

Scaling Up of Breastfeeding Promotion Programs in Low- and Middle-Income Countries: the “Breastfeeding Gear” Model^{1,2}

Rafael Pérez-Escamilla,* Leslie Curry, Dilpreet Minhas, Lauren Taylor, Elizabeth Bradley

Yale School of Public Health and Yale Global Health Leadership Institute, New Haven, CT

ABSTRACT

Breastfeeding (BF) promotion is one of the most cost-effective interventions to advance mother–child health. Evidence-based frameworks and models to promote the effective scale up and sustainability of BF programs are still lacking. A systematic review of peer-reviewed and gray literature reports was conducted to identify key barriers and facilitators for scale up of BF programs in low- and middle-income countries. The review identified BF programs located in 28 countries in Africa, Latin America and the Caribbean, and Asia. Study designs included case studies, qualitative studies, and observational quantitative studies. Only 1 randomized, controlled trial was identified. A total of 22 enabling factors and 15 barriers were mapped into a scale-up framework termed “AIDED” that was used to build the parsimonious breastfeeding gear model (BFGM). Analogous to a well-oiled engine, the BFGM indicates the need for several key “gears” to be working in synchrony and coordination. Evidence-based advocacy is needed to generate the necessary political will to enact legislation and policies to protect, promote, and support BF at the hospital and community levels. This political-policy axis in turn drives the resources needed to support workforce development, program delivery, and promotion. Research and evaluation are needed to sustain the decentralized program coordination “gear” required for goal setting and system feedback. The BFGM helps explain the different levels of performance in national BF outcomes in Mexico and Brazil. Empirical research is recommended to further test the usefulness of the AIDED framework and BFGM for global scaling up of BF programs. *Adv. Nutr.* 3: 790–800, 2012.

Epidemiological evidence strongly supports the need for strengthening breastfeeding (BF)³ promotion, protection, and support worldwide, with particular emphasis in the endorsement of exclusive breastfeeding (EBF) and the timely initiation of BF (within 1 h after birth). The prevalence of the timely initiation of BF is only 48% in the 68 “countdown to 2015” countries (i.e., those that experience >90% of the global mother–child mortality burden) (1). In addition, although prolonged BF is a common practice in these countries, the prevalence of EBF among infants younger than 6 mo old is only 34% (2). Large-scale BF promotion has the

potential to prevent an estimated 11.6% of infant deaths and reduce an estimated 21.9 million disability-adjusted life years (2). Thus, increased BF promotion has strong potential to improve global mother–child health.

BF promotion programs have focused on timely initiation of BF, EBF for the first 6 mo, and/or continued BF until the child is at least 24 mo old (1-6-24 model). EBF has become a top priority for BF promotion programs because most mothers in the world, including those living in the “countdown to 2015” countries, do not meet the EBF recommendations. Promoting EBF successfully requires avoiding prelacteal feeds (i.e., non–breast milk sources of nourishment offered to newborn before first BF episode), thus fostering a timely initiation of BF. Likewise, there is a strong correlation between the length of time that women breastfeed exclusively and the continuation of BF once complementary foods are introduced into the infant’s diet. Unfortunately, we still lack evidence-based knowledge about how to promote and ensure the effective scale up of EBF (3). Accordingly, from a combination of peer-reviewed and gray literature, we sought to develop a parsimonious BF scaling-up model based on the identification of key factors and approaches that promote or

¹ Presented at the symposium “Strategic, Global Approaches to Improve Breastfeeding Rates” held April 21, 2012 at the ASN Scientific Sessions and Annual Meeting at Experimental Biology 2012 in San Diego, CA. The symposium was sponsored by the American Society for Nutrition, the Lactation Research Interest Section, and the Society for International Nutrition. It was funded in part by Medela Inc. and the Bill & Melinda Gates Foundation. A summary of the symposium “Strategic, Global Approaches to Improve Breastfeeding Rates” was published in the November 2012 issue of *Advances in Nutrition*.

² Author disclosures: R. Pérez-Escamilla, L. Curry, D. Minhas, L. Taylor, E. Bradley, no conflicts of interest.

³ Abbreviations used: BF, breastfeeding; BFHI, Baby-Friendly Hospital Initiative; BFPCHU, Baby-Friendly Primary Health Care Unit; BFGM, breastfeeding gear model; EBF, exclusive breastfeeding; LMIC, low- and middle-income countries; WHO Code, WHO International Code of Marketing of Breast Milk Substitutes.

* To whom correspondence should be addressed. E-mail: rafael.perez-escamilla@yale.edu.

impede the scale up of EBF in low- and middle-income countries (LMIC), and their mapping into the AIDED framework for scaling up of family health interventions (4).

The AIDED framework

The AIDED framework was developed based on a mixed-methods methodology (4). AIDED represents an integrated and practical framework for scale up that synthesizes experiences of family health programs in LMIC. AIDED includes 5 nonlinear interrelated components: 1) assess the landscape, 2) innovate to fit user receptivity, 3) develop support, 4) engage user groups, and 5) devolve efforts for spreading innovation. The framework suggests successful multiple feedback loops and several potential paths to achieve intended outcomes. Failure to scale up may be attributable to insufficient assessment of user groups in context, lack of fit of the innovation with user receptivity, inability to address resistance from stakeholders, and inadequate engagement with user groups. The AIDED framework underscores the importance of finding the best possible fit when adapting and integrating an innovation into the local context to maximize the probability that the intended user groups will adopt it. Furthermore, the framework suggests that once key user groups successfully adopt new practices in a community or region, it then becomes more likely that the use of the innovation will spread successfully to other communities through common social networks.

Methods

We conducted a systematic review of the academic and gray literature on the dissemination, diffusion, scale up, and sustainability of EBF programs in LMIC. We defined a comprehensive BF program as one that promotes the 1-6-24 model or initiation of BF within 1 h of birth, conducted exclusively for 6 mo, and continued along with complementary feeding until at least 2 y of age. For both the academic and gray literature, we searched for publications that contained key words related both to BF and scale up or sustainability. The key words used to search for BF programs were breast feeding, exclusive breastfeeding, baby-friendly hospital initiative, and complementary feeding. The key words used to search for scale up or sustainability were replication, scale up, sustainability, diffusion, dissemination, take up, innovation, diffusion of innovation, technology transfer, information dissemination, acculturation, assimilation, and fidelity. The electronic search strings were repeatedly refined in response to emerging data and modified as appropriate for different databases while retaining a consistent set of core search terms. We included papers that discussed BF, addressed factors related to the diffusion, dissemination, and take up and sustainable BF, and went beyond superficial description or commentary.

Searches for academic literature were conducted in 11 electronic databases, including MEDLINE, CINAHL, EMBASE, Web of Knowledge, PsycINFO, Global Health, EconLit, Social Sciences Citation Index, International Bibliography of Social Sciences, Social Services Abstracts, and Sociological Abstracts. We included any literature published since the earliest date indexed in each database through December 2010. These academic literature searches yielded an initial sample of 69 unique articles after eliminating duplicates (Fig. 1). We screened the abstracts of all articles in this initial sample ($N = 69$) and excluded any articles that did not address at least 1 of the 1-6-24 BF dimensions as defined in this study ($n = 25$) or did not discuss the scale up or sustainability of BF ($n = 27$). We then screened the full text of the remaining articles ($n = 17$), and further excluded any articles that did not meet the study's definition of BF ($n = 2$), did not address scale up or sustainability of BF ($n = 5$), were superficial in the discussion of BF and/or did not provide empirical evidence of the scale up or sustainability

of BF programs ($n = 1$), and could not access the full text of the articles ($n = 4$). Five articles were retained for data extraction and analysis. Three articles (5–7) not detected through the electronic searches but identified as key by the lead author were included. In addition, an article (8) published after the electronic searches had been conducted was also included. Thus, we retained a total of 9 peer-reviewed articles for final data extraction.

The gray literature searches targeted the publications/resources databases and Web sites of the WHO, UNICEF, the United Nations Development Programme, the United Nations Population Fund, the World Bank, the African Development Bank, the Inter-American Development Bank, and the Asian Development Bank. We also reviewed the project reports published by major international aid organizations (the United States Agency for International Development, the Canadian International Development Agency, the United Kingdom Department for International Development, the Swedish International Cooperation Development Agency, the German Technical Cooperation Agency, the Global Fund to Fight AIDS, Tuberculosis and Malaria) and other influential nongovernmental organizations and partnerships in global health including CARE, the Global Alliance for Improved Nutrition, Family Health International, Partners in Health, Management Sciences for Health, and John Snow, Inc. Gray literature searches included any documents available via the organization's Web site on search dates within February 2011. Due to the large volume of hits generated from these Web site searches, the titles of all documents were screened first; if the title appeared relevant, then the full text was immediately reviewed using the same exclusion criteria as applied to the academic literature. This process yielded 4 documents that address the scale up and/or sustainability of EBF in LMIC. An additional 4 documents highly relevant to the lead author's previous work were also included (9–12) for a total of 8 gray literature documents.

Data extraction from the final sample of academic articles ($n = 9$) and gray literature documents ($n = 8$) was conducted first by the lead author using a pre-established data extraction form. For each article, the data extraction process identified the study design, geographic location, characteristics of the BF intervention, key findings related to scale up and/or sustainability of the BF intervention, and the degree of success in scaling up and/or sustaining the intervention. Preliminary data extraction results were presented and discussed with the coauthors, and a final set of factors influencing the success of BF program scale up and/or sustainability was identified. Enabling factors and barriers to scale up and/or sustainability were then grouped into thematic categories, with disagreements resolved through negotiated consensus among the team members.

Results

The final sample of 17 sources (9 academic articles and 8 gray literature documents) included studies representing a wide range of geographic areas and methodologies (Table 1). There were 28 countries included, with the majority located in sub-Saharan Africa (10 countries) and the Latin America and Caribbean region (8 countries), followed by South and South East Asia (7 countries), East Asia (2 countries), and Central Asia (1 country). Study designs were diverse: 6 studies followed a case study approach, 4 were literature reviews, 4 thought pieces, 4 included secular trend analyses (i.e., changes in BF outcomes across time), 4 used pre/postintervention designs without a control group, 4 were based on in-depth interviews with program officers, and 1 used focus groups and in-depth interviews with decision makers. We also identified 1 cost-effectiveness analysis (7) based on pre/post studies with control groups and 1 large-scale randomized, controlled community trial (8).

The data extraction process identified 22 enabling factors and 15 barriers for dissemination, diffusion, and scale up and/or sustainability that were then mapped into the 5 AIDED components (Table 2).

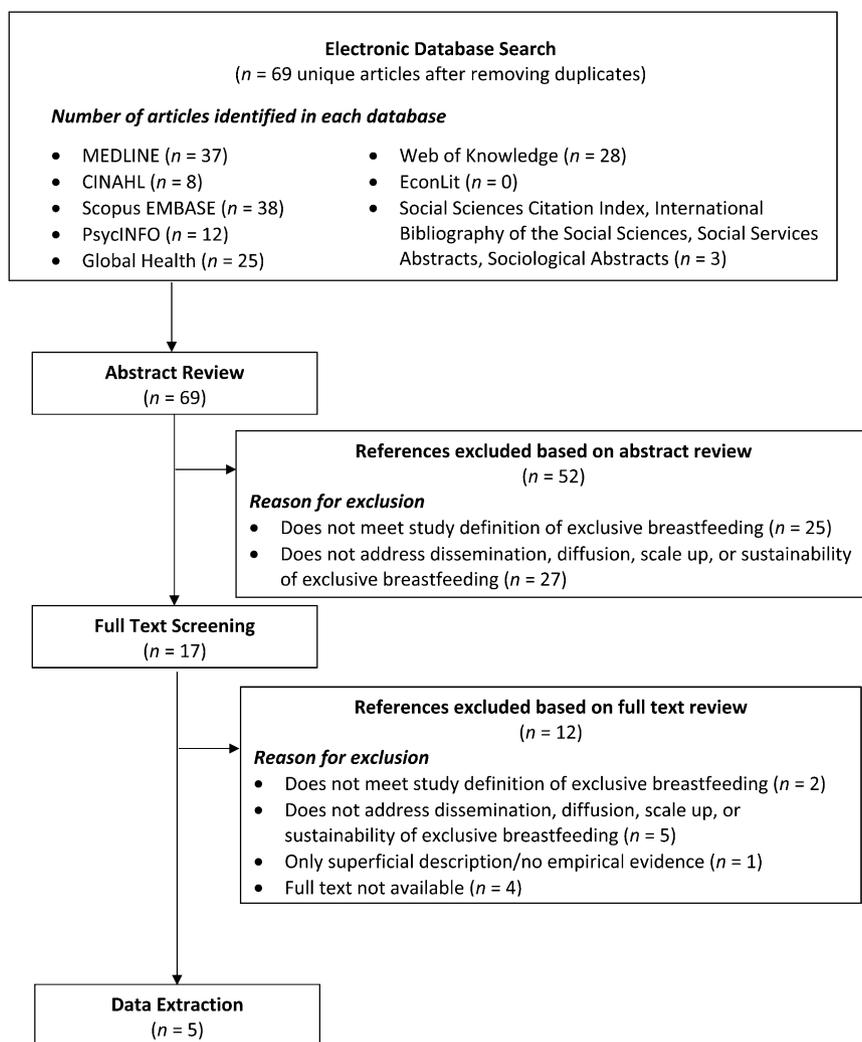


Figure 1 Academic literature review sample selection. Included are 3 peer-reviewed articles from the authors files (5–7) and 1 experimental study published after the initial electronic search was completed (8) resulting in data extraction from a total of 9 peer-reviewed articles.

In the following section, we summarize the enabling factors and barriers identified in the literature by each of the 5 components of the AIDED framework (assess, innovate, develop, engage, devolve) and provide illustrative examples for each. Finally, we conclude with the key unifying themes characterizing the scale up of BF promotion through the testable and parsimonious breastfeeding gear model (BFGM), which may also have relevance for scale up of other family health behavioral interventions.

Assess

The assess component refers to assessment of the broad landscape within a potential user community, including its needs and wants, absorptive capacity, and the political, economic, legal/regulatory, technological, and social conditions within its internal and external environment.

Key enabling factors. The empirical evidence indicates that successful dissemination, diffusion, and scaling up of BF promotion programs have relied heavily on baseline facility and community needs assessments (12–15), as well as operational (formative) research/pilot studies (8,13–18). These

efforts have been particularly successful when needs assessments are conducted with the scale up of BF promotion in mind and take into account the input from key stakeholders working in different sectors (15,17,18).

Illustrative example. In Pembo, Philippines, a BF promotion scale-up project team launched the process by conducting secondary data analyses of national infant feeding practices, an analysis of infant feeding formula advertisement and questionable promotional practices, and community-based participatory research with the local target community (15). This formative work provided the impetus for designing and launching a proof-of-concept pilot BF promotion intervention with the ultimate goal of bringing BF up to scale. After finding that peer counseling was effective at improving EBF based on a pre/post-intervention study design with 312 dyads, the program was then scaled up in <2 y to reach 161,612 people in urban areas. Now, a new goal of further scale to a 1-million people catchment area has been set. The evidence-informed political sensitization and community mobilization resulting from the formative evaluation phase were key to the success of this program.

Table 1. Characteristics of the final literature sample for data extraction ($n = 17$)

Characteristic	Sources, n
Geographic area of breastfeeding promotion program ¹	
Latin America and Caribbean: Bolivia, Brazil, Colombia, Costa Rica, El Salvador, Honduras, Mexico, Trinidad and Tobago	7
Sub-Saharan Africa: Benin, Burkina Faso, Ethiopia, Ghana, Kenya, Madagascar, Mali, Uganda, South Africa, Tanzania	5
East Asia: Papua New Guinea, Philippines	5
South Asia: Bangladesh, India, Nepal, Sri Lanka	4
Southeast Asia: Cambodia, Indonesia, Thailand	3
Central Asia: Uzbekistan	1
Methods used in study ¹	
Case study	6
Literature review	4
Thought piece using empirical evidence from other studies	4
Pre/post intervention without comparison group	3
Cross-sectional interviews/questionnaire	2
Qualitative in-depth interview/focus group/participant observation	2
Pre/post intervention with comparison group	2
Randomized, controlled community trial	1
Cost-effectiveness	1

¹ Total is greater than 100% because some sources covered multiple countries and/or used multiple methods.

Innovate

The innovate component includes designing, redesigning, and packaging an innovation so that it is acceptable and perceived as advantageous by potential user groups in their specific context or environment. These processes are aimed at achieving a “fit” between the innovation and the user group.

Key enabling factors. Three innovations that have been key for effectively fitting and packaging of BF promotion programs, resulting in successful scale up, are as follows: 1) communications and mass media campaigns that set the stage for the introduction of a BF promotion program in target areas (13,14,16–18); 2) facility-based delivery systems [e.g., Baby-Friendly Hospital Initiative (BFHI)] (7,9–12,14,18,19); and 3) community-based EBF promotion and support programs that include peer counselors, community health workers, mother-to-mother support groups (8,13,15,18), and visible community events (e.g., World Breastfeeding Week) (14,15).

Illustrative examples. Since 1975, Brazil has experienced an increase of >8 mo in average BF duration, accompanied by an impressive 8-fold increase in EBF rates among infants younger than 6 mo old. The Brazilian program that led to these remarkable results included innovative community approaches to improve the fit of the organization to local needs, including the Baby-Friendly Primary Health Care Unit (BFPHCU) innovation that was built on the facility-based BFHI and was successfully scaled up in the state of Rio de Janeiro, Brazil. This initiative includes 10 universal steps that should be met at local primary health care units (i.e., not at the hospital level) to promote and support BF

at the community level. Some of these steps include BF training for all primary health care unit staff, including community health agents (equivalent to peer counselors), and the formation of BF support groups. In the state of Rio de Janeiro, where BFPHCU has been scaled up, EBF rates among children younger than 6 mo were significantly higher in those primary health care units with better BFPHCU implementation (5,6).

A second set of examples are the many mass media BF promotion campaigns that have been designed with the specific goals of increasing the acceptability of BF and creating an atmosphere where this infant feeding behavior is perceived as advantageous (9,14,20). These campaigns can be particularly effective when based on formative marketing research that fully takes into account the community needs and wants (9). After doing extensive formative research, Brazil launched its national BF program in March 1981 through a mass media campaign that had the specific goal of laying the ground work for receptivity of implementation; this goal was achieved by sensitizing the public and government about the need for and the types of major structural and behavioral changes expected ahead. This initial campaign lasted 45 d and included reaching out to 13.5 million households via television, and many more via radio. Other components included press advertisements and messages on lottery tickets, telephone bills, electricity bills, water bills, and bank statements. Overall, the campaign was very successful at laying the ground work for the implementation of the program (14).

Last, the annual World Breastfeeding Week celebrated worldwide is an innovation that has also served the purpose of fostering a BF-friendly atmosphere and preparing target institutions and communities for the introduction of forthcoming BF programs. For example, the previously discussed Pembo project was formally launched at a highly visible event during World Breastfeeding Week and was attended by the local and state department of health officials as well as women from the community. The “packaging” for the delivery of BF promotion through peer counselors followed soon thereafter. As illustrated in the following sections, both mass media and visible community events are approaches that have also been used for the development and/or engagement components of the AIDED scale-up framework.

Develop

In the develop component, attention is directed at fostering enabling relationships, environments, and networks among partners who can support and facilitate the spread of the innovation. This section summarizes how international consensus meetings, fostering political will, legislation, workforce development, and infrastructure investments are key to developing the intersectoral partnerships needed for successful scale up (9,12,14,16,20).

Key enabling factors. Global BF promotion efforts have been built on the foundation established by evidence-based international consensus meetings/declarations (Bellagio and

Table 2. Enabling factors for the dissemination, diffusion, scale up, and sustainability of exclusive breastfeeding by AIDED framework components

Enabling factor	Sources citing factor, <i>n</i>	AIDED framework components mapped to factor
Contextual		
International advocacy groups: International Baby Food Action Network, World Alliance for Breastfeeding Action	5	Develop
Evidence-based recommendations: timely initiation of breastfeeding; exclusive breastfeeding for 6 mo (WHO)	5	Develop
International consensus meetings/declarations: Bellagio and beyond	8	Develop
Political support		
Cost/savings analyses	6	Assess
Local advocacy and coalition building, including public opinion leaders	8	Develop
Civil society mobilization and engagement	6	Develop
Political sensitization	6	Develop
Political will	6	Develop
Long-term commitment to scaling up	9	Devolve
Process and sustainability facilitators		
Research and evaluation		
Baseline facility and community needs assessments	7	Assess
Operational (formative) research/pilot studies	8	Assess
Program delivery		
Facility-based delivery system, e.g., Baby-Friendly Hospital Initiative	8	Innovate, develop, engage, devolve
Community-based exclusive breastfeeding promotion and support: baby-friendly primary health care units, peer counselors, community health workers, mother-to-mother support groups	8	Innovate, develop, engage, devolve
Communications/mass media campaigns targeting opinion leaders, policymakers, mothers; simple and doable messages; celebrities	8	Innovate, develop, engage
Visible community events: world breastfeeding week, other	3	Innovate, engage, devolve
Program delivery through other existing programs: immunizations, diarrheal control, family planning, and other programs	6	Innovate, develop, engage, devolve
Workforce development		
Training: administrators, health professionals, and paraprofessionals	10	Develop, devolve
Endorsement from medical societies	3	Develop
Medical/nursing school curricula	3	Develop
Legislation		
Legislation: maternity leave, workplace, WHO Code	6	Develop, devolve
Program coordination and quality control		
Intersectoral coordination: government, civil society (nongovernmental organizations, philanthropists), medical societies, academic researchers, mass media	8	Develop, engage, devolve
Monitoring and evaluation, low cost, rapid response	6	Assess, devolve

beyond) (7,9,10,13–16,20) and global infant feeding recommendations issued by UNICEF and WHO (8,13–16). Translating this support into action has greatly benefited from the efforts of international advocacy groups (e.g., International Baby Food Action Network, World Alliance for Breastfeeding Action) (9,13–15) and local advocacy groups, as well as coalition building with various stakeholders, including public opinion leaders (9,12–18). Before scale up can proceed, it is crucial to elicit political will (12,14,15,18,21) and long-term commitment for scale up (9,12–18) from policymakers through political sensitization (12–15,18) based on cost/savings analyses (13–17), and civil society mobilization and engagement (13–16,18).

Maternity leave and workplace legislation, as well as the enforcement of the WHO International Code of Marketing of Breast Milk Substitutes (WHO Code) (22), are key for attaining the supportive environment needed for EBF promotion to succeed on a large scale (14–17). The frequent violation of the WHO Code has consistently been identified as a major barrier to BF promotion (8–10,14,15,20).

Key to sustainable large-scale BF promotion is the training of administrators, health professionals, and paraprofessionals (8,13–16,21), a process that can be facilitated by improvements in medical/nursing school curricula (9,10,12,14,18). The physical infrastructure for the delivery of BF support at the facility and community level needs to

be in place for successful large scale up to occur. For example, a major barrier to the initial implementation of BFHI in many countries was that maternity wards were not designed to accommodate rooming-in (9,10). Lack of community-level infrastructure for lactation management support continues to be a major barrier to EBF promotion globally (16–18).

Illustrative example. The BF promotion literature illustrates the value of reaching global consensus and explains both why it is necessary and how to successfully promote desired family health behaviors. The evidence-based outcome recommendations (e.g., EBF for 6 mo) and the effective evidence-based approaches for promoting the desirable behavior (e.g., BFHI, community peer counselors) led intersectoral coalitions to organize highly visible consensus conferences. These, in turn, led to consensus declarations or global calls for action that provided the momentum for global BF promotion scale up.

In the 1970s, a global coalition formed by civil society and other stakeholders lobbied for infant formula companies to change their marketing approaches. This movement eventually led to the development of the WHO Code, adopted in 1981 by the WHO Assembly. In 1990, The Innocenti Declaration on the Protection, Promotion, and Support of Breastfeeding (23) recommended 4 actions: establishment of national BF committees, implementation of the 10 Steps to Successful Breastfeeding in maternity services, national legislation to protect the BF rights of employed women, and implementation of WHO Code. In 1991, after being successful at generating strong political will, WHO and UNICEF launched the BFHI, leading to the rapid global uptake and spread of this innovative program. Subsequently, the 2002 Global Strategy for Infant and Young Child Feeding reaffirmed the goals of the 1990 Innocenti Declaration and emphasized the need for strengthening BF support at the community level. The empirical evidence strongly supports the major influence that these consensus meetings have had in the successful launching and sustaining of BF promotion programs at scale in LMIC (7–12,14–19).

Media campaigns have also been used to generate support among stakeholders, which is key to the successful implementation of the program. For example, in the Brazilian program, the National Nutrition Institute requested funds from UNICEF in 1980 to develop an audiovisual presentation to document the need for a BF promotion program and elicit support among politicians, health officials, mass media, community leaders, and the Catholic Church (9,14). The audiovisual featured well-known and highly respected pediatricians. The key messages were “BF promotion saves money” and “we understand how to promote BF.” After touring the country and presenting this audiovisual to the ministers of health and welfare, the government agreed to launch the Brazilian National BF promotion program in 1981. The success of this strategy for generating political will and support can be traced back to the extensive

formative assessment phase on which the content of the messages and the dissemination strategies were based.

Engage

Although engagement occurs throughout the process of dissemination and diffusion, it is particularly central to the tasks of introducing the innovation from outside the user group to inside the user group through such methods as boundary spanners, translating the innovation so that user groups can assimilate the new information, and integrating the innovation into the routine practices and social norms of the user group.

Key enabling factors. BF promotion programs ultimately seek to engage the mother in considering the use of optimal infant feeding behaviors, including EBF. There are many factors that influence a mother’s infant feeding decisions, including the advice from health care providers, family, neighbors, friends, media, and others. Small trials have shown that women across cultures are significantly more likely to practice EBF when they are presented with innovative approaches that take into account the contexts in which they live. The key to the success of these interventions has been addressing cultural beliefs surrounding their infant feeding choices, such as the often unfounded belief that women are not able to produce enough milk for EBF of their infants (13,15,17,18,21). This pervasive belief has consistently been identified as one of the strongest risk factors for the early introduction of replacement infant feedings including infant formula. Once infant formula is introduced, the likelihood that the mother will revert to EBF is exceedingly low, and any BF duration becomes shortened as a result. Thus, it is crucial to understand the roots of this pervasive belief in different cultures to address it effectively (24).

A key barrier to the scale up of BF promotion programs is the lack of adequate communication skills among health care providers and peer counselors/community health workers (17,18). Thus, developing a work force that is well trained in the technical aspects of lactation management and BF promotion is necessary, but not a sufficient condition for successful scale up. Scale up requires developing the communication and counseling skills of individuals providing BF support to women. Good receptivity is most likely when women and individuals in their circle of influence fully engage in the decision-making process (17); otherwise, efforts to successfully engage target individuals are compromised and scale up eventually fails. Innovative facility- and community-based BF promotion approaches (through, for example, peer counselors, community health workers, mother-to-mother support groups) are indeed crucial for proper engagement of target individuals (8,13,15,18).

Illustrative example. Bangladesh is a country where significant BF promotion efforts have taken place; however, until recently, less than half of Bangladeshi infants younger than 5 mo were exclusively breast-fed, and this rate remained stable

for 15 y. Although the Bangladeshi program was successful at implementing the WHO Code in the country, introducing maternity leave legislation, and promoting heavy investment in BFHI efforts, the program failed to recognize that 85% of Bangladeshi newborns are delivered outside health facilities. Recognizing that the program has to be improved to be successful at engaging a key target audience (i.e., women who still have little contact with health sector maternity services), the country is currently piloting innovative community-based BF promotion approaches such as community nutrition promoters and mother-to-mother support groups (17). Recent reports indicate that EBF rates in Bangladesh have substantially improved as a result (25).

Sri Lanka, a country where 95% of women attend prenatal care and give birth in health care facilities, in contrast with Bangladesh, was able to increase EBF among infants younger than 5 mo from 17% in 1995 to 76% in 2006. Two major components of the country's program were extensive lactation management training of the vast majority of health workers posted in hospitals and field clinics (i.e., engaged through training) and working together with public health midwives providing home visits within the first 10 d after delivery. The Sri Lanka experience strongly supports the need for national BF promotion programs to engage target women at both the health facility and community levels through innovative approaches (17).

Mass media in Brazil was also used for engaging women in the BF program, in addition to its use during the components of the innovate and develop steps discussed previously, focusing on directly empowering women to breastfeed through messages combating the belief that women do not produce enough milk for EBF. Messages were delivered through highly innovative methods, such as being printed on electricity bills and bank statements and on television. The television spots featured well-known sports stars and other celebrities and were aired during commercial breaks of a popular soap opera with an audience reach estimated at 500 million viewers in just 2 cities. Thus, large numbers of women and families were exposed multiple times to these messages multiple times (9,14).

Devolve

This component involves the initial user groups' spreading the innovation within their peer networks, shifting the process to be mostly driven by the user groups and their networks rather than by the original innovator or external party. These user groups and their networks replicate and release the innovation (in adapted and potentially failed forms) in the way they see most appropriate.

Key enabling factors. Once a BF promotion program has been successfully scaled up and EBF uptake is widespread among the initial users, efforts to devolve for continued spreading among the next generation of users are critical for sustaining the initial scale-up phase. For this to happen, 6 conditions need to be met. First, effective sustainable lactation management and communication/counseling

through train-the-trainers programs need to be in place (9,10,19). Second, a sustainable workforce development pipeline including medical, nursing, and technical schools needs to be developed (9,10,17). Third, national intersectoral BF coordination with adequate budget allocation should not rely heavily on foreign aid and should be highly decentralized, as in the case of Brazil (5,6,14). Key sectors to be involved should be target women and communities, government, civil society (e.g., nongovernmental organizations, philanthropists), international agencies, medical societies, academic researchers, and mass media (13,14,16–18). Fourth, systems to avoid redundancies by incorporating BF promotion through existing programs (diarrhea, immunizations, family planning, growth monitoring) must be in place (16–18). Fifth, facility- and community-based infrastructure needed for effective BF promotion must also be in place (16–18). Sixth, there must be monitoring and evaluation systems that include low-cost rapid-response management information systems to facilitate local decentralized management of BF promotion efforts (11,13,14,16).

Scale-up experiences have also identified specific barriers to devolving, including the lack of proper incentives for staff, program "fatigue," draining of trained workforce members from the initial user groups, and attempting to devolve through staff who are already overburdened by other duties (7,11,16–18) (Table 3). Program fatigue has been identified to be one of the reasons for a decline in BFHI quality in several countries (26), including El Salvador (11), where BFHI was launched more than a decade ago. It is apparent that the fidelity to this package of steps has declined with time, especially once initial certification and recognition are obtained (11).

Illustrative example. Although the case of Brazil illustrates a successful decentralized scale-up model that meets the 6 devolving criteria outlined here, the literature is full of examples of initiatives (11,26) and countries where initial programs do not devolve.

The national Brazilian BF program illustrates how a well-coordinated multisectoral national BF promotion program likely explains the increase in median BF duration from 2 to 10 mo in a 25-y period (14). Impressive improvements in EBF were documented over the same period of time. The process that led to the successful scaling up of BF promotion in Brazil included the following steps (27): 1) baseline needs assessment including data on infant feeding practices; 2) advocacy (including the sensitization of decision makers based on scientific evidence of BF health and economic benefits and international consensus on BF policies/recommendations); 3) national and local mass media campaigns, social mobilization (e.g., World Breastfeeding Week); 4) implementation and spread of BFHI; 5) lactation management and communications/counseling training (development of human resources); 6) legislation (maternity/paternity leave, BF at work); and 7) monitoring and evaluation (including monitoring of the WHO Code). There was a lag time of ~6 y before significant BF duration

Table 3. Barriers to the dissemination, diffusion, scale up, and sustainability of exclusive breastfeeding by AIDED framework components

Barrier	Sources citing factor, <i>n</i>	AIDED framework component(s) mapped to factor
Unethical marketing of infant formula	7	Develop, engage, devolve
Maternal employment	2	Engage
Unsustainable workforce development system (affects sustainability)	3	Devolve
Overburdened staff in medical facilities and in community health settings	1	Devolve
Community health worker investment just to promote breastfeeding difficult to justify	5	Develop, devolve
Strong dependency on international aid (affects sustainability)	3	Devolve
Weak monitoring and evaluation systems	3	Assess, develop, devolve
Prolonged lag time before impacts can be detected	1	Devolve
Lack of community-level breastfeeding promotion and support	3	Develop, engage, devolve
High turnover of unpaid "volunteers"	3	Develop, devolve
Cultural beliefs: "insufficient" milk, other	5	Innovate, engage
Lack of multilevel incentives	1	Assess, devolve
Program "fatigue"	2	Devolve
Lack of referral system for lactation management problems	1	Engage
Poor interpersonal communication skills among peer counselors/community health workers	2	Assess, develop, engage

increases began to be detected. During the first 3 to 4 y, barriers to BF (free formula distribution, unethical advertisement by infant formula companies, medical education biases) were much stronger than facilitators (e.g., single-institution/small-scale BF promotion efforts, small advocacy efforts). The balance between barriers and facilitators improved significantly across time. Dependence on foreign assistance for sustainability also declined as the country continued to build its own critical capacity to succeed, eventually reaching a point where it has become self-sustaining.

A recent analysis of the work of Rea and others in Brazil (14,27) posits that the successful national program can be represented by a social marketing framework (27). The Brazilian experience offers 2 important lessons. First, social marketing can be a very useful conceptual framework for guiding the scale up of BF promotion programs. This framework, which is fully consistent with the AIDED model, suggests that when a product is available (such as BF) to fulfill a need (mother-child health improvement), can be offered to consumers in highly affordable and accessible attractive packages (e.g., BFHI, peer counseling, mother-to-mother support groups) and is positioned through key locations (health facilities, communities), then the dissemination, diffusion, and scale up of a public health intervention is facilitated. The successful social marketing of BF promotion in Brazil relied on the following: 1) strong support from government, civil societies, international agencies, academic and philanthropic organizations; 2) mass media (public opinion, behavior change communications); 3) strong intersectoral coordination [civil society, policymakers, professional societies (e.g., medical doctors, nurses), medical/nursing schools, governmental and nongovernmental organizations (including international agencies), mass media, and academic institutions]; and 4) decentralization. Second, the relatively long initial lag time observed in Brazil may be shorter in countries with fewer initial barriers to BF promotion scale up. Empirical evidence supporting this proposition is accumulating from other countries (12,15).

In contrast to Brazil, the Philippines national experience illustrates how initial scale up can become unsustainable when the conditions for effective devolution are not met. In the Philippines, EBF increased in the mid-1990s after a vigorous launching and spread of BFHI and WHO Code implementation. Nevertheless, little improvement was observed thereafter with only about one third of Filipino infants younger than 3 mo being exclusively breast-fed. A case study analysis (17) concluded that the main reasons for the lack of sustainability were as follows: 1) disengagement of ministry of health with the program due to restructuring, 2) high turnover of staff involved with BF program without replacements, 3) collapse of the monitoring and evaluation system, 4) restrengthening marketing efforts by infant formula companies (very likely as a result of the weakening of the WHO Code implementation), and 5) a highly centralized system with little devolving capabilities, especially at the community level.

The Philippines case study, together with the Brazilian experience, provides empirical support to the notion that multicomponent, well-coordinated intersectoral programs are the engine that drives not only successful initial scale up, but the ability to devolve or sustain the program. The key program components are highly interdependent; thus, once any of the key elements in the system starts to fail, the engine that drives the BF promotion program starts unraveling.

Breastfeeding gear model

We applied the AIDED framework and our previous extensive analysis of the Brazilian BF program to develop the parsimonious and testable dynamic BFGM. The BFGM posits that evidence-based advocacy is needed to generate the necessary political will to enact legislation and policies to protect, promote, and support BF at the hospital and community level. This political-policy axis is in turn needed to generate the resources needed to support the needed workforce development and program delivery, as well as for promotion

through mass media and local events. Research and evaluation are needed to maintain the effectiveness and control the quality of the programs. For the BF engine to work, a master gear is needed to serve the role of goal setting, coordination, and feedback (Fig. 2).

The BFGM suggests possible reasons why Brazil has been much more successful than Mexico at improving both the prevalence of EBF (Fig. 3A) and any BF duration (Fig. 3B) over the past 2 decades. In the case of Brazil, an analysis of the work conducted by Rea (14,27) carefully documenting the initiatives that have coincided with improvements in BF outcomes shows that all the elements of the BFGM have been and continue to be in place in that country (Fig. 3C). In contrast, in Mexico, where BFHI was massively launched in 1990 with several of the model gears in place, the effort did not devolve successfully and has significantly deteriorated since then to a point where most of the gears are now missing (and those that have been in “operation” have been fairly weak), perhaps explaining the lack of improvements in BF outcomes over the past 2 decades (Fig. 3D).

Discussion

An integration of the peer-reviewed and gray literature evidence covering sub-Saharan Africa, Latin America, and Asia (Central, Pacific Rim, South, and Southeast) suggests that BF promotion and support programs can now be scaled up relatively quickly through the AIDED framework, in combination with the BFGM. Successful scale-up efforts have built on evidence-informed advocacy that has led to impressive social mobilization, political will, and eventually to hospital- and community-based BF promotion policies and legislation (e.g., WHO Code, maternity leave legislation, BF-friendly work environments).

Scale up has been attained through extensive use of health communications strategies and massive professional and paraprofessional training/education efforts based on cascade training models. Scale up requires a high degree of intersectoral coordination, usually at the national and local levels, based on a flexible decentralized structure, and sustainability requires the availability of low-cost and rapid-response monitoring and evaluation systems. This conclusion is fully consistent with the



Figure 2 The breastfeeding gear model for scaling up and sustainability of breastfeeding programs.

recent integrative review by Semenic et al. (28) regarding the implementation of the BFHI. Scale up at the community level has usually been attained by incorporating BF promotion into multiple existing programs (e.g., Community-Integrated Management of Childhood Illness, growth monitoring, diarrhea, immunizations, family planning). Although the process of adoption and spread is now relatively well understood, we still have much to learn about how best to sustain the impacts that have been demonstrated to happen in a relatively short period of time (i.e., <3 y).

Large-scale, mixed-methods studies are needed to better understand how to do the following: 1) develop national and local coordination of flexible decentralized system with adequate quality controls; 2) incorporate BF promotion through existing programs whenever possible (but ensuring that critical mass is in place for adequate EBF support); 3) develop a sustainable pipeline of highly qualified lactation management professionals and paraprofessionals via training of trainer programs and strengthening of health professional school curricula; 4) strengthen monitoring and evaluation systems (including quality control); 5) provide innovative incentives to empower communities to develop a sense of ownership of the programs; 6) better define the optimal background, training, roles, tasks, and incentives needed for a well-prepared and sustainable workforce of community-based paraprofessionals (rapid turnover is a big problem); and 7) avoid high reliance in foreign aid for sustaining the program.

The well-documented case studies of Brazil (14) and Ghana (12), together with the scale-up studies conducted by UNICEF (17) and WHO (18) in numerous countries, indicate that the evidence-informed recommendations emanating from consensus meetings were pragmatic and appropriate for national and global scale up. The exponential increase in baby-friendly certified hospitals during the 1990s is a testament to this effort. The new challenge soon became the sustainability of the scale-up process. This challenge may potentially be met through well-planned devolving strategies accompanied by low-cost rapid-response BF counseling monitoring systems, as illustrated by the national MADLAC (Monitoreo de Ayuda Directa con la Lactancia Materna) experience in El Salvador (11).

Community-based BF support (represented by step 10 of BFHI) has become the focus of national programs seeking to improve and sustain EBF rates. The PROMISE-EBF large-scale randomized trial conducted in sub-Saharan Africa (8) demonstrates that BF peer counseling can indeed be effective at scale up at the community level. However, it also demonstrates that context matters. In this instance, the major EBF improvements found in Burkina Faso and Uganda could not be detected in South Africa, a country with exceedingly low EBF rates, perhaps as a result of widespread availability of infant formula. There is indeed a critical need to conduct health economics studies to understand the cost-effectiveness of community-based BF promotion in diverse settings.

We have identified the AIDED framework as encapsulating the essential steps needed to successfully scale up BF

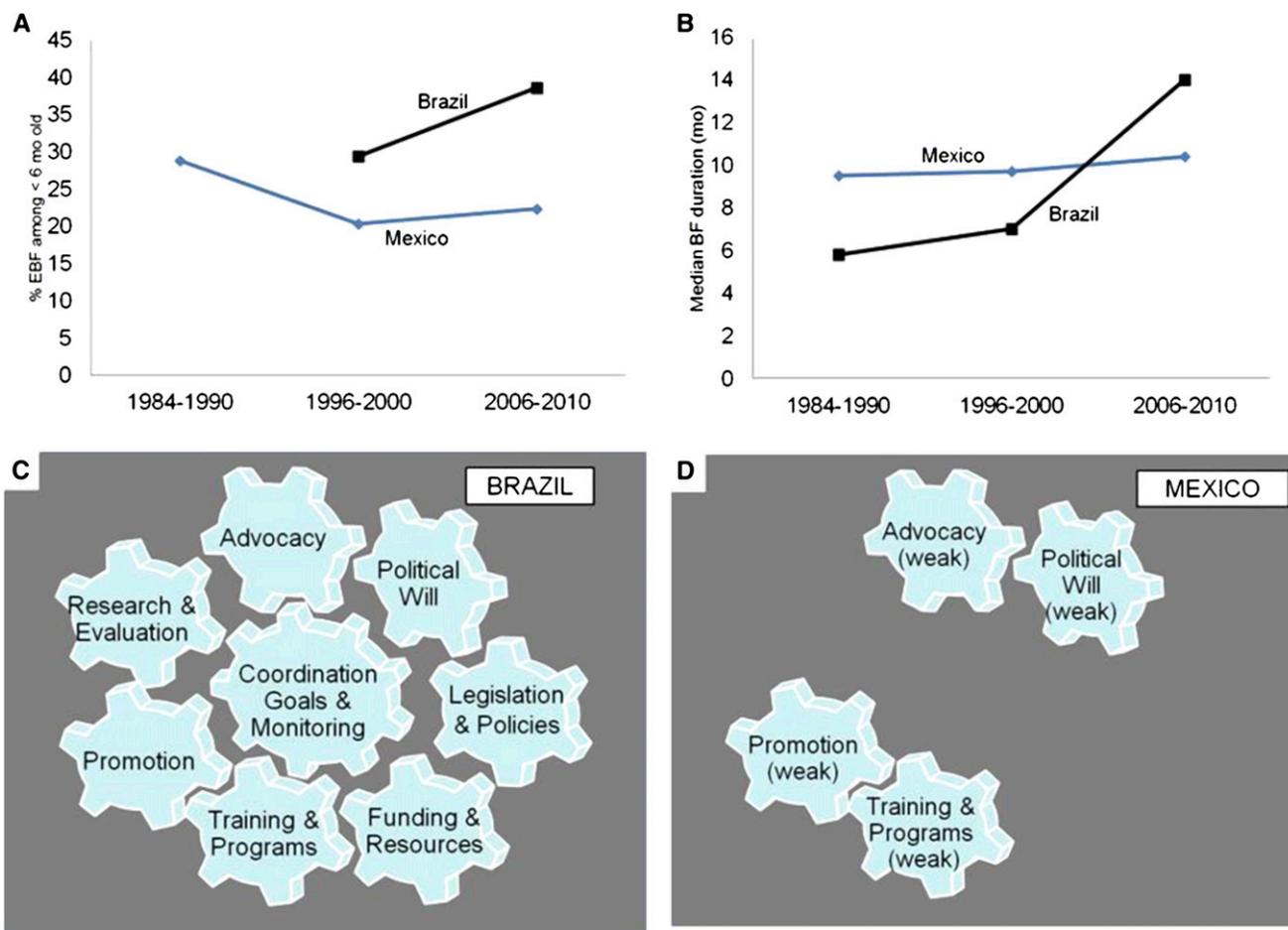


Figure 3 Differential performance in breastfeeding outcomes in Brazil and Mexico explained by the breastfeeding gear model. EBF rates in Brazil and Mexico among infants < 6 mo of age (A), median BF duration in Brazil and Mexico (B), and application of the Breastfeeding Gear Model in Brazil (C), and Mexico (D). Source of breastfeeding trends data are from (29). Note: Advocacy, political will, training and delivery, and promotion gears were present at a much lower intensity in Mexico compared with Brazil.

promotion in LMIC. The BFGM is a dynamic parsimonious model that can help guide these BF scale-up efforts. Although major knowledge gaps remain, substantial progress over the past 2 decades provides a wealth of knowledge ready to be used for scaling up BF promotion in diverse socioeconomic and cultural contexts. We recommend the implementation of large-scale studies to test the empirical validity of the AIDED framework and the BFGM, which in essence is central to the develop component of AIDED, and to continue filling in the knowledge gaps in maintaining the good performance of the system in the long term in different socioeconomic and cultural contexts. Because most BF problems initially develop during the first hours or days after delivery, it is crucial that scaling-up efforts targeting EBF are preceded by formative research to understand how best to reach out to women with sound BF information and support prenatally and in the immediate hours/days after delivery, regardless of where it takes place (17,30).

Acknowledgments

All authors read and approved the final manuscript.

Literature Cited

- Bhutta ZA, Chopra M, Axelson H, Berman P, Boerma T, Bryce J, Bustreo F, Cavagnero E, Cometto G, Daelmans B, et al. Countdown to 2015 decade report (2000–10): taking stock of maternal, newborn, and child survival. *Lancet*. 2010;375:2032–44.
- Bhutta ZA, Ahmed T, Black RE, Cousens S, Dewey K, Giugliani E, Haider BA, Kirkwood B, Morris SS, Sachdev HP, et al. Maternal and Child Undernutrition Study Group. What works? Interventions for maternal and child undernutrition and survival. *Lancet*. 2008;371:417–40.
- Chapman DJ, Morel K, Anderson AK, Damio G, Pérez-Escamilla R. Breastfeeding peer counseling: from efficacy through scale up. *J Hum Lact*. 2010;26:314–26.
- Bradley EH, Curry LA, Taylor L, Pallas S, Talbert-Slagle K, Yuan C, Minhas D, Ciccone D, Berg D, Pérez-Escamilla R. A model for scale up of family health innovations in low- and middle-income settings: A mixed methods study. *BMJ Open*. 2012;4:e000987.
- de Oliveira MI, Camacho LA, Tedstone AE. A method for the evaluation of primary health care units' practice in the promotion, protection, and support of breastfeeding: results from the state of Rio de Janeiro, Brazil. *J Hum Lact*. 2003;19:365–73.
- de Oliveira MI, Camacho LA, Souza IE. Breastfeeding promotion, protection, and support in primary health care in the State of Rio de Janeiro, Brazil: a case of evidence-based public health policy. *Cad Saude Publica*. 2005;21:1901–10.

7. Horton S, Sanghvi T, Phillips M, Fiedler J, Perez-Escamilla R, Lutter C, Rivera A, Segall-Correa AM. Breastfeeding promotion and priority setting in health. *Health Policy Plan.* 1996;11:156–68.
8. Tylleskär T, Jackson D, Meda N, Engebretsen IM, Chopra M, Diallo AH, Doherty T, Ekström EC, Fadnes LT, Goga A, et al. PROMISE-EBF Study Group. Exclusive breastfeeding promotion by peer counsellors in sub-Saharan Africa (PROMISE-EBF): a cluster-randomised trial. *Lancet.* 2011;378:420–7.
9. Jelliffe DB, Jelliffe EFP, editors. *Programmes to promote breastfeeding.* Oxford, UK: Oxford University Press; 1988.
10. Labbok M, McDonald M, editors. *Proceedings of the interagency workshop on health care practices related to breastfeeding.* *Int J Gynaecol Obstet.* 1990;31Suppl 1:1–191.
11. Perez-Escamilla R. Effectiveness of MADLAC at improving breastfeeding promotion and counseling indicators in maternity wards in El Salvador. Washington, DC: USAID; 2004. Available from: http://pdf.usaid.gov/pdf_docs/PNADD052.pdf [accessed September 25, 2011].
12. Timpo OM. Programs and policies associated with improved exclusive breastfeeding rates in Ghana: 1989–2003. Master's thesis. Storrs, CT: University of Connecticut; 2007.
13. Baker EJ, Saneí LC, Franklin N. Early initiation of and exclusive breastfeeding in large-scale community-based programmes in Bolivia and Madagascar. *J Health Popul Nutr.* 2006;24:530–9.
14. Rea MF. A review of breastfeeding in Brazil and how the country has reached ten months' breastfeeding duration. *Cad Saude Publica.* 2003; 19: Suppl 1:S37–45.
15. Salud MA, Gallardo JI, Dineros JA, Gammad AF, Basilio J, Borja V, Iellamo A, Worobec L, Sobel H, Olivé JM. People's initiative to counteract misinformation and marketing practices: the Pembo, Philippines, breastfeeding experience. *J Hum Lact.* 2009;25:341–9.
16. Bhandari N, Kabir AK, Salam MA. Mainstreaming nutrition into maternal and child health programmes: scaling up of exclusive breastfeeding. *Matern Child Nutr.* 2008;4: Suppl 1:5–23.
17. UNICEF. Consolidated report of six-country review of breastfeeding programmes. New York: UNICEF; 2010. Available from: http://www.unicef.org/nutrition/files/TYCF_Booklet_April_2010_Web.pdf [accessed September 25, 2011].
18. WHO. Learning from large-scale community-based programmes to improve breastfeeding practices. Geneva, Switzerland: WHO Press; 2008. Available at: http://whqlibdoc.who.int/publications/2008/9789241597371_eng.pdf [accessed: September 25, 2011].
19. WHO. Evidence for the ten steps to successful breastfeeding. Geneva, Switzerland: WHO Press; 1998. Available from: http://whqlibdoc.who.int/publications/2004/9241591544_eng.pdf [accessed September 25, 2011].
20. Tognetti J. A retrospective and prospective look at international breastfeeding promotion programs. Washington DC: USAID (mimeo); 1985.
21. Burke J. Infant HIV infection: acceptability of preventive strategies in central Tanzania. *AIDS Educ Prev.* 2004;16:415–25.
22. WHO International Code of Marketing of Breast Milk Substitutes. WHO: Geneva; 1981. Available from: http://www.who.int/nutrition/publications/code_english.pdf [Accessed July 13, 2012].
23. Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding; 1990. Available from: <http://www.unicef.org/programme/breastfeeding/innocenti.htm> [Accessed July 13, 2012].
24. Otoo GE, Lartey AA, Pérez-Escamilla R. Perceived incentives and barriers to exclusive breastfeeding among periurban Ghanaian women. *J Hum Lact.* 2009;25:34–41.
25. Alive & Thrive. Change is happening in Bangladesh. Alive & Thrive Technical Brief. Issue 8; May 2012. Available from: <http://www.aliveandthrive.org/newsletter/2012/may/31/issue-8-may-2012-alive-thrive-program-resources-and-technical-brief-essential> [Accessed July 6, 2012].
26. Pérez-Escamilla R. Evidence based breast-feeding promotion: the Baby-Friendly Hospital Initiative. *J Nutr.* 2007;137:484–7.
27. Institute of Medicine (IOM). Updating the USDA National Breastfeeding Campaign: Workshop Summary. Washington DC: National Academies Press; 2011. Available from: <http://www.iom.edu/Reports/2011/Updating-the-USDA-National-Breastfeeding-Campaign-Workshop-Summary.aspx> [Accessed September 25, 2011].
28. Semenic S, Childerhose JE, Lauzière J, Groleau D. Barriers, facilitators, and recommendations related to implementing the Baby-Friendly Initiative (BFI): an integrative review. *J Hum Lact.* 2012;28:317–34.
29. Pan American Health Organization. Situación actual y tendencia de la lactancia materna en América Latina y el Caribe: Implicaciones políticas y programáticas. Washington DC: PAHO, In press 2012.
30. Pérez-Escamilla R. Breastfeeding social marketing: lessons learned from USDA's "Loving Support" Campaign. *Breastfeed Med.* 2012;7:358–63.