

# Breastfeeding: Population-Based Perspectives

Miriam H. Labbok, MD, MPH, IBCLC, FACPM, FABM, FILCA

## KEYWORDS

- Breastfeeding • Innocenti • Public health frameworks • Policy • Programs
- Woman-centered care

## KEY POINTS

- Breastfeeding initiation has increased over the last 2 decades in the United States; increases in optimal breastfeeding lag.
- The number of published research studies has increased significantly, despite little dedicated federal funding for breastfeeding translational and programmatic research.
- Sociocultural factors, such as migration, ethnic belief systems, subtle discrimination, and social and other media, as well as political factors, such as laws and regulations, also create barriers to breastfeeding decisions and practices.
- The lack of guaranteed paid maternity leave and governmental provision of free formula immediately after birth in the United States, in contrast to the rest of North America and most countries in the world, creates an artificial short-term economic benefit for the use of human milk substitutes.
- The US Affordable Care Act offers new support for preventive health, including support for breastfeeding and for maintaining lactation after return to work.
- Health care practices and systems must change to cease creating barriers to breastfeeding.
- Clinicians have an essential role to play today in supporting needed changes in medical education and practice modifications based on the new and increasing research on how best to support optimal infant feeding.

## INTRODUCTION

Optimal infant feeding is defined as exclusive breastfeeding for 6 months, followed by continued breastfeeding with age-appropriate complementary feeding for at least 1 year<sup>1</sup> or up to 2 years or longer.<sup>2</sup> Immediate postpartum skin-to-skin contact with early initiation is also considered among the optimal practices for breastfeeding success.<sup>3</sup> For infants, lack of optimal breastfeeding is associated with increased infectious

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Carolina Global Breastfeeding Institute (CGBI), Department of Maternal and Child Health, Gillings School of Global Public Health, University of North Carolina, CB#7445, Chapel Hill, NC 27599-7445, USA

E-mail address: [labbok@unc.edu](mailto:labbok@unc.edu)

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diseases, gut diseases, diabetes, certain cancers,<sup>4</sup> and heart health risks such as obesity and hypertension.<sup>5</sup> Mothers, too, suffer from lack of breastfeeding in that they have increased risk of breast and ovarian cancers, slower postpartum uterine recovery, diabetes, and other risks.<sup>4</sup> These findings have created an increased interest among pediatricians and other clinicians in supporting breastfeeding.

Interest in breastfeeding increased at the global policy level in the 1990s. Mr James Grant, Executive Director of the United Nations Children's Fund (UNICEF), 1980 to 1995, often noted that "breastfeeding is the only natural safety net against being born into poverty." He considered breastfeeding "the great equalizer," because babies from all social or economic backgrounds who are optimally fed have an equal start on a healthy life. Although less was known in that decade about the specific health impacts of breastfeeding, population-level data were clear that lack of breastfeeding is extremely costly, in terms of excess mortality<sup>6</sup> and excess health care costs for mother and child, resulting in loss of productive life years. Breastfeeding not only reduces risk of disease, it also supports some natural birth spacing by suppressing the hormones that induce ovulation. Breastfeeding plays an important role in slowing population growth, especially in the poorer countries. As Mr Grant also observed, "How many of us are aware that if there were no breastfeeding tomorrow, births would increase by an estimated 20 to 30 per cent?"<sup>7</sup>

This population-based perspective was vital to support global action to protect, promote, and support breastfeeding, and served as the basis for the World Health Organization (WHO)/UNICEF Policymakers Meeting on "Breastfeeding in the 1990s: A Global Initiative," which led to the signing of the Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding on August 1, 1990.<sup>8</sup> At that time, less than optimal breastfeeding was estimated to cause 3000 to 4000 deaths in infants and young children each day. As a result of the progress that has been made in support of exclusive breastfeeding and other child survival interventions in the last 2 decades, the daily death count has been reduced by about 35%,<sup>9</sup> allowing a reduced estimate number of daily deaths from less than optimal breastfeeding of around 2000 each day. Although this figure reflects the real improvement in breastfeeding,<sup>10</sup> it also remains a highly unacceptable toll from a preventable cause.

The observed progress in breastfeeding rates over the last 20 years was spearheaded globally by UNICEF and WHO, working together for change. The 1990 WHO/UNICEF/US Agency for International Development/Sida Innocenti Declaration called for all nations to implement 4 operational goals by 1995: (1) appoint a national breastfeeding coordinator of appropriate authority, and establish a multisectoral national breastfeeding committee composed of representatives from relevant government departments, nongovernmental organizations (NGOs), and health professional associations; (2) ensure that every facility providing maternity services fully practices all 10 of the *Ten Steps to Successful Breastfeeding* set out in the joint WHO/UNICEF statement *Protecting, Promoting and Supporting Breastfeeding: the Special Role of Maternity Services*; (3) take action to give effect to the principles and aim of all articles of the *International Code of Marketing of Breast-Milk Substitutes* and subsequent relevant World Health Assembly resolutions in their entirety; and (4) enact imaginative legislation protecting the breastfeeding rights of working women and establish means for its enforcement.<sup>11</sup>

The United States, although a signatory on the Innocenti Declaration of 1990, has been slower or has taken no action on the 4 Innocenti operational targets: development of a national committee and authority, the baby-friendly hospital initiative, legislation supporting the *International Code of Marketing of Breast-Milk Substitutes*, and paid maternity leave with workplace accommodation. Other countries have been

more closely in tune with the global action plan. Infant mortality in the United States is the highest among countries of similar economic status. Although much of this mortality is attributable to a high rate of prematurity and low birth weight, the United States does better than most countries at keeping these newborns alive. In contrast, the mortality among full-term births is higher than other countries,<sup>12</sup> and a substantial part of this is caused by illnesses such as respiratory disease, sudden infant death syndrome, and sepsis, which could be reduced by increased breastfeeding.

This article explores the progress and trends in breastfeeding rates and research over the past decades, highlighting the sociocultural issues, politics, and public health thinking over the last decade that are increasingly supporting an enabling environment in which all women in North America have unbiased information on which to decide their feeding plan and succeed with their plans.

## PROGRESS

In the United States, the Healthy People 2010 goals for breastfeeding were to have 75% of mothers breastfeed in the early postpartum, continued breastfeeding by 50% at 6 months and 25% at 1 year, with exclusive breastfeeding by 40% at 3 months and 17% at 6 months.<sup>13</sup> Public health goals for breastfeeding are set to stimulate action both in clinical practices and in public health programming. Because of progress in breastfeeding rates, new US public health goals are now:

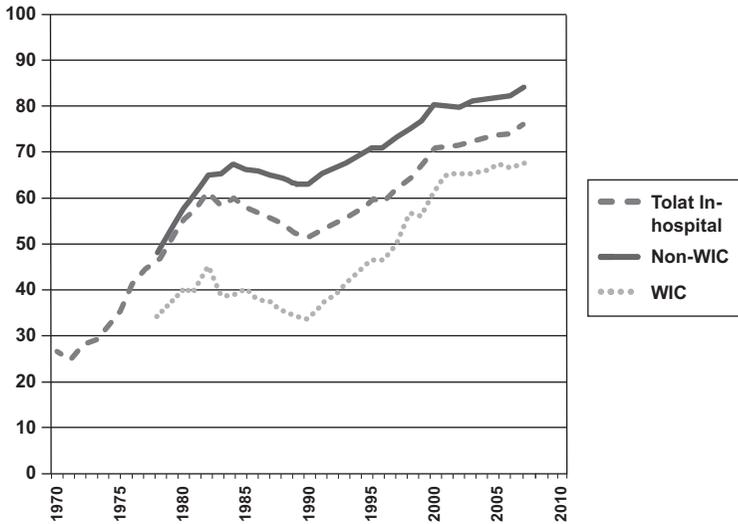
- Initiation of any breastfeeding, 81.9%; continued breastfeeding to 6 months, 60.6%; continued breastfeeding to 1 year, 34.1%; exclusive breastfeeding to 3 months, 46.2%; and exclusive breastfeeding to 6 months, 25.5%.<sup>13</sup>

Additional goals set include:

- Increase the proportion of employers who have worksite lactation support programs to 38%;
- Reduce the proportion of breastfed newborns who receive formula supplementation within the first 2 days of life to 14.2%; and
- Increase the proportion of live births that occur in facilities that provide recommended care for lactating mothers and their babies to 8.1%.

How did the need to set new goals arise? Breastfeeding, over the last 2 decades, has increasingly been recognized as a major component of reducing infant and child mortality globally<sup>6,14,15</sup> and increasingly recognized in national public health programs in North America. The trends in breastfeeding initiation and exclusive breastfeeding from 1999 to 2009 are shown in **Fig. 1** and **Table 1**. These data are not fully comparable, because the definition used internationally is generally the rate of exclusive breastfeeding among all infants aged 0 to 5 months, and the definition used in the Canadian and US data is exclusive breastfeeding until the sixth month of life.

Rates of breastfeeding initiation are on the increase in North America. Specifically in the United States, breastfeeding initiation has increased above the 2010 goal, although increases in optimal breastfeeding exclusivity and duration are lagging. Historically, the United States experienced a setback in the 1980s, such that the rate achieved by 1982 was not seen again until the latter half of the 1990s. The full explanation of this setback has not been adequately studied, but may have been a combination of 3 factors: increasing special supplemental nutrition program for women, infants, and children (WIC) enrollment, with concomitant free supplies of commercial formula; increased advertising to the public and to hospitals by formula



**Fig. 1.** Trends in breastfeeding initiation in the United States: national/total, women, infants, and children (WIC) population, and non-WIC populations: Ross survey data to 1999. (Courtesy of CDC National Immunization Survey 2000–2007; with permission.)

companies; and, possibly, attempts by many women to breastfeed in the 1970s with little support, resulting in lack of attempts with subsequent children.

In 1990, 2 important contributions to breastfeeding support occurred. The Innocenti Declaration was signed by the United States, and Dr Audrey Nora, at the time Associate Administrator, Maternal and Child Health, Health Services and Research Administration, attempted to jumpstart activities. However, the inclusion of formula companies in the US effort may have contributed to its short duration. The second important contribution was that of Catherine Bertini, then Assistant Secretary of

**Table 1**

**Reported breastfeeding rates (%) in selected countries: rates of initiation, or any, breastfeeding and rates of exclusive breastfeeding in the first 6 months of life**

Year	Breastfeeding Initiation Rates			Exclusive Breastfeeding in the First 6 mo		
	Canada <sup>a</sup>	Mexico <sup>b</sup>	United States <sup>c</sup>	Canada	Mexico	United States
1999	—	92.3	67.2	—	20.3	—
2001	81.5	—	71.6	—	—	—
2003	84.9	—	72.6	17.3	—	10.3
2005	86.9	—	74.1	20.3	—	12.3
2007	87.9	—	76.0	23.1	—	13.8
2009	87.3	—	76.9	25.9	—	16.3

<sup>a</sup> Health Canada: data source: Statistics Canada, Canadian Community Health Survey, 2001, 2003, 2005, 2007–2008, 2009–2010. Available at: <http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/prenatal/trends-tendances-eng.php>. Accessed September 5, 2012.

<sup>b</sup> Child-info: nutritional status statistical tables. Available at: [http://www.childinfo.org/undernutrition\\_nutritional\\_status.php](http://www.childinfo.org/undernutrition_nutritional_status.php). Accessed September 5, 2012.

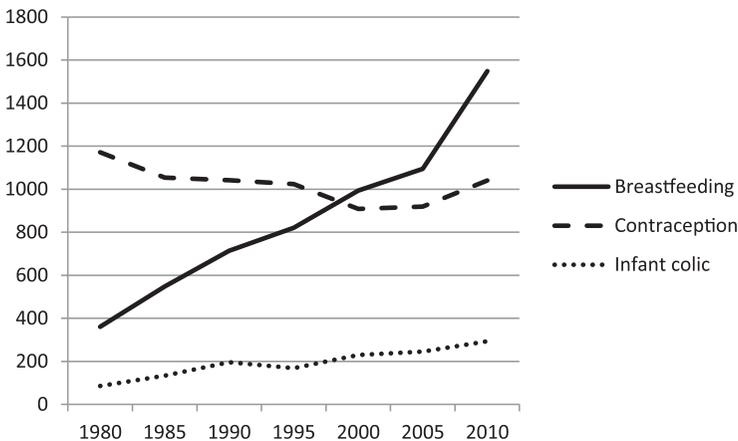
<sup>c</sup> CDC National Immunization Surveys Breastfeeding among US children. Available at: [http://www.cdc.gov/breastfeeding/data/nis\\_data/](http://www.cdc.gov/breastfeeding/data/nis_data/). Accessed September 5, 2012.

Agriculture for Food and Consumer Services at the US Department of Agriculture. In private conversations, she noted that when she first went to see a WIC program, she was shown storehouses full of formula and asked what was given to the breastfeeding mothers, with no response. Motivated in part by this experience, she oversaw the creation of the first food packages for low-income breastfeeding mothers.<sup>15</sup> As is shown in **Fig. 1**, the initiation of this package correlated with subsequent increases in the percentage of low-income American mothers who initially breastfed their infants.

The founding of the Academy of Breastfeeding Medicine, the increase in the number of International Board Certified Lactation Consultants and other forms of breastfeeding support training, and the growth of breastfeeding interest groups in pediatric professional organizations also have had an impact by greatly strengthening clinical support for breastfeeding. Clinicians have a vital role to play in creating the confidence among new mothers and in supporting behaviors associated with breastfeeding success. It will be necessary for clinical curricula to catch up with the increasing knowledge base and for all health care providers to consider the importance of breastfeeding in working with the mother/child dyad.

The US Breastfeeding Committee has been growing steadily and responds in part to the Innocenti call for a national committee and authority. With the increasing role of federal agencies in this committee, the impact is being multiplied. The US Centers for Disease Control and Prevention (CDC), along with the Surgeon General, the Office of Women's Health, the Food and Drug Administration, the Agency for Healthcare Research and Quality (AHRQ), and Maternal and Child Health Bureau, now participate in the US Breastfeeding Committee and have taken major steps to support breastfeeding in the new millennium. Since 2000, the CDC collects breastfeeding trend data, supports study of the issue, and actively supports hospitals to initiate the 10 steps called for in the Innocenti Declaration and codified in the Breastfeeding-Friendly Hospital Initiative. The CDC report card,<sup>16</sup> which includes several breastfeeding-related process indicators, also highlights the Maternity Practices in Infant Nutrition and Care survey of hospital practices.<sup>17</sup>

The numbers of studies and journals that report on breastfeeding have also taken a rapid upward turn in recent years. **Fig. 2** shows the number of articles published



**Fig. 2.** The trends in the numbers of articles cited in PubMed, from 1980 to 2010 in 5-year intervals, using the indicated search term. (From PubMed, US National Library of Medicine. Available at: [http://www.ncbi.nlm.nih.gov/libproxy.lib.unc.edu/sites/entrez?dr=abstract&otool=uncchlib&holding=\\_fft](http://www.ncbi.nlm.nih.gov/libproxy.lib.unc.edu/sites/entrez?dr=abstract&otool=uncchlib&holding=_fft); with permission.)

and reported by the US National Library of Medicine at 5-year intervals over 3 decades for 3 common terms associated with maternal or child health: breastfeeding, contraception, and infant colic. Although there has been some uptick in the number for colic, possibly because of emerging pharmaceutical research, the number for contraception has been steady or declining. In contrast, the rate of publication on breastfeeding has shown a steady increase, with a possible impetus in the last decade from the emergence of 2 new journals: *Breastfeeding Medicine* (the journal of the Academy of Breastfeeding Medicine) and the *International Breastfeeding Journal*.

Another major trend in the United States has been in the use of electronic pumps to express milk, rather than continued feeding at the breast.<sup>18</sup> By the year 2000, 85% of breastfeeding mothers of infants aged 1.5 to 4.5 months had expressed milk at some time since their infant was born, and a high proportion used the pump regularly and over a long period.<sup>19</sup> Nearly 5% of mothers fed their infants human milk exclusively by expression. In this same study, women most often stated that they expressed their milk so that some other person might feed the infant. Although shared caretaking is an important strategy, especially when mothers must return to work soon after the birth, little is known about the relative impact on the health parameters attributed to breastfeeding. The composition of milk changes during the course of a feeding and over time. Human milk components may influence sleep and growth patterns, and feeding by bottle does not foster so much control by the infant, allowing more ready overfeeding.<sup>20,21</sup> Further, the risks of pump usage should be monitored, because trauma and infection may result from improper usage. Public health planning and pediatric counseling would benefit from more research on such trends, as well as the impact of such trends on mother and child health.

## PERCEPTIONS

The pediatrician's role in support of breastfeeding is more important than ever. Increasingly, women are initiating breastfeeding; however, rates are far from optimal and barriers to successful breastfeeding persist. These barriers fall in 3 categories: (1) health system, (2) sociocultural and (3) economic/political barriers. The following sections consider how these barriers affect breastfeeding.

### *Health Systems*

Passive and active barriers to breastfeeding occur throughout our health care systems. The passive barriers result from lack of recognition and support for breastfeeding among all of our patients, the lack of clinician energy exerted to stay up to date in breastfeeding support skills, and the quiet acceptance of formula company advertising into our practices and hospitals. The active barriers include lack of clarity in reimbursement for breastfeeding support, prenatally, in maternity care, and throughout the continuum of health care for as long as the mother and child continue breastfeeding; the inattention to the importance of breastfeeding by other health providers, including the too-easy recommendation to stop breastfeeding for procedures when this is not warranted; and inappropriate contraceptive use during breastfeeding.

These barriers create an unnecessary tension for the mother who intends to breastfeed, contributing to lower achieved breastfeeding compared with maternal intentions. Recent studies confirm that quality-of-care practices, known as the *Ten Steps for Successful Breastfeeding* (see articles elsewhere in this issue by Chanry and Howard, Holmes, and Bunik), can reduce this tension and create an enabling environment in which the mother who intends to breastfeed can achieve her intention.<sup>22,23</sup>

Biologically and physiologically, all newborns and their mothers intend to breastfeed; infant and maternal reflexes bring the baby to the breast, and the urge to latch on is strong in the infant in the time immediately after birth. When these practices are disallowed by hospital procedures, it leads to breastfeeding failure, and maternal discontent with her treatment. The call for patient satisfaction alone should encourage these practice changes. There are many compelling reasons for immediate action to implement these steps, outlined in **Box 1**. In addition, new data are allowing us to see which of the steps might have the greatest impact on breastfeeding initiation and duration.<sup>24,25</sup> Specifically, step 1 (calling for consistent policy), step 2 (calling for training of all hospital staff), step 4 (calling for immediate postpartum skin-to-skin contact), step 6 (calling for limiting use of human milk substitutes), and step 9 (calling for restriction of the use of artificial nipples and pacifiers) seem to be most associated with achieving breastfeeding intentions in the hospital, in terms of exclusivity, and beyond, in terms of duration. These insights may help inform clinical practice change during the perinatal period.

All of the barriers merit active intervention. First, there is a critical need for including breastfeeding support skills in all undergraduate clinical training curricula, as well as in residencies for any specialty that may come into contact with a breastfeeding dyad. Next, clinicians should consider eliminating the ambiguous message given when they tell their patients that they support breastfeeding and yet offer formula marketing materials in their practice area and hospital. Pediatricians might consider instituting the 10 steps in every maternity setting, and adopting protocols that may enhance your practice, such as *The Breastfeeding-Friendly Physicians' Office: Optimizing Care for Infants and Children*, which may be located along with many other useful protocols at the Academy of Breastfeeding Medicine Web site.<sup>26</sup>

### **Sociocultural**

The general public and clinicians, alike, remain conflicted about breastfeeding and its importance in North America. This conflict is perhaps shown by a recent *Today Show* survey that asked, "Should mothers breastfeed their children" with an impossible choice of responses: 'It's the mother's choice. If she chooses not to breastfeed that's fine.' versus 'Yes, the health benefits are proved.' The options provided are neither comprehensive nor complementary; it is feasible that a person would agree with both. And yet more than 7500 responses came in choosing one or the other answer. By a slim margin of 56% to 43 %, the "yeses" won (**Fig. 3**). What does it mean that our society would accept this question, or that a thinking person would consider that these answers are mutually exclusive?

Perhaps our confusion stems in part from our sociocultural mix, acceptance of media and advertising, and love of technologies, sprinkled with a touch of gender discrimination and unrealistic expectations of women to perform as high-achieving nurturers and successful income generators, simultaneously. In North America, we have regional and community cultures and a high level of in-migration. Media, including television, advertisements, print media, and even cartoons, influence normative behavior in many areas of human behavior in North America. Research on how the media portray breastfeeding has shown that negative cultural attitudes toward breastfeeding have been reinforced by media messages. A textual analysis was conducted on 53 fictional television breastfeeding representations, ranging in genre and audience, from *Beavis and Butthead* to *Criminal Minds*.<sup>27</sup> Findings indicate that breastfeeding depictions are increasing in number and are generally positive, but limited in scope to educated, older, White women breastfeeding newborns, with little discussion about how to overcome problems. Extended breastfeeding and nursing in public

**Box 1****Reasons for implementation of the *Ten Steps for Successful Breastfeeding***

- Increasing interest and measurement of quality of care in all facilities: the 10 steps are a quality-of-care standard
- Reputation and public relations: implementation of the steps are now recognized by many states and provinces with either baby-friendly hospital status or other recognition
- Patient satisfaction<sup>a</sup>: women who wish to breastfeed express increased satisfaction with their hospital stay if they perceive that they are receiving support for their intentions
- Return hospitalizations among breastfed infants tend to be for less severe and costly reasons; formula-fed newborns had a higher incidence of positive diagnostic results and a longer hospital stay<sup>b</sup>
- Pharmacologic/ethical considerations: research shows that detail men successfully influence physician prescribing, and the same applies to formula sales personnel<sup>c</sup>
- Minimal cost with significant positive health outcomes
- New growth standards in use are based on breastfed infants' growth rates
- In the United States:
  - AHRQ Prevention Guidelines<sup>d</sup>
  - American Academy of Pediatrics, American Academy of Family Physicians, and American College of Obstetricians and Gynecologists statements and updates
  - Magnet status for nurses
  - *Clinical Preventive Services for Women: Closing the Gaps*<sup>e</sup>
  - Existence of Diagnostic and Statistical Manual (DSM) codes for prenatal nutrition counseling reimbursement
  - *The Surgeon General's Call to Action to Support Breastfeeding*<sup>f</sup> with 20 action areas
  - The Joint Commission Perinatal Care Voluntary Core Measure, PC-05: *Exclusive Breast Milk Feeding During the Newborn's Entire Hospitalization*<sup>g</sup>

<sup>a</sup> Howell E. Lack of patient preparation for the postpartum period and patients' satisfaction with their obstetric clinicians. *Obstet Gynecol* 2010;115(2 Pt 1):284–9.

<sup>b</sup> Tyler M, Hellings P. Feeding method and rehospitalization in newborns less than 1 month of age. *J Obstet Gynecol Neonatal Nurs* 2005;34(1):70–9.

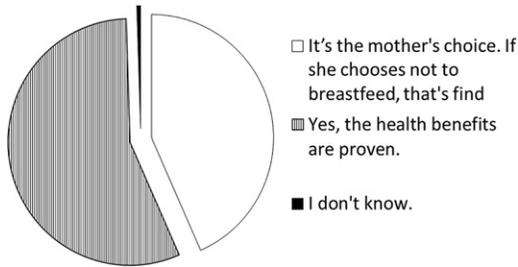
<sup>c</sup> Chren MM, Landefeld CS. Physicians' behavior and their interactions with drug companies. A controlled study of physicians who requested additions to a hospital drug formulary. *JAMA* 1994;271(9):684–9; Lurie N, Rich EC, Simpson DE, et al. Pharmaceutical representatives in academic medical centers: interaction with faculty and housestaff. *J Gen Intern Med.* 1990;5:240–3; and Wazana A. Physicians and the pharmaceutical industry: is a gift ever just a gift? *JAMA* 2000;283(3):373–80.

<sup>d</sup> AHRQ Guide to Clinical Preventive Services, 2010–2011, Primary Care Interventions to Promote Breastfeeding. Available at: <http://www.ahrq.gov/clinic/pocketgd1011/gcp10s2e.htm>. Accessed September 3, 2012.

<sup>e</sup> Clinical preventive services for women: closing the gaps, released July 19, 2011. Available at: <http://www.iom.edu/Reports/2011/Clinical-Preventive-Services-for-Women-Closing-the-Gaps.aspx>. Accessed September 3, 2012.

<sup>f</sup> US Department of Health and Human Services. *The Surgeon General's call to action to support breastfeeding*. Washington, DC: US Department of Health and Human Services, Office of the Surgeon General; 2011.

<sup>g</sup> Specifications Manual for Joint Commission National Quality Measures (v2011A), Available at: <http://manual.jointcommission.org/releases/TJC2011A/MIF0170.html>. Accessed September 3, 2012.



**Fig. 3.** Web viewers respond to “should mothers breastfeed their children” by selecting 1 of 2 nondiscreet questions.

were conveyed as socially unacceptable, making other characters uncomfortable, often within the same story lines that sexualized breasts. These depictions may reinforce myths and discourage women from breastfeeding past the newborn phase or in public. The author of the study noted that these portrayals may help explain why breastfeeding has not yet been culturally normalized, despite an international consensus that it is the best health choice for babies.

Social media and electronic interpersonal communications are having an increasing role on how we view the world. A recent study on social media examined adherence to the WHO *International Code of Marketing of Breast-Milk Substitutes* (the Code), which calls for ethical marketing.<sup>28</sup> The study revealed that infant formula manufacturers have established a social media presence and that violations of the Code as well as promotional practices unforeseen by the Code were common: enabling user-generated content that promotes the use of infant formula, financial relationships between manufacturers and bloggers, and creation of mobile apps for use by parents, further fostered by a lack of transparency in social media-based marketing.

Social marketing may be one way to address the impact of commercial marketing. Social marketing involves the application of commercial marketing principles to advance the public good. Generally, it involves 4 interrelated tasks: audience benefit, target behavior, essence (brand, relevance, positioning), and developing the 4Ps (product, price, place, promotion) marketing mix. A recent review examined the US Department of Agriculture *Loving Support Makes Breastfeeding Work* campaign, launched in 1997 based on social-marketing principles, designed to increase breastfeeding initiation rates and breastfeeding duration among WIC participants.<sup>29</sup> The findings included that it is important to design social-marketing campaigns to target not only mothers but also the influential societal forces (eg, family and friends, health care providers, employers, formula industry, legislators) that affect women’s decision and ability to breastfeed. The need to create societal norms brings us to the consideration of political and economic issues, which may not as yet be entirely supportive of breastfeeding.

### ***Economic/Political***

Breastfeeding is influenced by economic and political forces. Most women of reproductive age are in the workforce and, in the United States, there is no guaranteed paid maternity leave. Research is showing that there are negative effects of working while pregnant or in the early postpartum period. A nested case-control study in 2002 to 2003 of preterm birth and low birth weight among working women in Southern

California found that provision of maternity leave is associated with about one-fourth of the risk of cesarean delivery, adjusted for covariates (odds ratio, 0.27; 95% confidence interval, 0.08–0.94).<sup>30</sup> Even unpaid leave offered in the United States under the 1993 Family and Medical Leave Act was associated with small increases in birth weight, decreases in the likelihood of a premature birth, and substantial decreases in infant mortality for children of college-educated and married mothers, who were most able to take advantage of unpaid leave.<sup>31</sup> An assessment of the literature on the length of maternity leave and health of mothers and children found a positive ecological association between the length of maternity leave and mother's mental health and duration of breastfeeding, as well as with lower perinatal, neonatal and postneonatal mortality and lower child mortality.<sup>32</sup> Another systematic review found that, taking account of the methodological limitations, there is a statistically significant association between infant mortality and higher income inequality, and infant mortality and other indicators of less redistributive social policy, such as lack of maternity leave.<sup>33</sup> An Australian study found that returning to work in the first 10 months post partum is associated with shorter breastfeeding durations.<sup>34</sup> A Canadian study, which may have contributed to the newly instituted paid maternity leave in that country, noted that nearly 130 countries guarantee working women the right to breastfeed through leave and workplace accommodation to protect the health of infants and mothers alike. The investigators suggest that their country extend policies to ensure adequate maternity leave, legislate a right to breastfeed while working, and adapt workplaces to make this practical.<sup>35</sup>

The more politicoeconomic question then is: can we afford maternity leave? A national survey in the United States revealed many new and unexpected trends.<sup>36</sup> The 2008 National Study of the Changing Workforce, performed by the Family and Work Institute, was a nationally representative study of employees asking about their physical and mental well-being. Following on studies conducted in 1992, 1997, and 2002, the 2008 study allows a look at trends and how current workers differ from workers of the same age in the 1990s. The change, indicated in **Box 2**, is increased economic pressures on families for women to continue work throughout the child-bearing years. This situation begs the question as to whether or not society as a whole should support paid leave for maternal and child health, including breastfeeding. Additional study by the Family and Work Institute found that employers reported that investment by firms in paid leave was seen as paying off in the end, or as cost-neutral. The Families and Work Institute survey found that most surveyed firms (84%) viewed the investment in paid leave for maternity, paternity, and serious illness as providing either a positive return on the investment (42%) or as cost-neutral (42%). At a recent Breastfeeding Summit, hosted by the Academy of Breastfeeding Medicine, the economic issues were examined.<sup>37</sup> The conclusion was that although the gains from breastfeeding are at least partially understood, the overall case for breastfeeding remains incomplete economically and many questions remain to be answered to make the economic case for paid maternity leave.

The remaining questions are noted in **Box 3**, with 1 addition: what is the role of government? The United States, along with only Papua New Guinea, Swaziland, Liberia and Lesotho, offers no guaranteed maternity leave, causing the practice of optimal breastfeeding to be an economic challenge. In contrast, Canada has an Employment Insurance Act<sup>38</sup> that offers payment of maternity benefits to biological mothers for up to 15 weeks, with pay equal to 55% of an employee's average insurable earnings for the last 26 weeks. Benefits may begin as early as 8 weeks before the week the baby is due and must generally conclude no later than 17 weeks after the baby is born. If the baby is born prematurely or with a condition that requires hospitalization, this 17-week

**Box 2****The 2008 National Study of the Changing Workforce: trends in women's and men's roles**

- Women in dual-earner couples are contributing more to family income: in 1997, women contributed an average of 39% of annual family income; in 2008, 44%. In addition, there was an increase in the percent of women with earnings at least 10% more than their partners: from 15% in 1997 to 26% in 2008.
- Among those less than 29 years old, women are just as likely as men to want jobs with greater responsibility.
- Women with and without children are equally seeking jobs with more responsibility.
- Men and women are both less likely to embrace traditional gender roles, with only about 40% of each believing that it is better "if the man earns the money and the woman takes care of the home and children."
- Employed fathers are spending more time with children than their age counterparts did 3 decades ago, whereas employed mothers' time has not changed. Young fathers report spending 4.3 hours per workday compared with the 2.4 hours spent by their age counterparts in 1977. Mothers less than 29 years in 2008 average 5.0 hours compared with 4.5 hours in 1977.
- Men are taking more overall responsibility for the care of their children. In 1992, 21% of women said that their spouses or partners were taking as much or more responsibility for the care of their children as they were. By 2008, that percentage has risen to 31%.

*From* Derogatis K, Sakai K. New study shows significant and surprising changes among men and women at work and at home—first report from 2008 National Study of the Changing Workforce traces the trends in men's and women's attitudes and actions over the past 3 decades. Family and Work Institute; 2009. Available at: <http://familiesandwork.org/site/research/reports/main.html>; with permission.

maximum can be extended by the period of the child's hospitalization up to a maximum of 52 weeks after the week of the date of confinement. In Mexico, Article 123 of the Labor Law provides various protections and guarantees to workers, including an 8-hour workday, a maximum workweek of 6 days, equal pay for equal work, and mandatory

**Box 3****Research questions that help define the economic argument for paid maternity leave**

- What are the incremental benefits from extending breastfeeding month by month?
- How important is exclusivity versus supplemented breastfeeding?
- Which activities or programs increase duration of breastfeeding?

By education, income, and other socioeconomic groups

- What are the total benefits of breastfeeding?

Improved maternal and infant health and social and educational attainment, and sequelae

- What are the full costs of breastfeeding? Labor force, caloric intake, costs to/gains for employers?
- What is the proper role for the health care system and associated financial systems?
- What is the proper role for government?

*First 6 bullets from* Phelps CE. Economic issues of breastfeeding. *Breastfeed Med* 2011;6:307–11; with permission.

childbirth and maternity leave: Pregnant employees are entitled to 6 weeks' leave before the approximate date of childbirth and to 6 weeks' leave thereafter with full wages and the right to retained employment.<sup>39</sup> The Mexican Social Security Institute (Instituto Mexicano de Seguridad Social) subsidizes 60% of the female worker's salary; therefore, the employer need only pay the difference. During breastfeeding, mothers are entitled to 2 extra paid half-hour rest periods for nursing their children.

In the United States, women are offered 12 weeks of unpaid leave under the Family and Medical Leave Act, which exempts companies with fewer than 50 paid employees, but in 2011, only 11% of private-sector workers and 17% of public workers reported that they had access to paid maternity leave through their employer.<sup>40</sup> Only about half of first-time mothers can take paid leave when they give birth. This economic deterrent is further compounded in that the US Department of Agriculture offers formula free of cost to about half of all new mothers in the United States through the WIC program. Over the past 20 years, there has been accelerating support for breastfeeding within this system, and the WIC package given to exclusively breastfeeding mothers is greatly expanded, including counseling; follow-up support through peer counselors; eligibility to participate in WIC longer than nonbreastfeeding mothers; an enhanced food package; and pumps, breast shells, or nursing supplementers to help support the initiation and continuation of breastfeeding.<sup>41</sup> In addition, these mothers are not given free formula for at least the first month post partum. As a result of the increasing support, most WIC mothers now initiate breastfeeding. Nonetheless, with this combination of 2 highly unusual programs, mothers in the United States have a double whammy of no paid leave plus free formula for many, creating a double economic advantage in foregoing breastfeeding.

US Congress recently enacted the Patient Protection and Affordable Care Act, which requires employers with 50 or more employees to provide unpaid reasonable break time for mothers of infants to express their milk.<sup>42</sup> It also calls for breastfeeding support, supplies, and counseling to include comprehensive lactation support and counseling, by a trained provider during pregnancy or in the postpartum period, and costs for renting breastfeeding equipment.<sup>43</sup> This development adds urgency to the importance of determining the prevalence of exclusive and periodic milk expression and the consequences of these behaviors, compared with direct breastfeeding, for the health of mothers and their infants. This strategy, as well as the survey data discussed earlier, may open the door for discussion as to whether the United States might consider a form of employment insurance, not unlike disability insurance, to support paid maternity and postpartum leave.

## PUBLIC HEALTH

Public health approaches may help in the achievement of population-based health behavior change.<sup>44</sup> Some consider that policy development is a necessary prelude to program intervention. Globally, the major policy approach is the Millennium Development Goals (MDGs) for improving maternal and child health, including gender equity and reproductive justice as underlying needs. The MDGs include 8 goals, all which have implications for breastfeeding. This issue was examined at a global nutrition meeting and is summarized in **Table 2**.

A comprehensive approach, including both clinical and public health considerations, is needed to create an environment and a society that enable optimal breastfeeding success. This need for a comprehensive approach was a major theme of the WHO/UNICEF Global Strategy for Infant and Young Child Feeding<sup>2</sup> launched in 2003, as well as an

<b>Table 2</b>	
<b>The role of nutrition and infant and young child feeding in addressing the MDGs</b>	
<b>Goal Number and Targets</b>	<b>Contribution of Infant and Young Child Feeding<sup>a</sup></b>
1. Eradicate extreme poverty and hunger Halve, between 1990 and 2015, the proportion of people: Whose income is less than \$1 a day Who suffer from hunger	Breastfeeding significantly reduces early childhood feeding costs, and exclusive breastfeeding halves the cost of breastfeeding. <sup>b</sup> Exclusive breastfeeding and continued breastfeeding for 2 years is associated with reduction in underweight <sup>c</sup> and is an excellent source of high-quality calories for energy
2. Achieve universal primary education Ensure that by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary education	Breastfeeding and adequate complementary feeding are prerequisites for readiness to learn. <sup>d</sup> Breastfeeding and quality complementary foods significantly contribute to cognitive development
3. Promote gender equality and empower women Eliminate gender disparity in primary and secondary education, preferably by 2005 and in all levels of education no later than 2015	Breastfeeding is the great equalizer, giving every child a fair start in life. Most differences in growth between sexes begin as complementary foods are added into the diet, and gender preference begins to act on feeding decisions. Breastfeeding is uniquely a right of women, and should be supported by society <sup>e</sup>
4. Reduce child mortality Reduce by two-thirds, between 1990 and 2015, under-fives mortality rate	Infant mortality could be readily reduced by about 13% with improved breastfeeding practices alone, and 6% with improved complementary feeding. <sup>f</sup> In addition, about 50%–60% of under-5 mortality is secondary to malnutrition, greatly caused by inadequate complementary foods and feeding following on poor breastfeeding practices <sup>g</sup>
5. Improve maternal health Reduce by three-quarters, between 1990 and 2015, maternal mortality	The activities called for in the global strategy include increased attention to support for the mother's nutritional and social needs. In addition, breastfeeding is associated with decreased maternal postpartum blood loss, decreased breast cancer, ovarian cancer, and endometrial cancer, as well as the probability of decreased bone loss after menopause. Breastfeeding also contributes to the duration of birth intervals, reducing maternal risks of pregnancy too close together
6. Combat HIV/AIDS, malaria and other diseases Have halted by 2015 and begun to reverse the spread of HIV/AIDS	Based on extrapolation from the published literature on the impact of exclusive breastfeeding on MTCT, exclusive breastfeeding in an otherwise untested breastfeeding HIV-infected population could be associated with a significant and measurable reduction in MTCT

*(continued on next page)*

Table 2 (continued)	
Goal Number and Targets	Contribution of Infant and Young Child Feeding <sup>a</sup>
7. Ensure environmental sustainability	Breastfeeding is associated with decreased milk industry waste, pharmaceutical waste, plastics and aluminum tin waste, and excess use of firewood/fossil fuels <sup>h</sup>
8. Develop a global partnership for development	The Global Strategy for Infant and Young Child Feeding fosters multisectoral collaboration and can build on the extant partnerships for support of development through breastfeeding and complementary feeding In terms of future economic productivity, optimal infant feeding has major implications

*Abbreviations:* HIV, human immunodeficiency virus; MTCT, mother-to-child transmission.

<sup>a</sup> Early and exclusive breastfeeding, continued breastfeeding with complementary feeding and related maternal nutrition.

<sup>b</sup> Bhatnagar S, Jain NP, Tiwari VK. Cost of infant feeding in exclusive and partially breastfed infants. *Indian Pediatr* 1996;33:655–8.

<sup>c</sup> Dewey KG. Cross-cultural patterns of growth and nutritional status of breast-fed infants. *Am J Clin Nutr* 1998;67:10–7.

<sup>d</sup> Anderson JW, Johnstone BM, Remley DT. Breast-feeding and cognitive development: a meta-analysis. *Am J Clin Nutr* 1990;70:525–35.

<sup>e</sup> Labbok M. Breastfeeding: a woman's reproductive right. *Int J Gynaecol Obstet* 2006;94(3):277–86.

<sup>f</sup> Jones G, Steketee RW, Black RE, et al. How many child deaths can we prevent this year? *Lancet* 2003;362:65–71.

<sup>g</sup> Pelletier D, Frongillo E. Changes in child survival are strongly associated with changes in malnutrition in developing countries. *J Nutr* 2003;133:107–19.

<sup>h</sup> Labbok M. Breastfeeding as a women's issue: conclusions and consensus, complementary concerns, and next actions. *Int J Gynaecol Obstet* 1994;47(Suppl):S55–61.

*Courtesy of UN Standing Committee on Nutrition Working Group on breastfeeding/complementary feeding, 2004; with permission.*



**Fig. 4.** The socioecological framework includes the broad societal factors that help create a climate in which breastfeeding encouraged or inhibited. These factors include social and cultural norms. Other large societal factors include the health, economic, educational, and social policies that help to maintain economic, social, gender, or racial inequalities between groups in society.

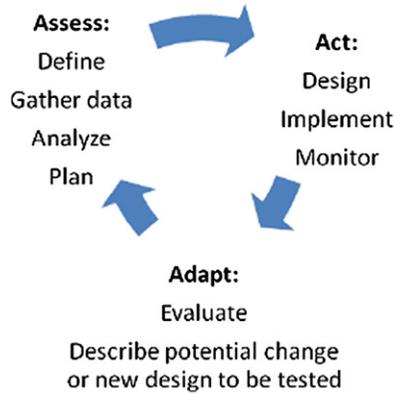


Fig. 5. The triple A approach.

outcome of a 2009 UNICEF expert consultation,<sup>45</sup> and has informed national blueprints. Public health approaches are most effective when they include both prevention and population-level thinking and include both targeted and comprehensive approaches. There are many frameworks, or models, that help clarify the steps in building a public health approach and intervention programming.<sup>44</sup> The socioecological model is perhaps the most frequently cited in public health conceptual thinking and planning, used in many action planning approaches, including the *Surgeon General's Call to Action*.<sup>46</sup> As seen in Fig. 4,<sup>47</sup> this framework allows consideration of interventions at many levels: from the individual, to the family, community, societal level, and so on. The CDC and WHO promote a 4-level model to guide research and practice related to effective programs and policies. This model considers the complex interactions between individual, relationship, community, and societal factors. Some models also include an external ring for civil society/government.

Two frequently used constructs for action may be used in clinical or population-level intervention planning. Perhaps the simplest model is the triple A model, suggesting assessment, action, reassessment, and adaptation, in a cyclic approach, as shown in Fig. 5. This model might apply to breastfeeding as follows:

*Assess: define the health problem through the systematic collection of information about the magnitude, scope, characteristics, and consequences and*

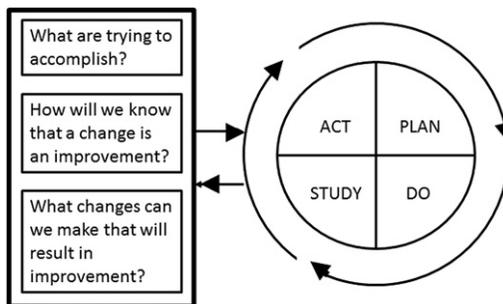


Fig. 6. The PDSA iterative continuous quality improvement approach. (From Langley GL, Nolan KM, Nolan TW, et al. The improvement guide: a practical approach to enhancing organizational performance. 2nd edition. San Francisco (CA): Jossey-Bass; 2009; with permission.)

*establish the factors that could be modified through interventions. This strategy would be the exploration of the literature and program experience in support of breastfeeding in a setting that affects more than 1 individual.*

*Action: from the assessment, an intervention may be designed and implemented. This intervention might be in the community or in a clinical outreach or group setting.*

*Reassessment and adaptation: monitoring the effects of these interventions on risk factors and the target outcome provides information that contributes to the evaluation of their impact and cost-effectiveness. Such evaluation is used to adapt the breastfeeding intervention.*

A similar but more targeted iterative approach developed by the Institute for Healthcare Improvement<sup>48</sup> is the plan-do-study-act (PDSA) cycle, which involves testing a change by developing a plan to test it (plan), performing the test (do), observing and learning from the consequences (study), and determining which modifications should be made to the test (act) in an iterative manner, such that a group of workers may try out and discuss small tests of change toward a goal (Fig. 6).

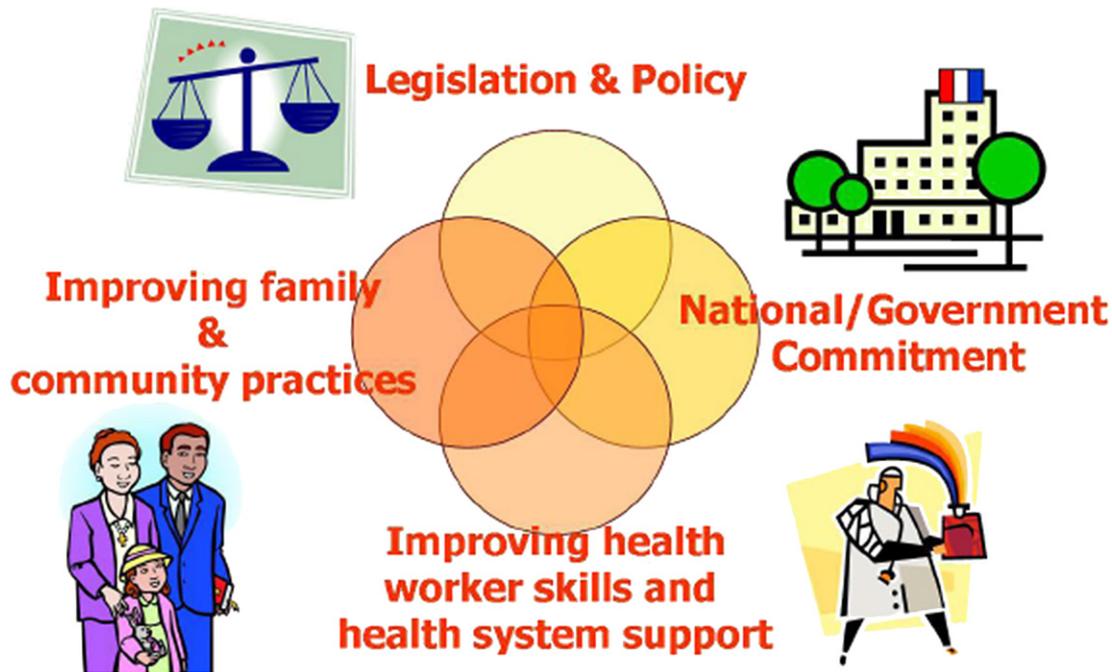
No matter which approach is used, the pediatricians and other clinicians are a critical influence for change at every sociopolitical level and in every public health effort. There is no shortage of initial approaches for a coalition of individuals and organizations committed to healthier, happier mothers and babies. The 4 policy pillars as defined by UNICEF and WHO are a solid base for sustainable change (Box 4, Fig. 7). These pillars include national/state government commitment, legislation, and policy; health worker training and health system support; communications; and family and community support. A fifth tenet is to address local specific issues, such as the need for exclusive breastfeeding, rather than mixed feeding, in areas endemic for human immunodeficiency virus.<sup>38</sup> As we examine the many potential ways forward, it may be useful to continue to work on these 4 basic areas, initially sparked by the Innocenti Declaration of 1990, as we plan toward the Healthy People goals for 2020.

#### **Box 4**

##### **The 4 pillars and possible actions to create a breastfeeding-friendly environment**

1. National/governmental commitment: this may be supported using women's and children's rights as arguments for change
2. Legislation/policy for maternity protection and paid leave, health insurance coverage, freedom to breastfeed as children need, and protection against aggressive advertising of infant formula
3. Health training and services improvement; this necessitates cooperation and partnership among state health departments, health professional associations, accrediting organizations, and academic faculties to ensure that preventive medicine, breastfeeding, and attention to women's equity are included in undergraduate training for all health workers
4. Policy in support of family/community: this must include attention to social support for birth spacing and motherhood, as well as the sharing of social marketing and advocacy across sectors; such policy-dictating action would include building with existing socially oriented NGOs, no matter what their primary social goal is

*From Labbok M. Transdisciplinary breastfeeding support: creating program and policy synergy across the reproductive continuum. Int Breastfeed J 2008;3:16; with permission.*



**Fig. 7.** The 4 pillars: the 4 action areas (pillars) for synergy consideration (figure derived from UNICEF and WHO presentation materials). (From Labbok M. Transdisciplinary breastfeeding support: creating program and policy synergy across the reproductive continuum. *Int Breastfeed J* 2008;3:16; with permission.)

## SUMMARY

Clinical support for breastfeeding is essential, but such support has greater impact if it is coupled with public health interventions as well. Clinicians have a vital role to play in ensuring their own skills and knowledge base and that of future clinicians, and they also have a vital role in advocating for comprehensive programming to ensure population-level normalization of optimal breastfeeding for all.

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