean their babies during this time.<sup>27</sup> Two of the most important factors include the return to work and misperceptions regarding infants' nutritional needs.<sup>42</sup> Various factors related to health care systems, socioeconomic and political spheres, and human milk substitute advertising are involved in the premature discontinuation of EBF at this time.

### ***Health Care System and Provider Influences on EBF in Months Four through Six***

As has been previously established in this paper, health care interactions beyond the immediate postpartum period typically focus on the infant. Therefore, pediatricians have an important role in EBF promotion and support in this time period, as they are usually the only health care provider with whom the mother and baby come into contact. Thus it is extremely problematic that pediatricians lack the necessary knowledge and skills to address common problems such as cracked nipples and engorgement.<sup>55</sup> Thirty-two percent of adults believe that infants require nutritional supplementation, and 31% believe infants need solids by three months of age.<sup>33</sup> Lack of knowledge among those providing pediatric care regarding optimal supplementation strategies is especially problematic given the widespread confusion on this topic. Lay and professional counselors and visiting nurses can continue to provide women with support and information.<sup>47 48 49 79</sup>

### ***Social, Economic, and Political Influences on EBF in Months Four through Six***

The return to work is a critical constraint to EBF that typically occurs at three months postpartum. Nearly 80% of women return to work by four months postpartum.<sup>102</sup> Mandated extended maternity leave increases the duration of EBF by more than one-half of one month, and increases the proportion of mother-child pairs attaining six months of EBF.<sup>103</sup> Women typically wean their babies soon after returning to work, especially when they have not secured adequate support.<sup>41 83</sup> Lack of workplace support (lactation rooms, scheduled breaks for milk expression, flexibility to work from home, etc.) is proven to have an especially deleterious effect on EBF.<sup>83 84</sup> The work environments of people with higher socioeconomic status tend to be more supportive of breastfeeding.<sup>86</sup> This fact alone could explain the difference in the rates of EBF occurring at three months in comparison to birth or one month.<sup>27</sup> (*See Table 1*)

As women return to work outside of the home, they commonly entrust their babies to formal day care providers or other caretakers who may or may not be relatives. The exclusively breastfed infant ideally has access to his or her mother for regular feedings. However, other caregivers can administer mothers' milk when appropriate storage and preparation amenities exist. Research suggests that day care providers are not well informed in regards to supporting exclusive breastfeeding in these ways.<sup>41</sup> Moreover, Raju and colleagues found that formal day care facilities are typically so isolated from the workplace that women are restricted from visiting during the day to feed their infants.<sup>87</sup>

### ***Media and Marketing Influences on EBF in Months Four through Six***

No study was identified.

## LIMITATIONS

This paper provides a review of research findings on the constraints to exclusive breastfeeding, examining influences from the health care system and providers; social, economic, and political factors; and media and marketing practices at eight critical stages in the decision making and practice of exclusive breastfeeding. However, there are several limitations to the extrapolation of interventions from these findings:

1. The number of studies of exclusive breastfeeding is limited in the United States, due to low levels of exclusivity and concomitant difficulties in identifying study participants in a timely manner.
2. Many areas of interest have not yet been studied, especially when interventions and outcomes are temporally separated, or when the intervention is diffuse and larger numbers would be needed to assess impact. For example, researchers exploring the impact of images observed in the media during preconception on exclusive breastfeeding that occurs many months later may perceive too many possible confounders and too much complexity for conventional research.
3. The definitions of breastfeeding and exclusive breastfeeding used in the research vary, making it difficult to assess comparability between studies.
4. Some of the available studies are of less than optimal design due to difficulties in carrying out research on long-term behavior and on later impact of behaviors and/or interventions.

## DISCUSSION

### Gaps in the Literature

This review has allowed for identification of areas in need of additional study. Some of the major areas where the literature is limited are listed in Table 6 below.

**Table 6. Gaps in the literature**

#### **Research on Health Care System and Providers**

- Identify effective pre- and inter-conceptional EBF counseling efforts.
- Measure the effect of increasing antenatal care time spent promoting EBF.
- Identify the optimal period of clinical intervention to promote EBF.
- Identify optimal strategies for provider intervention to promote EBF.
- Better define the “mother/baby bond.”
- Identify maternal conditions that cause a delay in lactogenesis II or insufficient production.
- Explore facilitation of availability of banked donor human milk.
- Determine the causal mechanism of the inverse association between cesarean section and EBF.
- Monitor and evaluate the impact of the proposed optimal lactation consultant/patient ratio.
- Quantify rates of non-medically indicated formula administration in immediate postpartum period in hospitals.
- Analyze the association between maternal co-sleeping and duration of exclusive breastfeeding, and/or assess overall health and survival rates of infants experiencing maternal co-sleeping.
- Assess the level and content of training received by providers.
- Assess the cultural competency of providers and impact on EBF support.
- Determine if there is differential impact with varying circumstances and location of delivery, such as home birth.

#### **Research on Social, Economic, and Political Factors**

- Demonstrate cost-effectiveness of workplace policies and practices to support EBF.
- Illustrate the potential for paid maternity leave in the U.S. economy.
- Measure impact of public misperceptions on women’s choices to EBF.
- Measure impact of negative public attitudes regarding breastfeeding on women’s choices to EBF.
- Identify effective strategies for improving public attitudes regarding EBF.
- Identify effective strategies for improving public awareness regarding the benefits of EBF.
- Identify factors influencing women’s sense of empowerment relating to EBF.
- Identify effective interventions for empowering women to EBF.
- Identify optimal mechanisms for improving fathers’ and other familial attitudes regarding breastfeeding and EBF.
- Study the impact of factors that occur in weeks 6 – 12 postpartum on EBF.
- Assess productivity changes as a result of support for breastfeeding while working.

#### **Research on Media and Marketing Practices**

- Determine the impact of formula advertising, at the various critical periods and in family practice, obstetrician/gynecologist, nurse-midwife, or other professional medical practices/offices.
- Explore the impact of exposure to marketing and media presentation of EBF over time.
- Study the impact of media and marketing to mothers and families in the postpartum period after hospital discharge on EBF.

## Potential Areas for Intervention: Recommendations for Action

It has been well established that early and exclusive breastfeeding is the optimal way to feed human infants for six months, and that rates of EBF are low in the United States. The following recommendations for action are based on the obstacles and constraints to EBF that have been outlined in this paper.

**It should be noted that the majority of interventions designed to increase breastfeeding in general also will have a positive impact on exclusive breastfeeding. Therefore, the recommendations presented below select and highlight, where possible, those interventions that are more specific to enhancing exclusive breastfeeding per se, based on this review of the literature.**

**Table 6: Areas identified for Action in Support of Exclusive Breastfeeding**

	<b>Health Care System and Providers</b>	<b>Social, Economic, and Political Factors</b>	<b>Media and Marketing Practices</b>
<b>General: USBC and the federal government are encouraged to use their offices to:</b>	<ul style="list-style-type: none"> <li>• Work with all health and medical boards and commissions to mandate inclusion of knowledge and skills necessary to counsel and support EBF in undergraduate medical, nursing, and public health training;</li> <li>• Increase awareness of the difference between breastfeeding and exclusive breastfeeding among all providers who come into contact with women, children, and fathers of young children;</li> <li>• Provide curricula modules if needed.</li> </ul>	<ul style="list-style-type: none"> <li>• Create an exclusive breastfeeding norm through emphasis that veering from the physiological norm leads to negative impacts;</li> <li>• Ensure public and community messaging and programs to address public perceptions, minorities, and legislation that endorses and enables breastfeeding wherever women may go, including the workplace;</li> <li>• Institute social marketing;</li> <li>• Legislate protective regulation, such as breastfeeding in public wherever a woman is permitted to be including workplace, maternity leave, and the principles of the International Code of Marketing of Breast-milk Substitutes.</li> </ul>	<ul style="list-style-type: none"> <li>• Call upon Ad Council and multimedia organizations to self regulate presentation of EBF in commercial programming and advertising;</li> <li>• Increase public service announcements that specifically include self-efficacy, and how to overcome obstacles to EBF.</li> </ul>
<b>Pre-/Inter-conception</b>	<ul style="list-style-type: none"> <li>• Include EBF planning in all patient/provider interactions.</li> </ul>	<ul style="list-style-type: none"> <li>• Make efforts to promote women's empowerment and self-efficacy.</li> </ul>	<ul style="list-style-type: none"> <li>• As above.</li> </ul>
<b>Antenatal</b>	<ul style="list-style-type: none"> <li>• Include EBF discussion in antenatal care (ANC) visits;</li> <li>• Ensure that breastfeeding-related ANC examination skills are in curricula;</li> <li>• Ensure that breastfeeding-related ANC examination skills and explanation of need are in clinical guidance provided by professional groups to members.</li> </ul>	(Not specifically studied in terms of EBF.)	<ul style="list-style-type: none"> <li>• As above.</li> </ul>

	<b>Health Care System and Providers</b>	<b>Social, Economic, and Political Factors</b>	<b>Media and Marketing Practices</b>
<b>Perinatal (Birth)</b>	<ul style="list-style-type: none"> <li>• Provide support for maternal self-efficacy;</li> <li>• Decrease interventions that are not medically indicated;</li> <li>• Encourage doula or similar companion;</li> <li>• Mandate practice of immediate postpartum skin-to-skin contact and support for breastfeeding initiation within the first hour.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop community advocacy and demand for decreasing practices that are not medically indicated and for increased support for humane treatment of mother and baby.</li> </ul>	<ul style="list-style-type: none"> <li>• Follow International Code of Marketing of Breast-milk Substitutes articles on commercial formula provision in the hospital.</li> </ul>
<b>Immediate Postpartum</b>	<ul style="list-style-type: none"> <li>• Increase ratio of onsite lactation consultants or other skills-trained health care personnel to number of births;</li> <li>• Create universal support for instituting the Ten Steps to Successful Breastfeeding;</li> <li>• Improve clinical use of family planning options appropriate to this period.</li> </ul>	<ul style="list-style-type: none"> <li>• Address maternal and paternal expectations, especially if delivery varies from that expected;</li> <li>• Increase planning for overcoming the potential obstacle of return to workplace, and the understanding that “any EBF is better than none” as an essential message for establishment of EBF.</li> </ul>	<ul style="list-style-type: none"> <li>• As above. Eliminate subsidized supplies to hospital and marketing in the form of take-home products or samples.</li> </ul>
<b>Days 3 – 12</b>	<ul style="list-style-type: none"> <li>• Provide skills and training in maternal counseling to address expectations and breastfeeding problems;</li> <li>• Increase availability of counseling by nurses or peers.</li> </ul>	<ul style="list-style-type: none"> <li>• Create a norm of mother care, rather than “baby viewing”;</li> <li>• Increase societal commitment to exclusivity;</li> <li>• Promote EBF among fathers and other family members.</li> </ul>	
<b>Day 12 – Week 6</b>	<ul style="list-style-type: none"> <li>• Include EBF support in family planning method selection and include LAM among choices;</li> <li>• Address maternal issues related to guilt/shame, frustration, fear, exhaustion, etc.;</li> <li>• Discourage pacifier use;</li> <li>• Increase prevalence of breastfeeding support groups in health care facilities.</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease societal stigma of breastfeeding;</li> <li>• Educate regarding benefits of breastfeeding and risks of supplementation;</li> <li>• Create safe, public spaces for breastfeeding;</li> <li>• Increase paid maternity leave where possible.</li> </ul>	<ul style="list-style-type: none"> <li>• Counter formula advertising with public health messages regarding human milk’s incomparability/superiority.</li> </ul>

	<b>Health Care System and Providers</b>	<b>Social, Economic, and Political Factors</b>	<b>Media and Marketing Practices</b>
<b>Week 6 – 12</b>	<ul style="list-style-type: none"> <li>• Increase support from nurses and peer support in clinical and home settings.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase paid maternity leave where possible.</li> </ul>	
<b>Months 4 – 6</b>	<ul style="list-style-type: none"> <li>• Train pediatricians in supporting optimal infant feeding, and treating breastfeeding problems such as cracked nipples and engorgement.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase compatibility of work and EBF by instituting lactation rooms, scheduled breaks for milk expression, in-house day care facilities, and increasing flexibility to work from home;</li> <li>• Educate day care workers regarding optimal infant feeding, and skills for feeding human milk;</li> <li>• Promote partnerships between employers and nearby day care facilities.</li> </ul>	

## **Programmatic Recommendations Suggested by This Review**

The following ten suggested actions are dependent on active multidisciplinary and multi-sectoral coordination and support. Those that demand little resource allocation may be encouraged for immediate action. For those that demand resources, it may be necessary to develop the cost savings arguments to support organizational or political change.

### **Health Care System and Providers**

1. Develop undergraduate curricula for all health care workers that include lactation support and counseling skills, addressing delays in lactogenesis, appropriate use of banked donor human milk, and introduction of family planning during breastfeeding, while continuing efforts to implement breastfeeding-friendly hospital practices.

This recommendation could be articulated by government public health entities and presented to medical boards, hospital accreditation groups, and professional organizations for action.

2. Expand and revise third party payment structure to cover all aspects of breastfeeding support.

While this issue is not specifically covered in the EBF literature, it is a common theme in the breastfeeding literature more generally. Having reviewed the literature, it is convincing that such support would also increase EBF. Currently, WIC is the only major provider that actively includes support for breastfeeding and EBF. Therefore, USBC or other entities may work with major third party payers to develop cost savings models for coding and increased compensation for lactation support, including direct services and anticipatory counseling. These models would be made available to the public and other insurance entities for consideration.

### **Social, Economic, and Political Factors**

#### **Socioeconomic:**

3. Initiate social marketing for demand creation (i.e., creating societal demand for protection, promotion, and support of breastfeeding) for all recommendations in support of exclusive breastfeeding, including improved health services, social and legislative support, and media and marketing practices.

Federal, state, and private donor seed funding is encouraged to support non-governmental organization (NGO) and other community-oriented activity in this area.

4. Develop community social marketing approaches for exclusive breastfeeding based on formative research for sub-populations, including: a) addressing inequities in early access to quality care, b) creating demand for reimbursement from third party payers, c) emphasizing maternal self-efficacy, d) supporting mother/baby care together to reduce excess health care utilization, and e) overcoming social and economic obstacles to exclusive breastfeeding.

USBC can encourage formative and translational research to provide the framework for targeted campaigns to address the specific social factors that create obstacles to exclusive breastfeeding in different sub-populations. Federal, state, and private donor seed funding is encouraged to support NGO and other community-oriented activity in this area.

### Political:

5. Promulgate federal and state legislation and regulation regarding aggressive marketing (i.e., legislate the International Code of Marketing of Breast-milk Substitutes), legality of breastfeeding wherever mothers can legally be present, tax incentives for child care/day care and for employers that provide paid maternity leave and workplace accommodations, and others, as needs arise.

This legislative action would depend on sufficient evidence-based research, demand creation, development and sponsorship of relevant pieces of legislation, and sufficient political will to pass them.

6. Establish and/or improve monitoring where legislation or regulation currently exists: third party coverage, medical facility adherence to the Ten Steps to Successful Breastfeeding, and WIC.

Government entities can create regulations based on existing and future health legislation and government position statements such as GAO reports. If no appropriate legislation or statements are extant, then the recommended action defers to number five.

### Media and Marketing Practices

7. Eliminate the distribution of free formula samples, gifts, and coupons to the public, with special attention to the impact of such activities at health care facilities and marketing at points of sale.

This may occur as a result of legislation, corporate action, and/or public activism.

8. Encourage or mandate regulation/self-regulation and monitoring by commercial formula manufacturers.

Although industry is cautious to avoid collusion, this issue could be framed as corporate social responsibility. The new Pharmaceutical Research and Manufacturers of America (PhRMA) Code on Interactions with Healthcare Professionals<sup>104</sup> is an example of self-regulation by industry.

9. Encourage or mandate self-regulation and monitoring by major broadcasting companies.

Advertising of alcoholic beverages and tobacco products is currently self-regulated by most major broadcasting companies according to guidelines promulgated by authoritative organizations and/or government entities. Commercial infant formula advertising should be similarly regulated.

10. Develop a series of public service announcements.

Building on the success of the DHHS Office on Women's Health National Breastfeeding Awareness Campaign,<sup>105</sup> despite the compromises that occurred, it is reasonable to encourage broader use of public service announcements and other media outlets to encourage EBF. Such encouragement may come from associations; federal, state, and local governments; USBC, and others.

## AFTERWORD

A recent analysis published as a letter in *Pediatrics*<sup>106</sup> noted that of the 362 federally funded research projects from 1994 – 1996 in the area of infant nutrition/breastfeeding/lactation, 31, or 8.6%, had a goal to increase breastfeeding. The author carried out a similar analysis of the 422 projects funded in a more recent period, 2003 – 2006, and found that only four, or less than 1%, specified a direct or indirect goal of increasing breastfeeding.

During this same decade, the quantity and quality of findings on the importance of breastfeeding, especially exclusive breastfeeding, for health and survival have increased significantly. Anything less than exclusive breastfeeding clearly carries risks.

Given these findings, this paper calls for broadening the awareness of the changes needed to increase exclusive breastfeeding. Increased federal, state, and other funding for health care providers, researchers, and planners; for social, economic/workplace, and political action; and towards media and marketing regulation is necessary if we are to enable women to choose and succeed in exclusive breastfeeding in the United States.

## ANNEX: ANNOTATED BIBLIOGRAPHY

### Health Care System and Providers

Citation	Setting	Study Design	Timing	Obstacle/ Constraint	Summary
Anderson AK, Damio G, Chapman DJ, Pérez-Escamilla R. Differential response to an exclusive breastfeeding peer counseling intervention: the role of ethnicity. <i>J Hum Lact.</i> 2007;23(1):16-23.	CT, USA	Pre- and post-intervention study	Up to 2 months pp	Lack of peer counselor; ethnicity	At two months postpartum, EBF in the intervention group was 11.4% among Puerto Ricans and 44.4% among non-Puerto Ricans ( $p < 0.008$ ). Multivariate logistic regression analyses: Mothers breastfed as children and women with antenatal intention were more likely to EBF. Those whose mothers lived in the United States were less likely to EBF at hospital discharge. At two months postpartum, non-Puerto Ricans had a significantly greater response to the intervention than Puerto Ricans (odds ratio, 6.40; 95% CI, 1.45, 28.33).
Broadfoot M, Britten J, Tappin DM, MacKenzie JM. The Baby Friendly Hospital Initiative and breast feeding rates in Scotland [electronic version]. <i>Arch Dis Child Fetal Neonatal Ed.</i> 2005;90:F114-F116.	Scotland, all maternity units	Observational study	0-3 days pp	Baby-Friendly hospital certification	Babies born in those units that had been awarded Baby-Friendly status were 28% ( $p > 0.001$ ) more likely to be exclusively breastfed at seven days postnatal age than those born where facility either was in process of becoming Baby-Friendly or had no initiative in place.
Chapman DJ, Damio G, Young S, Pérez-Escamilla R. Effectiveness of breastfeeding peer counseling in a low-income, predominantly Latina population: a randomized controlled trial. <i>Arch Pediatr Adolesc Med.</i> 2004;158:897-902.	Urban hospital serving a large population of low-income Latinas	Randomized, prospective, controlled trial; BF education only vs. BF education and peer counseling	Antenatal to 6 months pp	Lack of peer counselors: no impact on EBF	Counselors had positive effect on initiation and duration of breastfeeding, <i>but not on exclusivity</i> . Authors attribute this to counselors' lack of focus on EBF.
Chapman DJ, Pérez-Escamilla R. Identification of risk factors for delayed onset of lactation. <i>J Am Diet Assoc.</i> 1999;99(4):450-454.	CT, USA	Longitudinal cohort study	Onset of lactation	Lack of education re: milk production and onset of lactation	Women who are at risk for delayed onset of lactation need additional breastfeeding support during the first week postpartum. 31% of women had a delay beyond 72 hours of their milk increasing in volume, largely related to lack of infant suckling.

Citation	Setting	Study Design	Timing	Obstacle/ Constraint	Summary
Clifford TJ, Campbell MK, Speechley KN, Gorodzinsky F. Factors influencing full breastfeeding in a southwestern Ontario community: assessments at 1 week and at 6 months postpartum. <i>J Hum Lact.</i> 2006;22(3):292-304.	2 London (Ontario, Canada) hospitals providing full OB services w/ 4600 births annually	Cohort study	Birth	Anesthesia/ analgesia	Cox proportional hazards regression analysis showed that having received anesthesia/analgesia during labor and delivery, specifically epidurals and others, was associated with earlier cessation of EBF.
Cohen RJ, Brown KH, Rivera LL, Dewey KG. Promoting exclusive breastfeeding for 4-6 months in Honduras: attitudes of mothers and barriers to compliance. <i>J Hum Lact.</i> 1999;15(1):9-18.	Honduras, 2 maternity hospitals	Prospective/ retrospective; focus groups	0-180 days pp	Lack of support; misperceptions and fears	Breastfeeding problems in first weeks led to early cessation without staff support. Perceived time demand, concern that infant would accept solids less regularly, and fears of insufficiency of breast milk led to earlier cessation and diminished intensity (LBW infants).
Dewey KG, Nommsen-Rivers LA, Heinig MJ, Cohen RJ. Risk factors for suboptimal infant breastfeeding behavior, delayed onset of lactation, and excess neonatal weight loss. <i>Pediatrics.</i> 2003;112(3, pt 1):607-619.	CA, USA	Prospective cohort study	0-5 days pp	Maternal nutrition; primiparity; surgical birth	In a cohort of 280 women, maternal body mass index, primiparity (being a first time mother), and delivery through cesarean section all increased the risk for breastfeeding cessation. 22% of women had a delay beyond 72 hours of their milk increasing in volume (33% of first time mothers).
Fallon AB, Hegney D, O'Brien M, Brodribb W, Crepinsek M, Doolan J. An evaluation of a telephone-based postnatal support intervention for infant feeding in a regional Australian city. <i>Birth.</i> 2005;32(4):291-298.	Regional Australia; phone-based; private/public hospital patients	Prospective cohort study	2 days post discharge to 4 weeks; follow-up at 3 months pp	Lack of special lactation support; hospital setting	With special lactation support following births at private hospitals, mothers improved EBF duration, but this difference was no longer evident at three months postpartum. No effects observed for mothers attended at public hospital.
Halderman LD, Nelson AL. Impact of early postpartum administration of progestin-only hormonal contraceptives compared with nonhormonal contraceptives on short-term breast-feeding patterns. <i>Am J Obstet Gynecol.</i> 2002;186(6):1250-1258.	UCLA Medical Center, CA, USA	Prospective non-randomized trial	0-3 days pp	Immediate introduction of progestin-only methods: no impact on EBF	Progestin-only contraceptive methods administered before hospital discharge vs. nonhormonal methods. No difference on EBF or perception of insufficient milk production at four weeks.

Citation	Setting	Study Design	Timing	Obstacle/ Constraint	Summary
Howard CR, Howard FM, Lanphear B, Eberly S, deBlieck EA, Oakes D, Lawrence RA. Randomized clinical trial of pacifier use and bottle-feeding or cup feeding and their effect on breastfeeding. <i>Pediatrics</i> . 2003;111(3):511-518.	USA	Randomized controlled trial	Birth to 4 weeks pp	Pacifier use	EBF at four weeks was less likely among infants exposed to pacifiers (OR 1.5).
Hilson JA, Rasmussen KM, Kjolhede CL. Excessive weight gain during pregnancy is associated with earlier termination of breast-feeding among white women. <i>J Nutr</i> . 2006;136(1):140-146.	Hospital in Cooperstown, NY, USA and associated clinics in 3 nearby counties	Review of medical records	Antenatal	Rapid gestational weight gain	Underweight, overweight, and obese women who exceeded recommended gestational weight gain (GWG) had increased risk of early EBF cessation. In adjusted hazard analysis, these differences were significant. No interaction between pre-pregnancy BMI and GWG category on the duration of EBF. GWG above the Institute of Medicine recommendations was a significant factor ( $p < 0.02$ ).
Kurini N, Shiono PH. Early formula supplementation of breast-feeding. <i>Pediatrics</i> . 1991;88(4):745-750.	3 metropolitan Washington, D.C. hospitals, USA	Prospective cohort study	Antenatal; birth; 0-3 days pp	Lack of feeding on demand; lack of vaginal delivery	Feeding the baby on demand, having vaginal delivery, deciding to breastfeed before pregnancy, and initiating breastfeeding within six hours of delivery were all significantly predictive of exclusive breastfeeding. New mothers believed that formula supplementation was carried out “to give mother some rest.”
Martens PJ. Does breastfeeding education affect nursing staff beliefs, exclusive breastfeeding rates, and Baby-Friendly Hospital Initiative compliance? The experience of a small, rural Canadian hospital. <i>J Hum Lact</i> . 2000;16(4):309-318.	Small, rural Canadian hospitals	Pre- and post-training; control site	0-3 days pp	Lack of BFHI knowledge, skills and practices among nurses in maternity	Nurses given 1.5-hour breastfeeding in-service and optional written tutorial completed individually in next month. BFHI compliance and EBF rates rose. Control site experienced no change in BFHI compliance and a decrease in EBF rates. Non-compliance w/ Ten Steps led to less EBF, earlier formula introduction, and less duration of breastfeeding in general.

Citation	Setting	Study Design	Timing	Obstacle/ Constraint	Summary
Merten S, Dratva J, Ackermann-Liebrich U. Do Baby-Friendly hospitals influence breastfeeding duration on a national level? <i>Pediatrics</i> . 2005;116(5):e702-e708.	Switzerland	Cross-sectional and retrospective cohort study	Birth; 0-3 days pp	Lack of Ten Steps in hospital	Breastfeeding duration for infants born in BFHI hospitals, compared with infants born in other hospitals was longer if the hospital was in compliance w/ Ten Steps (20 weeks vs. 17 weeks for FBF, and 12 weeks vs. 6 weeks for EBF). If EBF in hospital, the median duration of exclusive, full, and any breastfeeding was longer than for those who had received water-based liquids or supplements in hospital. After controlling for medical problems before, during, and after delivery; type of delivery; well-being of mother; maternal smoking; maternal basal metabolic rate (BMR); nationality; education; work; and income; all BFHI factors were still significantly associated with the duration of exclusive, full, or any breastfeeding.
Morrow AL, Guerrero ML, Shults J, Calva JJ, Lutter C, Bravo J, Ruiz-Palacios G, Morrow RC, Butterfoss FD. Efficacy of home-based peer counselling to promote exclusive breastfeeding: a randomised controlled trial. <i>Lancet</i> . 1999;353(9160):1226-1231.	Mexico City	Randomized, controlled, community-based intervention trial	Antenatal; early weeks pp	Insufficient skilled counseling contacts	This study compared three intervention groups with different counseling frequencies (zero, three, and six visits). At three months pp, 67% of six-visit mothers EBF, 50% EBF in three-visit mothers, and 12% in control mothers. (Intervention vs. control, $p < 0.001$ ; six-visit vs. three-visit, $p < 0.02$ .) Breastfeeding duration was significantly longer ( $p < 0.02$ ) in intervention groups than controls.
Patel RR, Liebling RE, Murphy DJ. Effect of operative delivery in the second stage of labor on breastfeeding success. <i>Birth</i> . 2003;30(4):255-260.	UK	Prospective cohort study	Birth	Short sufficient hospital stay	While mode of delivery (vaginal or caesarean) showed no significant change in initiation or duration of EBF, length of hospital stay among women delivering by caesarean section led to more successful EBF experiences.
Pechlivani F, Vassilakou T, Sarafidou J, Zachou T, Anastasiou CA, Sidossis LS. Prevalence and determinants of exclusive breastfeeding during hospital stay in the area of Athens, Greece. <i>Acta Paediatr</i> . 2005;94(7):928-934.	Greece	Cross-sectional study	Birth; 0-3 days pp+	Intervention during labor and delivery; lack of rooming-in; lack of on-demand feeding	Logistic regression analysis revealed that type of delivery (OR 1.61, $p < 0.01$ ), rooming-in, and on-demand feeding are more important determinants of EBF than the socio-demographic parameters.

Citation	Setting	Study Design	Timing	Obstacle/Constraint	Summary
Petrova A, Hegyi T, Mehta R. Maternal race/ethnicity and one-month exclusive breastfeeding in association with the in-hospital feeding modality. <i>Breastfeed Med.</i> 2007;2(2):92-98.	UMDNJ/RWJMS, NJ, USA	Secondary analysis of randomized trial of neonatal hyperbilirubinemia prevention	0-3 days pp	Supplementation in hospital, mediated by race/ethnicity	In-hospital supplementation was associated with lower levels of EBF at one month. Supplementation rates reported by mothers varied with racial/ethnic groups (EBF in hospital reported by more than half of whites and Asians; lower in others) as did the association of EBF at one month with in-hospital supplementation. Blacks were least likely to report in-hospital supplementation, but Hispanics were least likely to EBF at one month.
Philipp BL, Malone KL, Cimo S, Merewood A. Sustained breastfeeding rates at a US Baby-Friendly hospital. <i>Pediatrics.</i> 2003;112(3, pt 1):e234-e236.	Boston Medical Center, MA, USA	Chart review	0-3 days pp	Lack of continued application of Ten Steps	Full implementation and continued application of the Ten Steps to Successful Breastfeeding had an extended positive impact on breastfeeding rates in a U.S. hospital setting. Non-statistically significant decrease in EBF over intervention.
Rowe-Murray HJ, Fisher JR. Baby Friendly hospital practices: cesarean section is a persistent barrier to early initiation of breastfeeding. <i>Birth.</i> 2002;29(2):124-131.	Australia	Prospective longitudinal study	Birth, hospital stay	Need to act to overcome surgical delivery	Mode of delivery had a small but significant effect on duration of partial and EBF. Women who delivered by caesarean section were delayed in breastfeeding initiation more related to hospital practices than biological effects of surgical delivery.
Scott JA, Landers MC, Hughes RM, Binns CW. Psychosocial factors associated with the abandonment of breastfeeding prior to hospital discharge. <i>J Hum Lact.</i> 2001;17(1):24-30.	Australia	Prospective study	Pre-/inter-conception; 0-3 days to 4 weeks pp.	Low level of preconception commitment; lack of social support; lack of exposure to BF	Low commitment levels (deciding to breastfeed after becoming pregnant), lack of social support (by the father), and lack of prior exposure to breastfeeding (through the mother's mother) were all risk factors for abandoning breastfeeding while still in the hospital.
Scott JA, Binns CW, Oddy WH, Graham KI. Predictors of breastfeeding duration: evidence from a cohort study. <i>Pediatrics.</i> 2006;117(4):e646-e655.	Australia	Cohort study	Up to 4 weeks pp	Pacifier use	Age of infant when pacifier first introduced <4 weeks 1.92 (1.39-2.64) and breastfeeding problems at or before 4 weeks 1.75 (1.35-2.23) were associated with increased cessation of EBF before six months.

Citation	Setting	Study Design	Timing	Obstacle/ Constraint	Summary
Sikorski J, Renfrew MJ, Pindoria S, Wade A. Support for breastfeeding mothers: a systematic review. <i>Paediatr Perinat Epidemiol.</i> 2003;17(4):407-417.	UK	Systematic review of 20 randomized and quasi-randomized controlled trials	Postpartum	Lay vs. professional support	Support had a larger positive effect on duration of EBF than on duration of partial breastfeeding. But when support was divided into professional vs. lay, professional support only influenced duration of partial breastfeeding while lay support only influenced duration of EBF.
Taveras EM, Li R, Grummer-Strawn L, Richardson M, Marshall R, Rêgo VH, Miroshnik I, Lieu TA. Opinions and practices of clinicians associated with continuation of exclusive breastfeeding. <i>Pediatrics.</i> 2004;113(4):e283-e290.	Harvard Vanguard Medical Associates, Boston, MA, USA	Prospective cohort study and cross-sectional study	0-12 weeks pp	Physician knowledge and skills; formula introduction	Clinicians' limited time to preventively address breastfeeding problems; obstetricians lack of knowledge regarding milk production; pediatricians lack of knowledge of breastfeeding problems; introduction of formula to promote weight gain; and problems w/ infant's latch all were negatively associated with EBF.
Wallace LM, Dunn OM, Alder EM, Inch S, Hills RK, Law SM. A randomised-controlled trial in England of a postnatal midwifery intervention on breast-feeding duration. <i>Midwifery.</i> 2006;22(3):262-273.	4 maternity hospitals, English Midlands, UK	Retrospective randomized controlled trial	Birth	Lack of skin-to-skin contact	42 out of 97 (43%) babies given skin-to-skin contact were partially or exclusively breastfeeding at four months compared with 40 out of 100 (40%) of babies in the routine care group.
Wright CM, Parkinson K, Scott J. Breast-feeding in a UK urban context: who breast-feeds, for how long and does it matter? <i>Public Health Nutr.</i> 2006;9(6):686-691.	UK	Prospective birth cohort study using questionnaires	0-3 days pp	Supplementary feeds in hospital	Supplementary feeds in the maternity unit were associated with a tenfold increase in odds of giving up breastfeeding by discharge (p=0.001) Non-breastfed infants had 50% more family doctor contacts up to four months of age (p=0.005).
Yarmo K, Malin CR. Reaching minority groups with culturally competent prenatal health education. Paper presented at: 133 <sup>rd</sup> Annual Meeting & Exposition of the American Public Health Association; December 2005; Philadelphia, PA.	Fresno, CA, USA	Intervention study	Antenatal to 6 weeks pp	Provider knowledge and skills	Culturally competent practice was used in a prenatal health education curriculum and support group model to reach Latina women of childbearing age. More than 60 instructors from 27 agencies were trained with an adapted curriculum to serve several minority groups (African-American, Hmong, Lao, Mixteco, and Russian). The program reported 63% EBF six weeks postpartum compared to 34% in the general local population, 2001.

## Social, Economic, and Political Factors

Citation	Setting	Study Design	Timing	Obstacle/Constraint	Summary
Anderson AK, Damio G, Young S, Chapman DJ, Pérez-Escamilla R. A randomized trial assessing the efficacy of peer counseling on exclusive breastfeeding in a predominantly Latina low-income community. <i>Arch Pediatr Adolesc Med.</i> 2005;159:836-841.	Hartford, CT, USA	Randomized, controlled trial	Antenatal to 3 months pp	Lack of counseling on EBF	Participants received either peer support for EBF as well as a support group [PC] or only the support group [CG]. At discharge, 24% in the CG compared w/ 9% in the PC had not initiated breastfeeding, w/ 56% & 41%, respectively, non-EBF. At three months pp, 97% in the CG and 73% in the PC were not EBF, relative risk 1.33 (1.14,1.56) during the previous 24 hours. The likelihood of non-EBF throughout the first three months was significantly higher for the CG than the PC (99% vs. 79%; RR 1.24 (1.09,1.41).
Baker M, Milligan K. Maternal employment, breastfeeding, and health: evidence from maternity leave mandates. <i>J Health Econ.</i> 2008;27(4):871-887.	Canada	National longitudinal study of children and youth	12 days to 6 months pp	Lack of sufficiently long paid maternity leave	Extended maternity leave mandates increased EBF duration over one-half month, and increased proportion of mother-child pairs attaining six months of EBF.
Cernadas JM, Noceda G, Barrera L, Martinez AM, Garsd A. Maternal and perinatal factors influencing the duration of exclusive breastfeeding during the first 6 months of life. <i>J Hum Lact.</i> 2003;19(2):136-144.	Argentina	Observational and longitudinal study	Birth to 6 months	Attitudes; lack of bonding or suckling technique; nipple problems	Positive maternal attitudes towards breastfeeding, adequate family support, good mother-infant bonding, appropriate suckling technique, and the absence of nipple problems led to longer duration of EBF, controlling for biological and demographic variables.
Chapman, DJ, Damio G, Young S, Pérez-Escamilla R. Effectiveness of breastfeeding peer counseling in a low-income, predominantly Latina population: a randomized controlled trial. <i>Arch Pediatr Adolesc Med.</i> 2004;158:897-902.	Urban hospital serving a large population of low-income Latinas	Randomized, prospective, controlled trial; BF education only vs. BF education and peer counseling	Antenatal to 6 months pp	Lack of peer counselors	This study examined the impact of a peer counseling program on initiation and duration of breastfeeding. Peer counselors had a positive impact on initiation, duration, and overall experience of breastfeeding women.

Citation	Setting	Study Design	Timing	Obstacle/Constraint	Summary
Clifford TJ, Campbell MK, Speechley KN, Gorodzinsky F. Factors influencing full breastfeeding in a southwestern Ontario community: assessments at 1 week and 6 months postpartum. <i>J Hum Lact.</i> 2006;22(3):292-304.	2 London (Ontario, Canada) hospitals providing full OB services w/ 4600 births annually	Cohort study	Antenatal to return to work	Maternal employment prior to delivery; anxiety; smoking; shift work	Variables with negative impact on EBF: smoking, maternal shift work, reported elevated anxiety, full time employment outside the home prior to delivery.
Dearden KA, Quan le N, Do M, Marsh DR, Pachon H, Schroeder DG, Lang TT. Work outside the home is the primary barrier to exclusive breastfeeding in rural Viet Nam: insights from mothers who exclusively breastfed and worked. <i>Food Nutr Bull</i> 2002;23(4):101-108.	Rural northern Vietnam	Cross-sectional, quantitative/qualitative assessment	Birth; 0-6 months pp	Maternal employment; lack of support	Lack of options for EBF when working outside the home. Not having secured support from others led to early cessation of EBF.
Dubois L, Girard M. Social determinants of initiation, duration and exclusivity of breastfeeding at the population level: the results of the Longitudinal Study of Child Development in Quebec (ELDEQ 1998-2002). <i>Can J Public Health.</i> 2003;94(4):300-305.	Quebec, Canada	Analysis of pre-existing data from the Longitudinal Study of Child Development in Quebec 1998-2002		None	Being exclusively breastfed for at least four months was influenced by mothers' age, followed by mothers' education level. Family income, family type, and parents' working situation did not influence EBF at four months.
Fein SB, Roe B. The effect of work status on initiation and duration of breast-feeding. <i>Am J Public Health.</i> 1998;88(7):1042-1046.	USA	Cross-sectional observational study	Antenatal	Expectation of full time work; part time, full time work	Expecting to work part time had no effect on breastfeeding. Expecting to work full time decreased the probability of breastfeeding. When compared to not working, full time workers stopped breastfeeding 8.6 weeks earlier. Part time work decreased duration of breastfeeding less than full time work.
Flores M, Rivera Pasquel M, Maulén I, Rivera J. Exclusive breastfeeding in three rural localities in Mexico. <i>J Hum Lact.</i> 2005;21(3):276-283.	Morelos, Mexico	Observational prospective cohort study	Birth; 0-6 months pp	Maternal employment outside home	EBF inversely related to maternal age, w/ 14-20 y.o. mothers most likely to EBF, then 21-30, then 31-40. Heavier baby associated with less EBF (weight-for-age & weight-for-length). More diarrhea associated with less breastfeeding. Older moms, moms working outside home, and higher SES were all negatively associated w/ EBF.

Citation	Setting	Study Design	Timing	Obstacle/Constraint	Summary
Hawkins SS, Griffiths LJ, Dezateux C, Law C. The Millennium Cohort Study Child Health Group. Maternal employment and breast-feeding initiation: findings from the Millennium Cohort Study. <i>Paediatr Perinat Epidemiol.</i> 2007;21(3):242-247.	Great Britain and Ireland, UK	Retrospective, controlled for confounders	3-6 months pp	Planning to work	14,830 white mothers provided information on infant feeding history and employment at nine months pp. Women employed full time were less likely to initiate breastfeeding than mothers who were not employed or students, adjusting for confounding factors [adjusted risk ratio (aRR) 0.92 (0.89, 0.96)]; those who returned to work within four months postpartum were less likely to start breastfeeding than women who returned at five or six months [aRR 0.95 (0.92, 0.99)]; and women who returned within the first six weeks were much less likely to initiate breastfeeding [aRR 0.85 (0.77, 0.94)]. Mothers returning for financial reasons were also less likely to initiate breastfeeding [aRR 0.96 (0.93, 0.99)].
Hörnell A, Hofvander Y, Kylberg E. Solids and formula: association with pattern and duration of breastfeeding. <i>Pediatrics.</i> 2001;107(3):e38.	Sweden	Descriptive longitudinal, prospective study of introduction of any formula or solids on any or predominant breastfeeding		Any formula introduction (not any solids)	506 mother-infant pairs were followed with diaries and visits. Introduction of solids was associated with no or minor changes in breastfeeding frequency and suckling duration. In infants given formula, the breastfeeding frequency and suckling duration declined swiftly. The younger an infant at the start of formula feeding, the shorter the breastfeeding duration.
Johnston ML, Esposito N. Barriers and facilitators for breastfeeding among working women in the United States. <i>J Obstet Gynecol Neonatal Nurs.</i> 2007;36(1):9-20.	USA	Review	12 days to 6 months pp	Employment situation; lack of characteristics and planning/support groups	Twenty studies analyzed using an ecologic framework. Lactation was facilitated when: working mothers possessed certain personal characteristics; working mothers developed a strategic plan; breastfeeding was promoted; social support was available; support groups were utilized. EBF can be increased using tactics geared toward the mother, her social network, and the entire community.
Kelly YJ, Watt RG. Breast-feeding initiation and exclusive duration at 6 months by social class—results from the Millennium Cohort Study. <i>Public Health Nutr.</i> 2005;8(4):417-421.	UK	Millennium Cohort Study	1-4 months pp	Workplace factors (blue collar jobs)	Women in routine jobs were less likely to exclusively breastfeed their infants at one month (OR 0.42, 95% CI 0.36-0.50) and four months (OR 0.5, 95% CI 0.31-0.77) compared with women in higher managerial and professional occupations.

Citation	Setting	Study Design	Timing	Obstacle/Constraint	Summary
Kronborg H, Vaeth M. The influence of psychosocial factors on the duration of breastfeeding. <i>Scand J Public Health</i> . 2004;32(3):210-216.	Denmark	Observational cohort Study	Birth; 0-17 weeks pp	Lack of self-efficacy, knowledge, intent and/or prior experience	Increased maternal self-efficacy, confidence, knowledge, intent, and prior experience w/ breastfeeding led to increased duration of EBF. Knowledge was only significant among primiparous mothers. Increased maternal education also had a positive effect on breastfeeding duration. 51% of women who ceased breastfeeding did so during the first five weeks postpartum.
Kurini N, Shiono PH. Early formula supplementation of breastfeeding. <i>Pediatrics</i> . 1991;88(4):745-750.	3 metropolitan Washington, D.C. hospitals, USA	Prospective survey	Antenatal; birth, 0-3 days pp	Lack of intention; initiating within 6 hours, and/or feeding on demand; method of delivery	Feeding the baby on demand, having vaginal delivery, deciding to breastfeed before pregnancy, and initiating breastfeeding within six hours of delivery were all significantly predictive of exclusive breastfeeding. New mothers believed that formula supplementation was carried out "to give mother some rest."
Lee Benítez Y, Parrilla-Rodriguez AM, Ríos P. Effectiveness in the implantation of law 155 of 2002 ordering the designation of spaces for breastfeeding in government agencies. <i>P R Health Sci J</i> . 2005;24(4):297-301.	PR, USA	Cross-sectional telephone interview, descriptive study of representative government agencies	6 weeks pp+	Lack of law enforcement	Public Law 427, 2000, and Law 155, 2002, designate breastfeeding spaces in the workplace. Compliance was assessed, and findings included that all of the responding agencies had knowledge about the law, but only 50% had set up and equipped the spaces. Of these, all had a table, a chair, and an electric outlet; 43% had running water; and 71% provided a refrigerator. 53% of the agencies reported having received verification communications. 61% reported having a written public policy in support of breastfeeding for working mothers. 54% offered some type of orientation to employees regarding their breastfeeding rights.
Li R, Darling N, Maurice E, Barker L, Grummer-Strawn LM. Breastfeeding rates in the United States by characteristics of the child, mother, or family: the 2002 National Immunization Survey. <i>Pediatrics</i> . 2005;115(1):e31-e37.	USA	National Immunization Survey: random digit dialing to households with children 19-35 months old	Pre-/inter-conception	Workplace; beliefs regarding workplace	Women going back to work/school find lack of support in the workplace. Belief that infants cannot get sufficient nutrition after three months. 32% of U.S. adults surveyed said infants needed cereal by three months of age. Day care staffs are not educated on how to support EBF.

Citation	Setting	Study Design	Timing	Obstacle/ Constraint	Summary
Li R, Hsia J, Fridinger F, Hussain A, Benton-Davis S, Grummer-Strawn L. Public beliefs about breastfeeding policies in various settings. <i>J Am Diet Assoc.</i> 2004;104(7):1162-1168.	USA	Cross-sectional observational study	Pre-/inter-conception	Belief that support is insufficient	Many Americans, especially African Americans and those with low household income, believe that women who breastfeed need extra support both at work and in public places. A variety of policy strategies would be appropriate to create a favorable environment for breastfeeding.
Li R, Rock VJ, Grummer-Strawn L. Changes in public attitudes toward breastfeeding in the United States, 1999-2003. <i>J Am Diet Assoc.</i> 2007;107(1):122-127.	USA	Cross-sectional observational study	Pre-/inter-conception	Knowledge and beliefs	The % of respondents in agreement with the statement, "Infant formula is as good as breast milk," increased significantly from 14.3% in 1999 to 25.7% in 2003. The increase was particularly notable among individuals from lower SES.
Li R, Fridinger F, Grummer-Strawn L. Public perceptions on breastfeeding constraints. <i>J Hum Lact.</i> 2002;18(3):227-235.	USA	Observational study	Pre-/inter-conception	Knowledge and beliefs	U.S. adults (45%) said the breastfeeding mother has to give up too many lifestyle habits, 31% thought that babies ought to be fed cereal or baby food by three months of age, 31% said that one-year-olds should not be breastfed, and 27% considered public breastfeeding embarrassing. More negative perceptions among non-whites, people <30 or >65 years, and those w/ low income and less education.
Ludvigsson JF, Ludvigsson J. Socio-economic determinants, maternal smoking and coffee consumption, and exclusive breastfeeding in 10205 children. <i>Acta Paediatr.</i> 2005;94(9):1310-1319.	Sweden	Prospective cohort study	Antenatal; 0-6 months pp	Smoking and dose of smoking; employment	Risk factors for EBF in descending order of AOR: maternal smoking, low maternal education, maternal employment <3 months during pregnancy, paternal age ≤29 years, maternal age ≤29 years, low paternal education.
Merten S, Dratva J, Ackermann-Liebrich U. Do Baby-Friendly hospitals influence breastfeeding duration on a national level? <i>Pediatrics.</i> 2005;116(5):e702-e708.	Switzerland	Cross-sectional and retrospective cohort study	Birth; 0-3 days pp	Type of delivery; well-being of mother; smoking; maternal BMI; nationality; work	The type of delivery, well-being of the mother, maternal smoking, maternal BMI, nationality, education, work, and income were all still significantly associated with the duration of full, exclusive, or any breastfeeding after controlling for medical problems before, during, and after delivery.

Citation	Setting	Study Design	Timing	Obstacle/Constraint	Summary
Osis MJ, Duarte GA, de Pádua KS, Hardy E, Sandoval LE, Bento SF. Exclusive breastfeeding among working women with free daycare available at workplace. <i>Rev Saude Publica</i> . 2004;38(2):172-179.	USA	Qualitative, semi-structured interviews	Birth; 0-6 months pp	Workplace day care	The availability of a free day care center at the workplace seems an important aspect to breastfeeding maintenance after women go back to work, especially for EBF.
Pechlivani F, Vassilakou T, Sarafidou J, Zachou T, Anastasiou CA, Sidossis LS. Prevalence and determinants of exclusive breastfeeding during hospital stay in the area of Athens, Greece. <i>Acta Paediatr</i> . 2005;94(7):928-934.	Greece	Cross-sectional study	Birth; 0-3 days pp+	Poor information	Logistic regression analysis revealed that the source of information received about breastfeeding is a more important determinant of EBF than the socio-demographic parameters.
Raju TN. Continued barriers for breast-feeding in public and the workplace. <i>J Pediatrics</i> . 2006;148(5):677-679.	USA	Commentary	12 days to 12 weeks pp+	Workplace; lack of legislation	Workplace: worse for poor women, lack of privacy and time to pump or feed, intolerance of infant in work environment, day care is at too great of a distance from work. There is a lack of supportive legislation.
Ruchala PL, Halstead L. The postpartum experience of low-risk women: a time of adjustment and change. <i>Matern Child Nurs J</i> . 1994;22(3):83-89.	USA	Retrospective interviews	0 days to 6 weeks pp	Short hospital stay; lack of recuperative time	Fatigue was identified as an underlying factor for many issues during this time period, including physical complications, emotional changes, and changes in relationships. Short hospital stays left women feeling as if they had too little time to recuperate before they were discharged.
Ryan AS, Zhou W. Lower breastfeeding rates persist among the special supplemental nutrition program for women, infants, and children participants, 1978-2003. <i>Pediatrics</i> . 2006;117(4):1136-1146.	USA	Cross-sectional cohort study	3 days to 6 months pp	WIC	Demographic factors predict breastfeeding initiation: some college education, living in western U.S., not participating in WIC, infant of normal birth weight, primipara not working outside home. For mothers of infants six months of age, WIC status was strongest determinant of not breastfeeding. Non-WIC mothers were more than 1.5 times more likely to be EBF at six months than mothers who participated in WIC.
Scott JA, Binns CW, Oddy WH, Graham KI. Predictors of breastfeeding duration: evidence from a cohort study. <i>Pediatrics</i> . 2006;117(4):e646-e655.	Australia	Cohort study	Preconception; antenatal	Lack of planned pregnancy; attitude; paternal influence; smoking	(preconception) Maternal age not associated w/ duration of EBF. Planned pregnancy hazard ratio 0.76 (CI 0.60-0.98), mothers infant feeding attitude hazard ratio 0.97 (0.96-0.99), (antenatal) father's feeding preference hazard ratio 0.71 (0.55-0.91) associated w/ less EBF cessation. Pregnancy smoking associated w/ increased risk of EBF cessation: hazard ratio 1.32 (1.02-1.71).

Citation	Setting	Study Design	Timing	Obstacle/Constraint	Summary
Taylor JS, Cabral HJ. Are women with an unintended pregnancy less likely to breastfeed? <i>J Fam Pract.</i> 2002;51(5):431-436.	USA	Secondary data analysis of the 1995 Cycle 5 of the National Survey of Family Growth	Preconception	Unplanned pregnancy	A strong inverse association between unwanted pregnancies and breastfeeding was observed among white women only. Education for women with unintended pregnancies may improve breastfeeding rates and subsequently, the health of women and infants.

## Media and Marketing Practices

Citation	Setting	Study Design	Timing	Obstacle/Constraint	Summary
Dusdieker LB, Dungy CI, Losch ME. Prenatal office practices regarding infant feeding choices. <i>Clin Pediatr.</i> 2006;45(9):841-845.	IA, USA	Survey	Antenatal	Office samples	Free formula samples offered in 73% of family practice offices, 54% of obstetrician/gynecologist offices, and 36% of nurse-midwife offices. Formula feeding and breastfeeding pamphlets readily available at all.
Donnelly A, Snowden HM, Renfrew MJ, Woolridge MW. Commercial hospital discharge packs for breastfeeding women. <i>Birth.</i> 2001;28(1):63-64.	UK	Nine randomized controlled trials	0-3 days pp	Commercial formula discharge packs	Meta-analysis showed giving breastfeeding women a commercial formula discharge pack (w/ or w/o formula) decreased EBF at any point in time from 0-6 months postpartum. However, the packs showed no significant effect upon earlier termination of non-EBF.
Dungy CI, Christensen-Szalanski J, Losch M, Russell D. Effect of discharge samples on duration of breast-feeding. <i>Pediatrics.</i> 1992;90(2, pt 1):233-237.	IA, USA	Randomized controlled cohort trial	0-3 days pp	Commercial formula discharge packs	Women w/ discharge pack w/ pump & no infant formula continued EBF for more weeks (mean = 4.2 weeks) than women receiving infant formula in discharge packs (mean = 2.8 weeks). Women who said that ease of nighttime breastfeeding was an important consideration were more likely to breastfeed over the entire eight-week period if they received the pump rather than infant formula (p<0.05).
Eastham CA, Rosenberg KD, Sandoval AP. Differential effect of formula discharge packs on breastfeeding by maternal race/ethnicity. Poster presented at: 133 <sup>rd</sup> Annual Meeting & Exposition of the American Public Health Association; December 2005; Philadelphia, PA.	USA	PRAMS, logistic regression	Hospital discharge	Commercial formula discharge packs	Women who did not receive discharge packs containing formula were more likely to be exclusively breastfeeding at three weeks postpartum (OR 1.52, CI 1.12, 2.05).
Frank DA, Wirtz SJ, Sorenson JR, Heeren T. Commercial discharge packs and breast-feeding counseling: effects on infant-feeding practices in a randomized trial. <i>Pediatrics.</i> 1987;80(6):845-854.	Boston City Hospital, MA, USA	Randomized controlled trial	Hospital discharge	Commercial formula discharge packs	Women who received the research discharge pack, compared with those who received the commercial pack, were more likely to prolong exclusive breastfeeding (p<0.004, one-tailed).

Citation	Setting	Study Design	Timing	Obstacle/Constraint	Summary
Greiner T, Latham MC. The influence of infant food advertising on infant feeding practices in St. Vincent. <i>Int J Health Serv.</i> 1982;12(1):53-75.	Caribbean	Survey	Ongoing	Advertising	The results of two multiple regression analyses suggested that the more a mother was influenced, directly or indirectly through the provider, by brand name infant food advertising, the sooner she began to bottle feed.
Howard CR, Weitzman M, Lawrence R, Howard FM. Antenatal formula advertising: another potential threat to breast-feeding. <i>Pediatrics.</i> 1994;94(1):102-104.	Rochester General Hospital, Rochester, NY, USA	Commentary	Hospital discharge	Advertising	Advertisement supports mixed/formula. In subgroup analyses, women with uncertain goals for breastfeeding or goals of 12 weeks or less experienced shortened exclusive (hazard ratio 1.53, 95% CI 1.06, 2.21), full (hazard ratio 1.70, 95% CI 1.18, 2.48), and overall (hazard ratio 1.75, 95% CI 1.16, 2.64) breastfeeding duration when exposed to the commercial intervention.

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