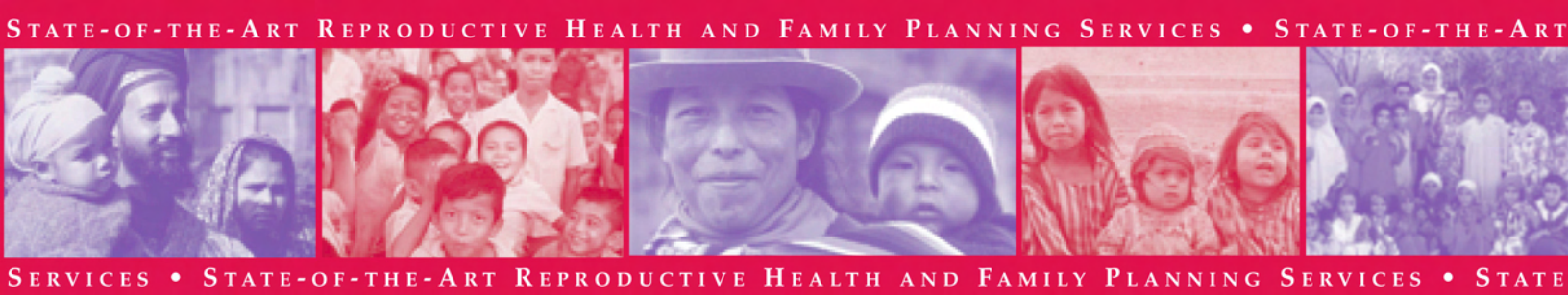

COMMUNITY-BASED POSTPARTUM CARE: AN URGENT UNMET NEED

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The idea of focusing on integrated community-based postpartum care began with USAID staff members, Maureen Norton, Mary Ellen Stanton, and Lily Kak, and to each one, we are grateful. It was through their initiative that this work was funded. We are also grateful to all other CATALYST technical staff who contributed to this paper.

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The CATALYST Consortium is a global reproductive health and family planning activity initiated in September 2000 by the Office of Population and Reproductive Health, Bureau for Global Health of the United States Agency for International Development (USAID). The Consortium is a partnership of five organizations: Academy for Educational Development (AED), Centre for Development and Population Activities (CEDPA), Meridian Group International, Inc., Pathfinder International and PROFAMILIA/Colombia. CATALYST works in reproductive health and family planning through synergistic partnerships and state-of-the-art technical leadership. Its overall strategic objective is to increase the use of sustainable, quality reproductive health and family planning services and healthy practices through clinical and nonclinical programs.

Mission:

CATALYST's mission is to improve the quality and availability of sustainable reproductive health and family planning services.

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ACRONYMS & ABBREVIATIONS

ACNM	American College of Nurse Midwives
AED	Academy for Educational Development
ASUH	Awal Sehat Untak Hidup Sehat (A Healthy Start for Healthy Life)
AVSC	Association for Voluntary Sterilization and Contraception
BASICS	The USAID Basics II Project (Basic Support for Institutionalizing Child Survival)
Bdd	*bidan di desa* (village-based midwife)
BF	Breastfeeding
CEDPA	Centre for Development and Population Activities
CHWs	Community health workers
CSLH	Consultorio San Luis de Huechuraba (an NGO neighborhood-run clinic in Santiago, Chile)
DHS	Demographic and Health Surveys
EBF	Exclusive breastfeeding
HBLSS	Home-based life saving skills
IBI	National Midwifery Association (Indonesia)
IFA	Iron folic acid tablets
IUD	Intrauterine device
JHPIEGO Corporation	An affiliate of Johns Hopkins University, a nonprofit corporation dedicated to improving the health of women and families
KMC	Kangaroo Mother Care
LAM	Lactational amenorrhea method
LSS	Life-saving skills
MA	Medical assistant
MeSH	Medical Subject Headings
MoHP	Ministry of Health and Population
MMR	Maternal mortality ratio (Number of maternal deaths per 100,000 live births)
NGOs	Nongovernmental organizations
OR	Operations research
PATH	Program for Appropriate Technology in Health
PHNI	Population, Health, and Nutrition Information project (USAID-funded project)
PIH	Pregnancy-induced hypertension
PPH	Postpartum health
PPHV	Postpartum home visit
PROCOSI	Programa de Coordinación en Salud Integral (Bolivian NGO network concerned with integral health in Bolivia)
PVO	Private voluntary organization
RCTs	Randomized controlled trials

SBA	Skilled birth attendant
SNL	Saving Newborn Lives
TBA	Traditional birth attendant
TIBF	Timely initiation of breastfeeding
WHO	World Health Organization
USAID	United States Agency for International Development
VHW	Village health worker

EXECUTIVE SUMMARY

Guidance for integrated postpartum care at the community/household level that reduces maternal and newborn mortality and encourages health in the immediate postpartum period is lacking. The objective of this report is to begin to fill that need. The report identifies and summarizes descriptive and research studies of existing community-based postpartum programs which provide counseling and services along with education on self-care.

Integrated, community-based postpartum programs are defined as those which include some or all of the following components:

- Provision of maternal and newborn care, including normal care (examinations, newborn eye and cord care, and linkages to immunization services), maternal nutrition (iron & vitamin A), and complications/illness management through stabilization/referral of cases
- Provision of family planning, birth spacing, LAM counseling, services and support, and referral for clinical methods
- Family counseling on:
    - newborn care (hygiene, warming, exclusive breastfeeding), danger signs and complication readiness
    - nutrition (including immediate and exclusive breastfeeding) and hygiene
    - danger signs of maternal complications and newborn illnesses associated with delivery and the postpartum period, and where to go
    - referral for subsequent maternal and newborn morbidities, such as anemia, postpartum depression, fistulas, prolapsed uterus and infections
    - benefits of birth spacing and risks of other fertility behaviors (e.g., at higher, lower ages)

Research studies of the effectiveness of these components were included in this review if they met the following requirements:

- A brief description of a community-based intervention(s) that aimed to improve family planning, birth spacing, breastfeeding promotion, neonatal health or mortality reduction, and/or maternal survival and health in the postpartum period (immediately following delivery through the first 42 days of the newborn's life or through the year, if family planning is involved)
- Size of the targeted community
- A comparison to show success (e.g., before and after, with or without control or comparison group or area; randomized controlled or cluster trial).

Descriptive studies of barriers and facilitators to the use of any postpartum services and counseling (facility or community-based) and the perceived quality of postpartum care

were also included. Descriptive studies of maternal, perinatal, and neonatal morbidity and mortality were included, if the time and cause of death were known.

Published and unpublished literature on community-based postpartum care was reviewed through a systematic and thorough electronic database search assisted by medical librarians and covering the 1970s through March 2004. These searches were supplemented by contacting appropriate cooperating agencies for relevant unpublished reports and studies. Abstracts of over 750 articles were reviewed for evaluation, 178 articles and reports were retrieved for more detailed evaluation, and 51 studies form the basis of this report.

To assess use of postpartum care as reported in the Demographic and Health Surveys, USAID commissioned the Population, Health and Nutrition Information Project (PHNIP) to explore DHS databases for countries that reported on postpartum care between 1998-2002. Their analysis focused on live births that occurred up to five years prior to the survey and reported on the most recent birth for each woman.

The postpartum period is one of vulnerability for both the mother and newborn, yet neither health programs nor mothers and families recognize this vulnerability. For mothers, death at delivery, immediately thereafter, and through the first week of life can account for 60% or more of all maternal deaths. Among the infants who die in the first year, two-thirds die in the first month of life, two-thirds of these occur during the first week. Two-thirds of infant deaths in the first week of life happen on the first day after being born. Most of these deaths occur among women in developing countries who lack access to skilled care during labor/delivery or in the immediate postpartum period. These numbers are large: Nearly half of women in developing countries deliver without any skilled care and fewer than a third are estimated to receive any postpartum care at all.

To ensure that both mother and baby continue to experience good health following birth, healthy behaviors need to be initiated at that time. Yet the continuum of care from the antenatal through the postpartum period that is needed to foster healthy behaviors is diffuse and inconsistent.

Barriers to use of postpartum care, whether provided in a facility or within the community, include: costs, transport/distance, lack of decision-making power, lack of availability, perceived poor quality of care, and limited recognition of the complications/illnesses that kill, or of their medical etiology. Traditional seclusion of the mother and newborn is a barrier unique to this period, although it has been argued that seclusion does not inhibit care seeking, at least in Pakistan. The barrier that may be the most difficult to overcome is the mother's or provider's lack of motivation to use or administer postpartum care—thinking that, if the mother and newborn have survived delivery, they have crossed the most difficult hurdle. It is obvious that the mortality burden associated with the immediate postpartum period is not understood at any level—including policy level.

Mothers say they want to receive something tangible from postpartum care for both the mother and the newborn (e.g., vitamin A, vaccinations). To this end, some parts of postpartum care could be piggybacked onto the vaccination program for the newborn (and the vaccine date moved closer to the time of delivery).

For women, quality of postpartum care is linked to receiving a useful service, typically for her newborn. Although women state that they also suffer from problems in the postpartum period and may realize the problems are serious and even life-threatening, women rarely seek care before trying other sources for possible cures, such as relatives and traditional healers.

The literature review identified three models of community-base postpartum care:

- Model 1: Home visits by professional health care providers
- Model 2: Home visits by community workers
- Model 3: Home visits by community workers with referral or health facility support

Model 1:
Home visits by professional health care providers may be an appropriate long-term approach. It addresses the identification, referral, and management of complications leading to death as well as promotion of healthy behaviors in the crucial postpartum period when women are trying new behaviors. However, it is probably not feasible in most developing countries, where the expense and demands related to regular home visits by professional health care providers may be too great. Additionally, the logistics to reach women becomes the hurdle as postpartum home visits depend on locating the just-delivered woman, the availability of transport to reach her, and the health provider's motivation to pay the visit, especially immediately postpartum.

A number of countries stipulate that a professional health care provider should visit a woman and her recently delivered newborn at home in the early postpartum period. Examples include Egypt, Indonesia, Zimbabwe, Nepal, India, and Bangladesh. Results from the five studies that examined aspects of home-based care by professionals show that healthy behaviors can be promoted and improved, e.g., exclusive breastfeeding, early breastfeeding initiation, lactational amenorrhea method (LAM), use of family planning, use of iron folate tablets, hygienic care, and immunizations. Theoretically, such programs could manage maternal and newborn complications and illnesses, but there are no data available to support this.

Model 2:
In this approach, nonprofessional community workers pay household visits to provide home care or facilitate women's groups. There is little or no provision for referral in this approach. This is the general pattern of newborn care home visit programs, such as those reported from India over the past two decades. This approach holds promise, especially for neonatal care, as many of the studies have reported success in the reduction of neonatal and perinatal mortality.

There have been 15 studies on the effects of this model. The studies show, for example, that community health workers (CHWs) who have some education, who receive phased training and who are under close supervision, can lower neonatal mortality primarily through reduction of neonatal sepsis, by providing appropriate parenteral antibiotics. Another study also found that, under close supervision, traditional birth attendants (TBAs) were able to reduce pneumonia in newborns with oral antibiotics. Similarly, another study looking at community approaches documented that, in India, TBA training in newborn resuscitation resulted in a decline in perinatal mortality.

Breastfeeding promotion efforts through peer counselors (local women who have had experience with breastfeeding) and other community-based means have proved successful, at pilot- and scaled-up levels (1-6 million total population), in timely initiation of exclusive breastfeeding. Among these efforts, some show additional beneficial health effects (e.g., diarrhea reduction and infant growth).

Community workers can play an important role in facilitating effective participatory group processes. Participatory groups of women, focusing on addressing improved childbirth and newborn care behaviors have also been successful in reducing neonatal mortality. These groups were led by literate women residing in the locality. Other participatory group processes include breastfeeding support groups.

Model 3:
Model 3 involves home visits by community workers with referral or health facility support. It is a community-based outreach system with emergency referral support to a hospital for management of emergency obstetric complications, or outreach by family planning clinics to ensure counseling support, referral for broader contraceptive choice, and clinical management.

Few research studies have used Model 3. Only eight studies, along with four maternal health and four postpartum family planning projects were identified. Outcomes of these projects show improvement in the use of skilled birth attendants, birth planning, family planning continuation rates, and initiation and continuation of full breastfeeding.

Referral links remain the weakest point in Model 3. Locating referral centers closer to women may facilitate their use. Birthing centers, placed in remote, difficult to access localities and staffed by a skilled provider, were part of the successful response to high maternal mortality in Honduras. A community-based health facility with local outreach workers promoting family planning and organizing clinic visit schedules successfully increased continuation rates of family planning methods for up to one year postpartum in Chile.

To integrate community-based postpartum care, programmers will need to address the following issues:

Programmatic Issues:

- **How do we find pregnant and just-delivered women?**
  What would motivate women to register or providers to seek women who deliver at home?
  How can women who deliver at home be located?

- **What is an effective program approach for integrated services?**
  What components should be included (hemorrhage, asphyxia, infection)?
  How frequently should they be delivered?
  Can we prevent some of the problems (hemorrhage, sepsis)?
  Can we predict those who may have problems (low birth weight babies) and follow them more closely?

- **Who and how can the postpartum package be delivered?**
  Household visits or women's groups?
  How much skill is needed? TBA, CHW, or both?

- **How do we scale-up these efforts?**
  How can we prioritize messages and services and build on present structures?
  Should we target areas of under use? Of poverty?

Research Issues:

To support community-based postpartum care programs, research is needed to obtain data on the following topics:

- Time and cause of death/morbidity data for both mother and newborn
- Timing and content of visits and provider skill level needed (e.g., specifically for birth spacing, maternal and newborn complications and illness care)
- Women's perception of postpartum care needs
- Quality of postpartum care—criteria from both women and providers' perspectives
- Cost-effectiveness data on different packages (prevention, risk approach, case management)
- DHS data on postpartum care availability, use, when, from whom, content sought (e.g., care for complications/illnesses) for all postpartum women
- Indicators of postpartum maternal health.

Most countries are likely to have policies and guidelines for postpartum care aimed at a 42-day visit by the woman to providers. This visit is too late to address the urgent health needs of both the mother and newborn. Modification of these policies is urgently needed to address immediate postpartum needs.

Countries themselves will have to define their packages of postpartum care building upon their current infrastructure and resources. At the international level, modification of the present WHO regimen is needed urgently to ensure that women and newborns receive attention immediately following delivery, continuously throughout the first week, and up to four weeks thereafter.

INTRODUCTION

There is a very urgent need to focus on the immediate postpartum period for both the mother and newborn. Not only is the highest concentration of maternal and children's deaths at the time of delivery and immediately thereafter, but both mortality and morbidity for the mother and newborn continue to be relatively high during the first week and up to four weeks postpartum.

The postpartum period is also a period of transition when many women initiate new behaviors. However, the opportunity to provide health care during this critical period is often missed. Across Asia, sub-Saharan Africa, and Latin America, for example, only 3-8% of women state that they want another child within two years of their last birth. For all 27 countries for which there are DHS data, 40% of women in the first year postpartum intend to use a family planning method within the next year. But among those interviewed in their second year postpartum, this level of contraception is not achieved (Ross and Winfrey 2001).

Services are often either not available, or they are not used in the postpartum period. Reasons for lack of use are multiple: women and the newborn may be in traditional seclusion; or, they may not have the funds necessary to access care, decision-making power, or motivation to seek care during this period, believing that having survived birth, they will survive the next phase as well. Programs typically do not focus on this period, except with standard messages on health promotion, which are usually provided at the end of the postpartum period of 42 days. Even at birth, about half of the women in developing countries do not use services, and this proportion is even higher for some of the more vulnerable populations.

Given these factors, there is an obvious need for a community-based approach to postpartum care initiated immediately after delivery and birth. Yet guidance reaching households on effective integrated postpartum care to reduce deaths and promote new behaviors to ensure the health of the mother and her baby is lacking. This report is a first step toward filling that gap. It identifies and summarizes descriptive and research studies of community-based postpartum programs, including self-care, counseling, and services.

Integrated, community-based postpartum programs are defined as including some or all of the following components:

- Provision of maternal and newborn care, including normal care (examinations, newborn eye and cord care, and linkages to immunization services), maternal nutrition (iron & vitamin A), and complications/illness management through stabilization/referral of cases
- Provision of family planning, birth spacing, LAM counseling, services and support, and referral for clinical methods
- Family counseling on:

- newborn care (hygiene, warming, exclusive breastfeeding), danger signs and complication readiness
- nutrition (including immediate and exclusive breastfeeding) and hygiene
- danger signs of maternal complications and newborn illnesses associated with delivery and the postpartum period, and where to go
- referral for subsequent maternal and newborn morbidities, such as anemia, postpartum depression, fistulas, prolapsed uterus and infections
- benefits of birth spacing and risks of other fertility behaviors (e.g., at higher, lower ages)

These community-based postpartum services may be provided at facilities, through home visits or as part of women's empowerment programs that include some element of group learning (e.g., breastfeeding or pregnant women's clubs; women's social networks; literacy or microcredit programs, etc.) and reinforce the adoption of healthy reproductive behaviors through peer group support.

This report addresses the following seven questions by examining both the published and unpublished literature:

1. What is the definition of postpartum care, and what services are currently recommended?
2. Is there an urgent need for postpartum care?
3. What are the patterns of use of community-based postpartum care?
4. What are the barriers and facilitators to use of postpartum care?
5. What models to community-based postpartum care are available now?
   Is there evidence that integrated, community-based postpartum programs are effective in improving knowledge, producing behavior change, or have a beneficial effect on women's/neonate's health and mortality?
6. What are the determinants of quality of community-based postpartum care?

Finally, the report provides recommendations for next steps to fill information gaps and provides lessons learned to develop future guidance for community-based postpartum care programming.

METHODS

This literature review focuses on integrated community-based postpartum care in developing countries. The Academy for Educational Development (AED) Information Services conducted eight searches of two databases (MEDLINE and POPLINE) since 1990 to identify articles or reports on the topics of community-based care for neonatal mortality reduction, early and exclusive breastfeeding promotion, family planning and/or maternal health and survival programs. The following MeSH headings were used: community health services, community health aids, program evaluation; infant, newborn, infant care; maternal welfare; breastfeeding; child health services; developing countries; home care services; health education; perinatal or postpartum. Other key words used included: health seeking or help seeking or care seeking and postpartum or postnatal; La Leche; postpartum and breastfeeding and community.

The author also searched MEDLINE and the Johns Hopkins University Center for Communications Programs database for articles published since the 1970s through March 2004, using the key words: birth spacing, family planning, community-based, and postpartum; and postpartum, maternal morbidity, maternal mortality, neonatal morbidity, and perinatal/neonatal mortality; cause and time of death. Published articles of specific authors known to work in relevant fields in the last three decades were also reviewed, including: A. Bang, A. Costello, A.S. Daga, S.R. Daga, D. Olds, A. Pratinidhi, J. Ross, U. Shah, G. Walraven, C. Westoff, and B. Winikoff. Snowball searching was carried out, whereby citations of the literature referenced in key articles but not identified through the systematic literature searches were obtained.

Unpublished relevant reports were requested from BASICS, CARE, the Centre for Development and Population Activities, EngenderHealth, Family Care International, JHPIEGO Corporation, the Johns Hopkins University Center for Communications Program, LINKAGES Project, MotherCare, NGO Networks for Health, PATH, Population Council, Programa de Coordinación en Salud Integral (PROCOSI), Save the Children, including Saving Newborn Lives research, and the WHO Safe Motherhood program.

Abstracts of over 750 articles were retrieved for evaluation, 178 articles and reports retrieved for more detailed evaluation, and 51 studies formed the basis of this report.

A total of 27 research studies of the effectiveness of components that could comprise "integrated community-based postpartum" programs or such programs themselves were included as they met the following requirements.

- a brief description was provided of a community-based intervention(s) that aimed to improve family planning, birth spacing, breastfeeding promotion, neonatal health or mortality reduction, and/or maternal survival and health in the postpartum period (immediately following delivery through the first 42 days of the newborn's life or through the year if family planning were involved);

- size of the targeted community;
- a comparison to show success (e.g., before/after, with or without control or comparison group; randomized controlled or cluster trial).

Descriptive studies of barriers and facilitators to the use of any postpartum services/ counseling (facility or community-based) and those pertaining to the perceived quality of postpartum care were also included. Finally, descriptive studies on maternal and perinatal and neonatal morbidity and mortality were included, if the time and cause of death were known. A total of 16 descriptive studies were located and reviewed.

To assess use of postpartum care as reported in the Demographic and Health Surveys, the Population, Health and Nutrition Information Project was commissioned by USAID to explore DHS databases for countries that gathered data on postpartum care between 1998-2002, when these questions were first asked. The analysis focuses on live births that occurred up to five years before the survey and reports on the most recent birth for each woman.

RESULTS

Few studies of "integrated community-based postpartum care" programs exist that include any comparison as evidence of success. Many are not called postpartum programs; rather they are referred to by the topical area of focus e.g., reduction of neonatal mortality or breastfeeding promotion. Many are not focused solely on the postpartum period; rather they may begin at the time of prenatal care and continue into the postpartum period with the aim of improving care or health in the latter period (e.g., neonatal health, family planning, and breastfeeding promotion projects). Projects for improving maternal survival and health have most often focused on the care that would reduce maternal mortality (primarily intrapartum and postpartum care) and do not distinguish postpartum care per se. While most projects focus on more than one or two of the many possible components of postpartum care listed above, they often are more integrated in their interventions than the report of their results would lead one to realize. Unfortunately, the effects of coexisting interventions are indistinguishable, and data are often missing.

Given this wide array of material to gather lessons learned for "integrated community-based postpartum care," this report is more inclusive than exclusive: projects/programs are included that provide information on any intervention (integrated or not integrated) that could benefit programming at the community-level for the period immediately postdelivery through the first 42 days of life (or the first year, for family planning purposes).

Inclusiveness has not resulted in a large portfolio of projects/programs from which to draw lessons. The 27 studies that include any comparative measure of program effectiveness are described in Appendix 1. They include the following (note that some of these categories overlap):

- Community-based neonatal mortality research projects are the most detailed and targeted. Results include mortality rates as well as improved health behaviors. However, they are geographically very confined: five of the nine neonatal projects are from India, one from Bolivia, one from Kenya/Tanzania, and two from Indonesia. One study in Indonesia is the scaled-up version of an earlier pilot project.
- Among the seven projects that aim to improve maternal survival and health at the community level, five distinguish the postpartum period. Results are typically given in terms of changed behaviors, not survival of either the mother or newborn.
- Family planning program reports focus on the postpartum period beginning in the 1960s by the Population Council and the Association for Voluntary Surgical Contraception (AVSC) (now EngenderHealth). With two exceptions, reports and articles have focused on facility-based postpartum care programs for family planning. These two studies monitor results beyond the 42 days

postdelivery, following progress for up to one year postpartum (the "extended postpartum period" in the family planning literature). Two other family planning efforts are integrated into a neonatal project and a maternal health project; hence, in total there are four community-based postpartum family planning programs.

- Community-based family planning distribution programs are widely available but have not focused on the postpartum period; surprisingly, reports of programs promoting birth spacing in the postpartum period were not identified.
- Breastfeeding programs have emphasized hospital programs over home-based care, but seven reports provide a measure of effectiveness of programs or projects, which offer community-based care for breastfeeding, including peer counselors and mother-to-mother support groups. Five other projects integrate breastfeeding interventions into other foci.
- Seven studies are operations research projects comparing initiation of home visit programs by a professional or community worker or varying the number of visits. Results of such projects are typically analyzed not in terms of women's knowledge, practices, or health outcomes, but in terms of the percent of women who receive home visits within a specified time following delivery.
- Four studies are project reports of scaling-up efforts to reach a larger audience. While one of these projects provided enhanced outreach by professional providers, the other three promoted community workers acting as individuals or in groups to reach their audience. These projects covered total populations that ranged from 1 to 6 million.
- Descriptive studies of barriers and facilitators (6), quality of care (2), and the time and cause of maternal, perinatal, and neonatal mortality and morbidity (8) also provided valuable information for this report. (Three of these were reviews.)

Demographic and Health Survey reports from 22 countries surveyed between 1998-2002 provided recent data on the use of postpartum care. These data were analyzed and reported by the Population, Health, and Nutrition Information (PHNI) Project and abstracted for this report.

1. What is the definition of the postpartum period, and what services are currently recommended?

According to the World Health Organization (WHO), the postpartum period starts one hour postdelivery of the placenta and includes the following six weeks. Postpartum care should respond to the needs of the mother and baby during this time. This means postpartum care must aim to reduce mortality and severe morbidities, as well as promote the health of both the mother and newborn. To address these multiple needs, postpartum care should include: the prevention and early detection and treatment of complications

and disease and the provision of advice and services on breastfeeding, birth spacing, immunizations, and maternal nutrition (WHO 1988). (See Table 1.)

Others have defined the postpartum period differently. Ross and Winfrey (2001) state that the biologic postpartum period depends upon the return of menses, which ranges widely among women and across societies, primarily due to the duration and intensity of breastfeeding. Culturally, the postpartum period is described as a vulnerable time for women. In many religions and societies, the 40 days following birth are a ritually marked period associated with taboos and sexual abstinence, and are considered a period of pollution, uncleanliness, or one of rejuvenation. Care of the mother might include seclusion, or it might require extensive interaction especially with female relatives who may provide massages, bathing, and special foods (van Esterik 1992).

In this report, the WHO definition using 42 days as the outside limit is adopted. Community-based family planning programs are the exception, as they typically follow progress for one year postpartum. **When** the postpartum period begins in relation to delivery remains unclear in all of the reports and studies reviewed.

Table 1. Components of postpartum care, WHO 1998

Person	6-12 hours	3-6 days	6 weeks	6 months
Baby	Breathing Warmth Feeding Cord care Immunization	Feeding Infection Routine tests	Weight/feeding Immunization	Development Weaning
Mother	Blood loss Pain Blood pressure Advice/warning signs	Breast care Temperature/infection Lochia Mood	Recovery Anemia Contraception	General health Contraception Continuing morbidity

2. Is There an Urgent Need for Postpartum Care?

The data are clear that there is an urgent need for community-based postpartum care for several reasons. Most maternal and infant deaths as well as morbidities are concentrated in the first week of the postpartum period. New behaviors are needed to ensure the health of the mother and newborn. Women appear open to some new behaviors, especially for the newborn, and state that they intend to follow others, such as birth spacing, yet their actual behavioral practices fall far short of their intentions.

Mortality. More than one in four maternal deaths and two in four perinatal deaths in developing countries occur during labor and delivery and within 24 hours postdelivery (Tables 2 and 3). Based on data from seven studies, Li et al (1996) report that 61-72% of

all maternal deaths occur within the 42-day postpartum period. Most of these deaths occur soon after delivery with numbers tapering off as time passes: 45% of maternal postpartum deaths occur within 24 hours of delivery, with 23% more between days 2-7, 14% between days 8-14, 8% between 15-21 days, 6% between 22-30 days, and 4% between 31-42 days (Li et al. 1996).

Direct obstetric causes accounted for 77% of the 684 postpartum deaths in the seven studies for which there were data (Li et al 1996). Half of these women died from hemorrhage occurring within the first seven days postpartum; in one study, postpartum hemorrhage took women's lives within four hours of delivery (Kane et al. 1992). Among those dying within the first week postpartum were women with pregnancy-induced hypertension (12.9%), and a small percentage who experienced obstructed labor or operative complications. Infection took the lives of nearly a third of the women with most of the women (78% of those who died of infection) dying between days 8-28.

Similarly for children, delivery and the early postpartum period are most critical for their survival and health. Intrapartum asphyxia is the primary killer around the time of delivery and day 1 (Bartlett et al. 1991; Lawn and Darmstadt 2002). After day 1, illness and deaths in the first week are caused by very small size, trauma/hypoxia (days 1-3), infection (principally sepsis) (Bartlett et al. 1991), and tetanus (days 4-7) (Fauveau et al. 1994; Lawn and Darmstadt 2002; and Shah et al. 1984). Breastfeeding problems and hypothermia contribute as well (Bang et al. 2001). Infections are the primary cause of late neonatal deaths (Lawn et al. 2001).

Considering the pattern of both maternal and newborn death, the health care needs of mother and baby become obvious (Table 4). Between days 1-3 care is needed to address the problems associated with management at delivery, among others. Infection then becomes the primary killer for both mother and newborn.

Table 2. Maternal deaths during labor and delivery and within the first 24 hours after delivery

Country	Total maternal deaths studied	Percent mortality during labor/delivery and within 24 hours postpartum
India (Bhatia 1993) Rural	262	25.6*
Urban	22	31.8*
Bangladesh (Fauveau et al. 1988)	297	34.0 (48. hrs postpartum)
Bangladesh (Alauddin 1986)	48	23.0
China (Li and Gu 1990)	61	27.9
Egypt (Kane et al. 1992)	156	32.0

* Antepartum deaths, incorporated by the author as deaths occurring the "same day" as delivery, are not included.

Source: Koblinsky et al. 2000

Table 3. Perinatal deaths during labor and delivery and within the first 24 hours after delivery

Country	Number of perinatal deaths studied	Percent of perinatal deaths during delivery and within 24 hours postpartum
Jamaica (Coard et al. 1991)*	2,069	44.0% (min)
Malawi (McDermott et al. 1996)	264	50.4
Indonesia (Stott 1997) Rural Lombok	220	38.6
Urban Mataram	87	49.4
India (Pratinidhi et al. 1986;Shah et al. 1984a)	220	58.6

* Includes fresh stillbirths, macerated stillbirths if they occurred during labor, and deaths between 0-24 hrs.

Table 4. Timing of postpartum death by cause of death for mothers and newborns

Causes	Day 1	Days 2-4	Days 5-7	Days 8-14	Days 15-42
Mother:					
Hemorrhage	X	X	X		
PIH	X				
Infection				X	X
Newborn:					
Asphyxia	X	X	X		
Trauma	X				
Small size	X	X			
Infection			X	X	X
Tetanus			X	X	

Morbidity. Not only maternal mortality but also maternal morbidities (perceived by women with lay worker validation) are highest during the postpartum period, according to two rural studies of home deliveries (Bang et al.2004; Goodburn et al. 1994). Village health workers trained to recognize morbidities prospectively reported that about half of the 772 women observed in Gadchirola, India in 1995-96 suffered morbidity during labor (18%), and/or the puerperium (43%). Common complications in the postpartum period included secondary postpartum hemorrhage (15%), puerperal infections (10%), and breast problems (18%). Heavy bleeding (with use of five or more pads) was a problem for 2% of the women through day 2 and continued through day 5 for less than 1% of the women (Bang et al. 2004).

The Bangladesh rural study reported even higher levels of morbidity, as determined by lay reporting and simple physical examination by community health workers: 92% of women suffered symptoms of ill health during the first two weeks postdelivery, and

nearly 50% were still reporting problems at 12 weeks (Goodburn et al. 1994). Sixteen percent of women reported secondary hemorrhage up to two weeks postdelivery and 5.6% between weeks two and six. Puerperal infections were more common. Twenty-six percent of women suffered any two of three symptoms—fever, foul discharge, or lower abdominal pain—within the first two weeks postpartum, and 15% between weeks two and six. Goodburn and colleagues found that this heavy infection burden was associated with vaginal manual inspection by TBAs and other local birth attendants, duration of the second stage of labor, and the poor nutritional status of mothers (Goodburn et al 1994). Problems of the perineum and of the breasts also plagued Bangladeshi mothers especially during the first two weeks, with some problems, such as perceived poor milk supply continuing even at 12 weeks postdelivery.

Health promotion. Less urgent but extremely critical, is the need for the mother to practice new behaviors and her potential receptivity to such behavior changes in the postpartum period (or earlier).

Multiple behaviors that, **if initiated during the postpartum period,** would promote the health of both the new mother and baby, include: timely initiation of exclusive breastfeeding, feeding of colostrum, exclusive breastfeeding through the first six months of life, extra feeding for small or sick newborns, complementary feeding, normal newborn care (drying, warmth), care for the small baby (nutrition, warmth, kangaroo care), immunizations for the baby (polio, Hepatitis B); birth spacing, LAM, family planning initiation; and hygiene for mother and newborn (cord care, breasts, perineum). Other behaviors that would have an impact on the mother and newborn's health after delivery need to be initiated earlier—**during pregnancy or at the time of labor or delivery**: nutrition for the mother (vitamin A, iron folate); use of a birth kit (or sterilized razor blade); community-based partograph; and tetanus toxoid immunization for the mothers (See Table 5.)

As studies are few and none integrate all of the components, issues on how to prioritize and deliver the interventions, and when and how often to introduce components of health promotion, are subject to debate. However, with the exceptions of normal newborn care, kangaroo mother care (skin-to-skin contact of mother and newborn), community-based partographs and birth kits, there are one or more successful studies of the other efforts shown in Table 5 at the community level delivered by community workers (and possibly with community mobilization and mass media). They are typically small with the exception of breastfeeding promotional efforts.

Protocols for normal newborn care and for the Kangaroo Mother Care at the community level exist and are now being tested (in India and Bangladesh respectively). The Kangaroo Mother Care (KMC)[1] was piloted in Bangladesh and shown to be feasible at

[1] The method was developed in a hospital study in Colombia as an alternative to placing premature, low birth weight newborns in an incubator. As part of kangaroo care, mothers carry babies against their chests for hours each day, keeping babies upright and switching off with fathers or other caretakers when they need a break. The technique is used with premature babies who are medically stable, but cannot yet regulate their body temperatures.

community level (Quasem et al 2003). Birth kits have been used in Nepal and Bangladesh at the community level and one study (Tsu 2000) has shown that they are as effective for decreasing cord infections as are sterilized razors. Only one report pertains to trained CHWs and midwives using a partograph in peripheral maternity clinics (Dujardin et al. 1992) but no reports of community-based partographs were found; yet they may be very useful in preventing asphyxia, as noted in hospital studies (Lawn and Darmstadt 2002).

3. What Are the Patterns of Use of Community-based Postpartum Care?

WHO estimates that levels of use of postpartum care are below 30% for developing countries (WHO 1997); these estimates are lower than those for women delivering with a skilled birth attendant or for use of antenatal care. However, estimates of postpartum care use are poor, as they are not often reported to WHO by countries and, until recently, they were not collected or reported in the Demographic and Health Surveys. Less than a third of developing countries report any national data on postpartum care use to WHO, and these data are typically outdated; for instance, the 1997 report from WHO provides data from the 1980s.

Table 5. Promotion of health for the postpartum period by time for promotion

Health promotion means	Prenatal	Labor/delivery	Day 1 immediate postpartum	Days 2-7	Days 8-42
Timely initiation of breastfeeding	X	X			
Colostrum	X	X	X		
Exclusive breastfeeding LAM Sick baby feeding	X	X	X	X X X	X X X
Danger signs— Mother Newborn	X		X	X	
Partograph		X			
Hygiene Cord care Eye care	X	X	X	X	
Normal newborn care:					

Health promotion means	Prenatal	Labor/delivery	Day 1 immediate postpartum	Days 2-7	Days 8-42
Warmth, drying	X	X	X		
Vaccination	X	X	X		
				X	
Small babies Kangaroo care	X	X	X	X	X
Mother care					
Breast	X			X	X
Perineum	X			X	
Birth spacing				X	X
Family planning	X				
Hygiene	X			X	X
Violence					X
Depression			X	X	X
Nutrition					
Vitamin A				X	X
Iron folate				X	X
Immunization for mother (Tetanus toxoid)	X				
Birth kits		X			

Twenty-two countries have DHS data on postpartum care since they began collecting such information in 1998. A recent review of these data reported the following (Nyangara and Johnston 2004):

- Of the 22 countries with data, only the Philippines and Armenia report that the majority of women with noninstitutional births (most recent last birth, 63 and 8%, respectively) had postpartum care (34 and 5%, respectively). Both Bangladesh and Nepal had a higher percentage of women with noninstitutional births with postpartum care (10 and 19%, respectively) than the proportion who had institutional births (9 and 10%, respectively). (Figure 1.)
- Women who used facilities for birth were more likely to receive specific postpartum services as well, such as vitamin A (16 countries), medical attention for complications (Peru only), and breastfeeding training/advice (reported for four countries). With one exception, Guatemalan women stated they received more vitamin A within two months postpartum if they delivered outside of services.
- Among the 21 countries for which data exist, women with noninstitutional births in 10 countries were as likely (two countries) or more likely (eight countries) to breastfeed their newborns immediately. These included the four

countries in which women were more likely to receive breastfeeding training/advice in a facility (Colombia, Egypt, the Philippines, and Peru).

- Among the 19 countries with available data, over 50% of women delivering outside of facilities received postpartum care within two days in nine countries. In Bangladesh, Haiti, Mali, Nepal, Rwanda, and Uganda, postpartum care was primarily delivered in women's homes, but only in Bangladesh and Uganda was the provider more likely to be a health professional. Trained TBAs or others were the most likely providers in Haiti, Mali, Nepal, and Rwanda.

A continuum of care is necessary to ensure that much of the mother care (self care and care by others) needed in the early postpartum period begins during pregnancy. Use of antenatal care for developing countries is at 68% (data not available for China).[2] However, use of skilled birth attendance at labor and delivery is limited. By the end of 2000, 48% of women delivered without a skilled birth attendant, mainly at home (WHO 2001). (See Table 6.) This is an improvement over the level recorded in 1989, when 66% of women in developing countries delivered without skilled care, but there are particular areas of the world that have not yet seen an improvement— 66% of women in sub-Saharan Africa did not rely on a SBA in 1989, and the same percentage did not use SBA care in 1999. Reliance on use of skilled care has improved in Asia, yet half of all Asian women still do not use such care.

Table 6. Reported lack of use of skilled birth attendant (SBA) for 53 countries, 1989, 1999

UN region	# countries with data	% total regional births	% not attended by SBA, 1989	% not attended by SBA, 1999
Sub-Saharan Africa	17	59	66	66
Middle East and North Africa	9	56	51	36
Asia	7	89	61	51
Latin America and Caribbean	18	74	26	19
Total	53	76	66	48

Source: WHO 2001

[2] WHO 2003. *Antenatal Care in Developing Countries: promises, achievements and missed opportunities: an analysis of trends, levels and differentials, 1990-2001.* P.5

4. What Are the Barriers and Facilitators to Use of Postpartum Care?

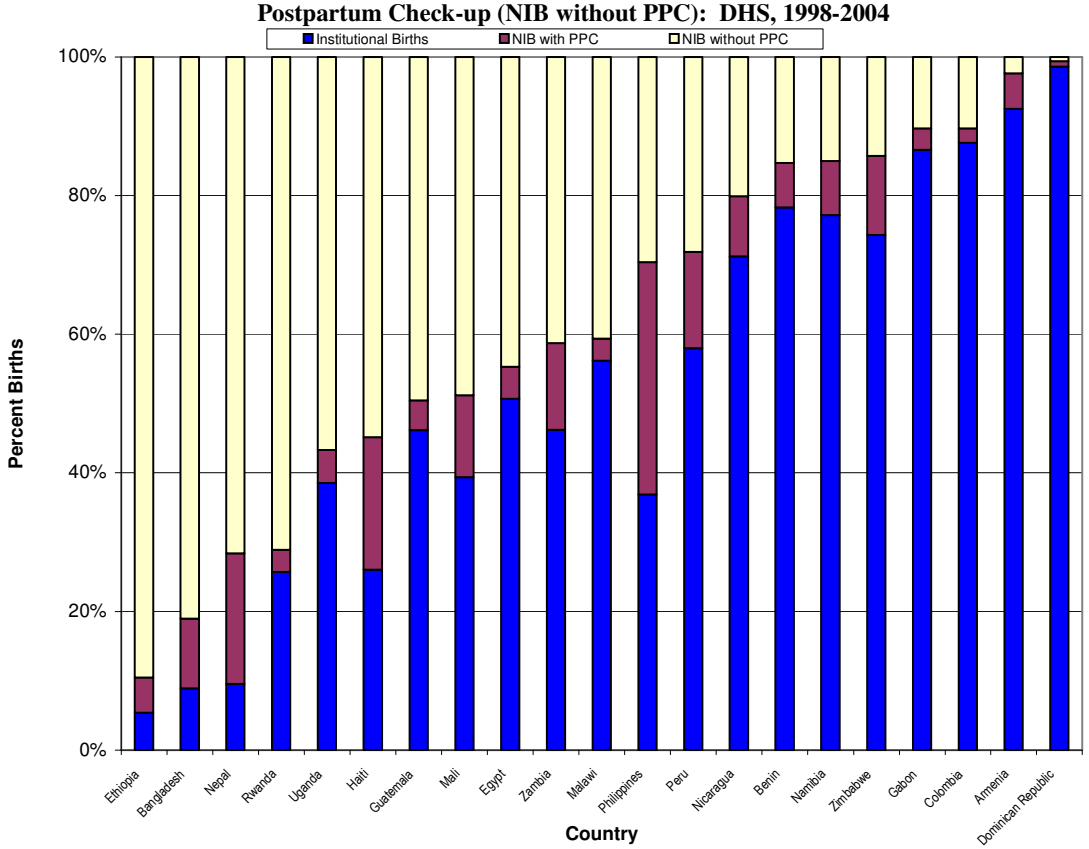
While each field that contributes to "integrated community-based postpartum care" may have its own literature on barriers and facilitators to use of services that pertain to a specific component (e.g., family planning, neonatal care), the literature reviewed in this report addresses barriers and facilitators to the use of "postpartum care," which usually refers to the national program of integrated care postdelivery. These barriers and facilitators to use of postpartum care, either at the facility level or community level, are listed in Table 7.

General barriers to use of postpartum care are similar to those affecting use of many public health services—cost/fees, distance/transport, nonavailability of services/providers, perceived poor quality, and lack of decision-making power on the part of the woman to access such services. They also include some common to the maternal health field: symptoms of complications are not recognized, are ascribed to a nonmedical etiology, or worse still, are considered healthy (e.g., heavy bleeding releases impurities [Fikree et al.2004]). One barrier unique to the postpartum care field is traditional seclusion: women and newborns may not be mobile during the period following delivery because they are vulnerable to evil spirits, are unclean (due to pollution), or need to recuperate. The standard time period for this may be anywhere from 7 to 40 days, and may relate to a period of sexual abstinence, and/or return of menses. Fikree states that the period of seclusion in Karachi, Pakistan pertains to convalescence and protected time for bonding with the newborn. She argues that, as such, it is not a deterrent to health care seeking for perceived serious obstetric morbidities (Fikree et al.2004).

Of major concern is the perceived lack of need for postpartum care described by women in the Egypt study (Cairo University et al. 2003). Women who had recently delivered stated they saw no need for preventive care associated with the postpartum period but would be interested if there were specific objectives for such care, such as improving their health through provision of iron folate tablets or the health of their child through vaccinations. In other words, they wanted specific objectives for postpartum care and wanted to receive something.

Others who may perceive a need for care in the postpartum period do not always act upon their perceptions. Analysis of the 1993-97 DHS surveys in 27 countries show that over 90% of women who had recently delivered were interested in delaying the next birth (Ross and Winfrey 2001). However, of those who were one year postdelivery, two-thirds had an unmet need for contraception. Qualitative data from Bolivia, Peru, India, Pakistan, and Egypt also found that participants (women and men) in focus groups had clear concepts of birth spacing, with the majority expressing a positive attitude towards birth spacing of two or more years following a recent birth (CATALYST Consortium 2003).

Figure 1. Percentage of Institutional Births and Non-institutional Births with Postpartum Check-up (NIB with PPC) and Non-institutional Births without Postpartum Check-up (NIB without PPC): DHS, 1998-2004



On the service side, providers appear unmotivated to provide postpartum care, given that they inform few women of postpartum care or set up few appointments for them (Telfer et al. 2002). In the Karachi study, about half the women delivered in a facility, but relatively few were counseled to attend postpartum clinics (17%) and even fewer (26% of those counseled) actually attended (Fikree et al.2004). Policies regulating outreach visits by professional health providers or specifying a certain number of postpartum visits by women do not necessarily result in action on the part of the providers or potential clients.

Two case studies conducted in Dhaka, Bangladesh and Karachi, Pakistan provide insights into why women do or do not use postpartum care. In a community-based study in a Dhaka slum, 96% of the 122 postpartum women located suffered some malnutrition based on mid-upper arm circumference, and three-quarters of the women reported a nontrivial illness during the first six weeks postpartum (Uzma et al 1999). Nearly one-quarter (24%) of the women described symptoms of puerperal sepsis during the six weeks postpartum, and six were verified on examination at six weeks. Puerperal sepsis was defined as having two or more of the following three symptoms: fever; foul smelling vaginal discharge; and lower abdominal pain. Twenty-five of the 57 women with persistent problems had a vaginal examination, and eight had clearly detectable prolapse. Sixteen women reported symptoms suggestive of lower urinary tract infection (pain or burning on micturition with or without frequency), with one suffering what appeared to be a vesico-vaginal fistula.

Despite serious poverty, 71% of the 96 women reporting illness sought care from a wide range of Western and traditional health care providers, with only two women seeking such care from a qualified medical practitioner. A general pattern to health-care seeking was apparent: perceived mild and self-limiting illnesses were dealt with by a wait-and-see attitude; perceived serious problems generally resulted in seeking care, usually traditional; and, where the condition persisted, a second practitioner was sought, at this stage most commonly a formal medical practitioner. This pattern varied, depending on the degree of trust a woman and her family had in a particular practitioner, the cost or potential cost of care, the acuteness of the problem, and the perceived cause. Less expensive traditional practitioners were initially sought because of less social and physical distance with them.

A similar pattern of postpartum care seeking was found in five areas characterized by low socioeconomic status in Karachi. Women generally sought care initially from close relatives or traditional healers and only turned to Western trained health providers if they continued to suffer (Fikree et al. 2004). This was true whether the problem was typically deemed as not serious (e.g., backache) or very serious (e.g., heavy bleeding).

Since heavy bleeding and sepsis are the two primary killers of mothers in the postpartum period in Karachi, Fikree pursued women's perception of the seriousness of these two problems as the possible pivotal point to adopting appropriate use of skilled care. More women who perceived high fever as very serious or serious sought allopathic care earlier (within 1.2 and 2.8 days of symptom recognition) than they did for heavy bleeding (2.9

days and 5.4 days) (Fikree et al. 2004). Fikree reasoned that the demand for health services does not hinge solely on women's perceptions of the seriousness of the problem. Heavy bleeding, though considered serious, is also considered "healthy" and "normal during puerperium"; high fever on the other hand is "dangerous" and hence warrants quick action.

Table 7. Barriers and facilitators to use of postpartum care (either facility or community-based)

Level of barrier/facilitator	Barriers	Facilitators
Community/ Household	- Symptoms for puerperal sepsis and postabortion sepsis develop slowly and are not easily recognized before peritonitis sets in [2] - Decision making by husband (and/or mother-in-law) [3] - Symptoms of breast problems, perineal injuries, weakness, fatigue, and vaginal bleeding described by women as normal consequence of life [3]; women are more concerned about the baby [5] - Heavy bleeding is considered to be good, as it releases "impurities from the woman's stomach" [6] - High fever was attributed to weakness, washing clothes/utensils, or normal and not attributable to a cause [6] - Cost [3] - Women have little power to access resources; they are not included in decision making [3] - Social and physical distance between poor women and qualified health professionals [3] - Causes of complications nonmedical, including evil spirits, violation of food taboos, heavy physical activity [4], and weakness [6] - Women's seclusion/not mobile due to fear and shame (vulnerable to evil spirits and are impure) (Hindu-30 to 40 days; Muslim-7 days) [7] - TBAs do not alter their beliefs or practices through training [4] - Women unaware of postpartum care [5] - Women do not see a need for preventive services; they set a specific objective for	Integrated community health program with postpartum surveillance [2], [3]

Level of barrier/facilitator	Barriers	Facilitators
	seeking care and postpartum care: a package of health promotion rather than a specific service [5]	
Health services	- Women are not told to get a postpartum check (only 1.3% were informed about postpartum care in Gambia) [1] - Rural areas—shortages of staff, beds, and money for outreach programs results in inadequate postpartum surveillance [2] - Limited resources so that scheduled home visits by nurses cannot be made, including nursing shortages, multiple responsibilities, and lack of incentives [5] - Providers (like a primary health nurse) are "young, inexperienced" [5] - Upon discharge from the hospital, physicians prescribe antibiotics and vitamins to women, hence women see no need for postpartum visits [5] - To report health education activities, provide them before giving women medication, irrespective of women's interest [5] - "Team" is really not true; providers are aligned with vertical programs, which hinder communication.	Vaccination for baby [1] High motivation to seek care, but care must be accessible (close by) [3] Want to receive something: Provision of iron and vitamin A to the woman and neonatal screening for the baby (thyroid function in Egypt) [5] Interest in child health—to get birth certificate and health card for the child immediately postbirth [5]. Coordination between family planning and postpartum services to identify women and combine resources [5]
Health sector/policy/ managerial	Nurse/midwife shortages [5] Vertical programs with no cross-fertilization (e.g., women just delivered not known to postpartum program or to family planning program) [5]	

Sources :

[1] Telfer et al. 2002
[2] Fawcus et al. 1996
[3] Uzma et al. 1999
[4] Goodburn et al. 1995
[5] Cairo University et al. 2003
[6] Fikree et al. 2004

5. What Models to Community-based Postpartum Care Are Available Now?

There are three models to community-based postpartum care in the programs. Within each model, there is the potential for two distinct foci: one on the provision of services for management and referral of complications or illnesses that lead directly to death, and the second on counseling and services for the promotion of health.

- **Model 1: Home visits by professional health care providers.** These are national programs of outreach with services that aim to provide a wide range of care, not just counseling, directly to women in their homes with a few links to health facility care for specific services. Examples are: a primary health nurse in Egypt, or a midwife in Indonesia and Zimbabwe.

- **Model 2: Home visits by community workers.** In this model, there is limited provision of referrals. This is the general pattern of newborn care home visit programs which strive to reduce neonatal mortality, such as those reported from India over the past two decades. Examples of this model that promote health include peer counseling efforts on breastfeeding.

- **Model 3: Home visits by community workers with referral or health facility support.** These workers provide education and some treatment with linkages to health facility services and professional health care providers. The third model combines the advantages of the previous two by providing community outreach through community workers with referral. Examples of mortality reduction efforts are recent maternal and newborn care programs that use community mobilization and community health workers linked with a referral system to hospitals to manage maternal and newborn complications. Community-based postpartum family planning programs also follow this model but with linkages to primary health care facilities for specific methods, further counseling on prevention, or treatment of side effects.

Variations on these models exist, emphasizing different components of care, working through different cadres of workers (but of the approximate same level of skill), and reaching families through household visits, group sessions, and/or mass media. Four of the 27 reports examining the effectiveness of these models aimed to scale-up the first and second models; three of these were breastfeeding promotion efforts. The remaining 23 studies were typically relatively small research studies.

While integration of services (meaning more than one topical focus) in the national programs and projects is the norm, reports and publications generally emphasize and report on only one possible component of postpartum care—family planning, breastfeeding, maternal and child nutrition, neonatal, or maternal survival.

Unfortunately, the effects of coexisting interventions are indistinguishable, and data are rarely presented.

6. Do Integrated, Community-based Postpartum Programs/Projects Increase Knowledge, Produce Behavior Change and Have a Beneficial Effect on Women's/Neonate's Health and Mortality?

Although there is evidence from 27 studies that community-based postpartum programs can be effective in increasing knowledge, changing behaviors (e.g., timely initiation of breastfeeding, exclusive breastfeeding, LAM, use of postpartum contraceptives, use of iron folate tablets) and reducing death rates, specifically neonatal mortality rates, the evidence is often compromised by weak study designs and lack of statistical testing. (See Appendix 1.)

However, four of the 27 effectiveness studies did use a randomized controlled study design; three of these used a cluster or community randomized design. Three of the four randomized control trials (RCTs) evaluated breastfeeding promotion efforts. The pre/postdesign was used in 24 studies, nine of which had a comparison or control group. Facility registers formed the database for two of the studies. (See Table 8.)

Model 1: Home visits by professional health care providers.

Postpartum home visits by professional health care providers can reduce mortality of both the mother and newborn and address the need for health promotion. If such an approach is possible, however, the logistics required to reach women become the hurdle, as postpartum care home visits depend on knowledge of where the just-delivered woman is located, transport to reach her, and motivation to make the visit, especially immediately following delivery.

A number of countries stipulate that a professional health care provider should visit a recently-delivered woman and her newborn at home in the early postpartum period. These countries include Egypt, Indonesia, the Philippines, Zimbabwe, Nepal, India, Bangladesh, and there are probably many more. Few descriptions of these programs exist. In Egypt, an operations research study provided insights into, and the testing of an alternative home visit regimen. In Indonesia, three projects have enhanced the national postpartum program. However, all four of these reports remain unpublished.

Table 8. Community-based postpartum studies by type of study and approach*

Study type	Model 1	Model 2	Model 3	Total
RCT				**4**
Individual	1			1
Cluster		3		3
Factorial design				**1**
Effects			1	
Pre/post Controlled				**9**
Effects	1	5	1	7
OR	1		1	2
Pre/post Uncontrolled				**15**
Effects	2	5	3	10
OR	2		3	5
Posttest control				**2**
Effects			1	1
OR			1	1
Facility registers				**2**
Effects		1	1	2

* The total exceeds 27 studies since some studies used more than one methodological approach.

One published study of postpartum program home visits by professional health care providers is a controlled trial of the effectiveness of a midwife home visit program on the prevalence of health problems and breastfeeding behavior. It is a trial of randomly selected Zambian mothers (who normally deliver in a facility) and their healthy, full-term, newborn babies, during the postpartum period (up to 42 days). It concludes that the intervention, a midwife home visit program (days 3, 7, 28, and 42), reduced the prevalence of infant health problems and enabled mothers to take action when they identified an infant health problem (Ransjo-Arvidson et al. 1998). Unfortunately, this study did not examine the feasibility of the program on a broader scale.

The unpublished reports document the feasibility of a changed postpartum home visit regimen for national program providers and provide information on behavior changes of mothers (e.g., improved self care, infant care, and breastfeeding). From Egypt it is clear that the present home visit regimen mandated by the Government of six visits through the first 40 days of life is not logistically feasible for the primary health nurses, whereas an alternative strategy of one home visit per birth to educate the mother, diagnose problems, and refer them would reach more women and would be more feasible (Cairo University et al. 2003). (See Case Study 1.)

Indonesia presents a unique example of a program with a midwife posted in each village, a population with low fertility and high population density (a community midwife serving

a population of 1,000 to 6,000 may cover as few as an average 23 births per year), and the need for each midwife to build up her clientele because of her short-term contract status with the government. The community midwife (*bidan di desa* [Bdd]) can reach women immediately following delivery, as shown in the MotherCare example (Case Study 2). Even so, when PATH scaled-up their birth-centered program in Indonesia, the community midwives required assistance in finding women through community volunteers. The immunization program provided the added incentive and urgency to make early postpartum program visits, although this early postpartum visit was still seven days postdelivery! (See Case Study 3.)

Model 1. Case Study 1. Egypt Ministry of Health and Population Postpartum Program

As of 2003, the Egyptian Ministry of Health and Population (MoHP) policy for postpartum care called for a primary health nurse from an MCH Center to provide six scheduled home visits (on days 2, 4, 6, 14, 21, and 40) to each mother and baby. During each visit the nurse/midwife is expected to do the following for the mother: take her temperature, ensure adequate nutrition during lactation, examine breasts, and check for possible vaginal bleeding or abnormal discharge. For the child, she must ensure adequate breastfeeding, orient the mother to proper breastfeeding, and inform her about the immunization schedule for the child and proper child hygiene. During the fifth visit on day 21, the nurse instructs the woman to visit the clinic to discuss use of family planning methods (in case of nonresponse, the nurse is to visit again the next day). All data are recorded in the woman's health record, and each visit is recorded in the facility center logbook.

Whether such home visits take place is debatable. According to the Demographic and Health Survey of 2000, about half of the births took place outside of a health facility during the five-year period preceding the survey, and about 13% of these home births were attended by a health care professional. Yet, for births outside of a facility, whether attended by a professional health provider or not, only 8.9% had a postpartum visit according to the women. Most of these visits (56%) were at a facility with about a quarter of the women who had delivered outside a facility receiving care within two days of birth, and another quarter between three to seven days postbirth (El-Zanaty and Way 2001).

Service statistics present a different picture: The average number of postpartum home visits per birth was reported at less than one visit (0.7 visit per birth at the national level with 0.51 visit per birth in urban areas, and 0.77 visit per birth in rural areas) (Cairo University et al. 2003). Although the policy specifies six visits, the home visit rate reported by providers is higher than that reported by women in the DHS survey. This difference could be attributable to the fact that women do not value the visits made and hence do not remember or report them, or providers may overreport their visit pattern. Women interviewed in an operations research study stated they were uninterested in health education only; they wanted to receive something tangible—iron folate or vitamin A or something for their newborn, such as a drug or vaccination. Women stated that they needed an objective to seek care (meaning they wanted something specific from the care). They also stated that home visits by public-sector nurses who do not come with resources were not viewed as desirable (Cairo University et al. 2003).

According to the researchers, the providers' home visit schedule is not feasible. A nurse in an urban health center would have to make 27-54 visits per day to provide six postpartum visits to each woman.

In rural areas, this would require three visits per day. However, many rural health units only have one nurse, and some have none. Furthermore, given the seasonality of births, some months may require many more than the average number of visits, in both urban and rural areas (Cairo University et al. 2003).

The MoHP planners and managers attribute the low visit rate to a lack of personnel. However, it could also be attributable to other reasons. In conservative communities where postpartum women are isolated, such visits may not be welcome (Cairo University et al. 2003).

The operations research study tested an alternative strategy of one home visit per birth that focused on health education, identification of the at-risk mother, and referral to a health facility (outreach-referral strategy vs. outreach-service). This would translate into 4.5-9 home visits per working day of the primary health nurse in urban areas and one visit every other day in the rural area. Following a three-day training aimed at improving health education and communications techniques of the entire team at six health centers, postpartum home visits did increase. The majority of the postpartum visits occurred in the first week, with a small number of women followed-up later on. This was in contrast to the pre-intervention period, which showed a smaller number of women being visited many times. Hence, shifting the visit pattern is feasible and allows for more women to be visited. Whether it addresses the needs expressed by women is not clear.

Governorates successful in achieving a high level of postpartum visits (Alexandria and Cairo) credit their success to the Neonatal Screening Program. Home visits to screen babies for thyroid function permit women's early contact with a health team where they can receive postpartum care. Cross-referral mechanisms between health offices where birth certificates are issued and MCH centers, where women and child health cards are issued, are responsible for the success reported in El-Sharkiaa Governorate (Cairo University et al. 2003).

Model 1. Case Study 2. Indonesia Postpartum Care Program

In 1994, the Government of Indonesia began an ambitious midwifery training program with the goal of placing a midwife in every village to bring services closer to the population in need. The existence of the Safe Motherhood Initiative, the recognition that the maternal mortality ratio (MMR)[3] in Indonesia was among the highest in South East Asia, and the understanding that home is the preferred site for delivery stimulated this program.

In 1995, the Ministry of Health/Indonesia and IBI (National Midwifery Association), with MotherCare and the American College of Nurse Midwives (ACNM), designed and provided competency-based training to enhance the postpartum home visit (PPHV) program to be implemented by village-based midwives (*bidan di desa* [Bdd]) in three districts in South Kalimantan, Indonesia. The goal of the PPHV program was twofold: first, to increase the number of women and neonates who receive care in the period following home delivery and, second, to support the integration of Bdd into the community so that the proportion of home births attended or supervised by Bdd increases.

The PPHV program was designed so that the Bdd visit mothers in the postpartum period would:

- Identify mothers and babies with problems and properly manage or refer them early to the area facility
- Provide counseling to support and increase breastfeeding and family planning
- Provide counseling and iron supplementation for 40 days postpartum to increase compliance and to decrease the prevalence of anemia among women
- Provide counseling for maternal vitamin A supplementation

[3] Number of maternal deaths per 100,000 live births.

- Increase the credibility of the *bidan di desa* as a competent provider of maternal and neonatal care in the eyes of the mother, the family, the traditional birth attendant (TBA), and the community.

Specific assessment activities, interventions, and counseling topics for the mother and the baby were defined for four postpartum visits. The first three visits take place at the woman's home within six hours of delivery, three days after delivery, and two weeks after delivery, and the fourth visit at six weeks may occur either at the health facility or at the woman's home. The specific activities of the Bdd for each visit are described on page 32.

A 1999 evaluation of this postpartum program combined quantitative and qualitative data to answer two key questions:

> Can the *bidan di desa* implement this program as it is defined?
> > Are the content and timing of each visit appropriate to meet the needs of the woman and baby?

Whereas only 36% of women reported the visit of a village midwife during the 40-day seclusion period between 1993 and 1996, by 1999, 72% of the women reported that they had been visited postpartum by a midwife. Among women seen by a trained village midwife, over 64% had received the four visits recommended in the postpartum care program (within six hours, at three days, at two weeks, and at six weeks).

In addition, 42% of the women were visited within 7-12 hours of delivery, a critical time for the prevention of maternal and neonatal ill health. Although some increase in coverage of postpartum care is due to the increased availability of *bidan di desa* in the villages between the two time periods covered in the surveys (1993-96 and 1998-99), the high coverage of visits within the first 24 hours after birth in 1999 is attributable most likely to the PPHV program (Achadi et al. 2000).

Other successful outcomes of the home visit program were that nearly 70% of the postpartum women consumed 40 tablets or more of iron folate tablets (IFA), and 88% were contracepting by the end of week six. However, only one person was using LAM; most women used oral contraceptives (Achadi et al. 2000).

List of activities performed by *bidan di desa*, during home visits in Indonesia

Visit #1: Within six hours of birth

- Recognize excessive bleeding, provide emergency care, and refer as necessary
- Identify lacerations that need repair and refer
- Educate the woman and family about maternal and neonatal danger signs
- Promote early initiation of breastfeeding
- Identify baby with complications, provide emergency care, and refer as necessary
- Prevent hypothermia (no bathing for first 12 hours and keep warm)
- Provide eye prophylaxis and cord care
- Weigh the baby

Visit #2: At three days after birth

- Recognize excessive bleeding and signs of infection, provide emergency care, and refer as necessary
- Recognize and manage breastfeeding problems (sore or cracked nipples, engorged breast, insufficient milk)
- Provide iron folate tables and instructions postpartum
- Advise mother to get vitamin A capsules postpartum
- Recognize neonates that are not eating well, have conjunctivitis, cord infection, jaundice, or other signs of complications, provide emergency care, and refer as necessary
- Reenforce education on maternal and newborn danger signs
- Promote immunizations (BCG, polio, and Hepatitis B)

Visit #3: Two weeks after delivery

- Recognize maternal or neonatal problems, provide emergency care, and refer as necessary
- Recognize and manage breastfeeding problems (sore or cracked nipples, mastitis, insufficient milk)
- Discuss family planning methods, including lactational amenorrhea method (LAM)

Visit #4: Six weeks after delivery

- Confirm involution of uterus
- Recognize and manage breastfeeding problems (sore or cracked nipples, mastitis, insufficient milk, poor weight gain in baby)
- Initiate family planning method
- Promote attendance for baby at the clinic for children under-five.

Source: Achadi et al. 2000

Model 1. Case Study 3. Indonesia Healthy Start for Healthy Life (ASUH)

A PATH-supported program in Indonesia on the islands of Lombak and Sumbawa, the Healthy Start for Child Survival program, organized care around birth and lasted for a decade ending in 1998. A member of the Village Women's Movement identified pregnant women and both the TBA and community midwife, *bidan di desa* (Bdd), attended the birth at home. Follow-up visits within seven days postdelivery by the Bdd provided immunization for the newborn (polio and Hepatitis B) and mother (tetanus), nutritional supplements (IFA and vitamin A), and promoted exclusive breastfeeding and care for the low birth weight baby (PATH 1998).

Based on the increases reported in terms of births attended by a midwife, exclusive breastfeeding, and infants receiving oral polio and Hepatitis B within seven days of birth, the program was scaled-up in four districts in Java with a total population of 6.2 million starting in late 2000. In this program, the Bdds were connected with pregnant or just delivered mothers through volunteer community facilitators or colored flags or signs that announced the event. Trained in communications as well as clinical skills to work with families around improved newborn care (specifically early immunization and exclusive breastfeeding), the Bdd were also supported by mass media, a video, leaflets, and a district-level health system strengthened to provide needed supervision and social mobilization. Only one year following implementation, the number of neonatal visits within seven days of birth increased by a factor of two in the intervention districts (17%) vs. comparison areas to reach 42%, and Hepatitis B vaccinations within seven days increased markedly from 9.6% to more than 36%. Early initiation of breastfeeding, however, did not change until there were specific radio campaigns to emphasize its importance. Exclusive breastfeeding increased in both intervention and comparison districts (PATH 2003).

Model 2: Home Visits by Community Workers.

Model 2 is the polar opposite of Model 1 with home visits made by nonprofessional community workers with little recourse to referral. Such efforts have been used to reduce newborn mortality and to promote health through breastfeeding support.

Newborn mortality reduction projects. Several projects, mainly in India, have focused on training community workers to recognize and treat specific newborn conditions or illnesses (i.e., asphyxia, neonatal sepsis, pneumonia, tetanus), thereby decreasing neonatal mortality. Table 9 displays the components of care from the successful Sirur and Gadchiroli neonatal care projects that have reduced neonatal mortality rates by between 25 and 62%. (Also see Case Studies 4 and 5.)

Community workers, including a trial with trained traditional birth attendants, were found to be effective in reducing pneumonia in newborns. In a meta-analysis of five studies using community approaches, Sazawal and Black showed that training community workers to provide oral antibiotics for pneumonia in the home successfully reduced the point estimate for neonatal mortality between 13 and 30% (Sazawal and Black 2003).

Training of TBAs in essential newborn care has proved to be successful in reducing perinatal and/or neonatal mortality in other projects. In India, TBA training in resuscitation (mucous extractor and bag and mask ventilation) resulted in a decline in the perinatal mortality rate of 19% (Kumar 1995). Similarly, TBA training to maintain the

baby's warmth, resuscitate asphyxiated babies, and provide early appropriate referral for babies with a foot size below 6.5 cm (indicative of a small baby), with the support of the Anganawadi workers, in the rural Neonatal Care Project in Dahanu, India, resulted in neonatal and perinatal mortality rate reductions by 41 and 62%, respectively (Daga et al. 1992; 1993; 1997). TBAs trained to use clean water or milk instead of cow dung on the cord in rural Kenya and Tanzania, where tetanus immunization was not available, reduced the neonatal tetanus death rate to 0.75 from 82 per 1,000 live births between 1981 and 1988 (Meegan et al. 2001).

Relying on a group process facilitated by the staff of Save the Children rather than the education and services of individual community workers, perinatal mortality decreased by 65% over three years in a rural community of Bolivia (O'Rourke et al. 1998). Following the nine steps of an autodiagnóstico process, women's groups identified and prioritized maternal and newborn problems, developed a formal action plan with the community, implemented the plan, and engaged in its evaluation (the *Warmi* intervention). Two years following initiation of the *Warmi* intervention, more women were involved in groups, and significantly more women received prenatal care and breastfed their babies on the first day of life. There was also an increase in the percentage of infants who received attention immediately following delivery. Basic skills for safe delivery were taught to birth attendants in this area, but the women interviewed could not state whether their attendant, often their husbands, had received such training.

Where referral is not possible, these newborn care projects indicate that implementation of a newborn care program through community workers who provide home care or through a group process that provides community-level support can successfully reduce neonatal and perinatal mortality. (See Appendix 1.) Two of these small, well-supervised studies are now being or have been replicated. One is in India where the Gadchirola effort (Bang et al. 1994; 1999) is replicated through seven NGOs and is slated for a major scale-up in five states. They are also testing whether the VHWs' success could be achieved with fewer visits (five instead of seven). In Bangladesh, the ICDDR,B is testing a similar package with fewer VHW visits (Arifeen personal communication). Replicating *Warmi*'s group process in Makwanpur, Nepal in a randomized cluster trial has resulted in a significant 30% reduction in neonatal mortality with approximately one-third of pregnant women participating in the groups. The primary intervention was participation in the groups that tried to develop strategies to manage maternal and newborn problems at the community level (Manandhar et al. 2004).

Table 9. Home-based Newborn Care Packages: Sirur, India and Gadchiroli, India

	Sirur, India (VHWs)	Gadchiroli, India (VHWs)
Birthing		Collect histories of pregnant women Observe labor Hygienic delivery
Newborn care	Sterile cord-cutting Clean baby's mouth and pharynx Resuscitate by mouth-to-mouth Weigh the newborn Feed with dropper, if necessary, if premature Warm the baby Ensure breastfeeding Minimal handling	Examine and weigh neonates Diagnose and treat pneumonia and minor ailments Ensure warmth Asphyxia Clear mucus Tactile stimulation Resuscitation Prematurity Extra warmth Frequent breastfeeding More home visits Sepsis IM Gentamicin Oral Cotrimaxazide Cord care with Gentian Violet Eye care – breast milk and tetracycline Injection of vitamin K Early and exclusive breastfeeding counseling
Risk factors	Low birth weight and small size Preterm birth Feeding problems Illness Mother had a history of prolonged and difficult labor	Asphyxia at one minute postbirth Birth weight by hand held spring balance Temperature by digital thermometer Sepsis, manifested by two of the following: Baby stopped sucking or weakened, according to mother Drowsiness or unconsciousness Skin temperature >99ºF or <95ºF Pus in skin or umbilicus Diarrhea, persistent vomiting, or distention of abdomen Grunting or severe chest in-drawing Respiratory rate ≥60/min (two counts)

Model 2. Case Study 4. Sirur, India: Newborn Care Program

During 1981-82 in Sirur, India, a periurban area near Pune, 25% of the deliveries took place in the municipal hospital, while the remainder took place at home, attended primarily by a relative. Those delivering in the hospital received routine care over three to four days before discharge. At home, an auxiliary nurse midwife saw about 15-20% of the infants during the first four weeks. Enlarging this system with a neonatal package delivered in homes by trained village health workers resulted in a decline in the neonatal mortality rate of 25% from 51.9 to 38.8 per 1,000 live births (Pratinidhi et al. 1986a; 1986b).

The Sirur project depended on 40 educated female village health workers selected and trained to serve the population of 47,000 with three home visits (day 1 or soon after delivery and on days 8 and 29). The village worker identified high-risk cases that required treatment by herself and the nurse, under the supervision of the field medical officer. Twenty-eight percent of infants were identified to be at risk with the risk identified in three-quarters of the cases, and treated in three of every five cases. (Failure to visit the home prior to the death of a baby was an important factor in not identifying the risk.)

The most common risk factors were low birth weight and small size (19.6% of all live births), followed by mother's history of prolonged or difficult labor (5.9%). However, illness and feeding problems (4.9% and 2.3%, respectively), most likely due to infections, had the highest neonatal mortality rates. Causes of neonatal death in the project's last year included 42% from low birth weight and associated complications, another 20% from infections, and 17.8% from asphyxia, the first day after birth being the most critical. Deaths were reduced primarily in the weight group of 2,000-2,499 g. Care administered in this project is detailed in Table 9 above.

Model 2. Case Study 5. Gadchiroli, India: Newborn Care Program

Bang and his colleagues introduced a similar neonatal package to that of Sirur, in a controlled study in a rural district, Gadchirola within Maharashtra, India, where nearly 95% of all births take place in the home with a *dai* (midwife) (Bang et al. 1999). Two additions to the package enhanced its effectiveness: the village health workers (VHWs), trained in the management of neonatal sepsis, could provide parenteral antibiotic treatment directly to sick neonates, and secondly, the VHWs most often attended the births with the local *dai* and could provide resuscitation immediately, if needed (see Table 9 above for the neonatal package). The perinatal and neonatal mortality rates were significantly reduced to 47.8 and 25.5 (a decrease of 71% and 62%, respectively) compared with the control area (nonrandom).

Over the three years of the intervention, increasing numbers of newborns received home-based care and management, reaching 93% of newborns by the last year of the project. Less than 1% of neonates were admitted to the hospital during the project years, and 6.5% were treated for sepsis. Neonatal sepsis was the primary cause of death reduced by program interventions, although asphyxia and, to a much lesser extent, prematurity were also reduced. The authors attributed success in the reduction of all three causes to the use of antibiotics in the management of sepsis. Approximately 83% of septic cases were diagnosed by the VHWs.

At the end of the project with VHWs, causes of the remaining 22 neonatal deaths were primarily birth weight of less than 2,000 g (nine deaths) or prematurity (nine deaths), cases of sepsis missed by the VHW or treatment refused (six deaths), or birth asphyxia (five deaths). Most of these deaths occurred within the first 24 hours of birth.

The VHW was not alone at the village level but joined in the work of the TBA previously trained by SEARCH in hygienic delivery. The TBA working together with male village health workers, had also been trained to dispense iron and calcium tablets to pregnant women, treat common reproductive tract infections in women, and provide case management for pneumonia in children,. The TBA's work in this regard was associated with a 20% reduction in neonatal mortality, primarily through treatment of pneumonia. Neonatal deaths from prematurity and birth asphyxia were also reduced, the latter significantly, presumably through the treatment for pneumonia (Bang et al. 1994).

Breastfeeding promotion projects. Reports from two randomized controlled trials support the strategy of training peer counselors to make home visits to increase timely initiation and the incidence of exclusive breastfeeding. Peer counselors are women with personal breastfeeding experience who come from similar backgrounds as the women they counsel and are willing to help other mothers. The two RCTs, one in Dhaka, Bangladesh (Haider et al 2000) and the other in periurban Mexico City (Morrow et al 1999), both found significantly increased levels of exclusive breastfeeding through five months and three months, respectively, following visit patterns as high as 15 visits (including two during late pregnancy) or as low as three visits postpartum (with one visit during late pregnancy). Diarrhea episodes were significantly reduced in the intervention area with three or six postpartum visits, and lactational amenorrhea and infant weight

gain were improved with the 15-visit regimen.

Huffman and her colleagues (2001) have also shown that early exclusive breastfeeding has the potential to reduce neonatal mortality by preventing hypothermia and hypoglycemia in the first week of life, and infections throughout the first month of life (with the exception of tetanus).

Women's groups, either breastfeeding support groups that are promoted by La Leche League in a number of countries, or groups formed for other purposes (credit, economic development, social, political, and religious functions) that also address breastfeeding, increase exclusive breastfeeding among those they reach (AHLACMA et al 1993; Dearden et al. 2002; Rivera et al. 1993), but they may not be effective alone on a population basis (Dearden et al. 2002).

Building on these small study successes, large-scale, multilevel, comprehensive approaches to breastfeeding promotion and child survival have been undertaken in Madagascar (Guyon and Rambelosan 2002), Ghana (Adjei and Schubert 2002; Chee et al 2002; World LINKAGES/Ghana 2004), Bolivia (World LINKAGES/Bolivia 2004), Honduras (van Roekel et al. 2002) and a similar multilevel effort was tested in a randomized cluster trial in India (Bhandari et al. 2003). All of these projects, with the exception of the RCT in India, cover large segments of the countries with target total populations ranging from 1 to 6 million.

Described in WHO's *Community-based Strategies for Breastfeeding Promotion and Support in Developing Countries*, the projects in Madagascar, Honduras, and India employ different approaches but all include efforts at the policy, service, and community level (Morrow 2004). In all three comprehensive projects, evaluations have shown significant increases in exclusive breastfeeding. In both the Madagascar and Indian projects, they also report significant increases in the duration of exclusive breastfeeding and decreases in diarrhea prevalence rates. The Bolivia and Ghana projects reported significant increases in initiation of breastfeeding within the first hour and in exclusive breastfeeding up to five months of age.

These comprehensive approaches work at all levels of the system to ensure similar messages are emphasized at every point of contact and women and families are supported for optimal, continuous breastfeeding through the first six months of the newborn's life with complementary feeding thereafter. They build a foundation with the development of intersectoral partnerships or coalitions, formative research, monitoring and evaluation, training (using protocols based on international standards) and supervision, strong management, and visionary leadership (Morrow 2004). LINKAGES, the USAID project instrumental in many of the large-scale efforts, teams with local organizations, and applies a systematic behavior change orientation to its advocacy, policy, capacity building, and communication interventions. Case Study 6 below describes the scale-up of these endeavors in Ghana.

Functioning as a catalyst rather than an implementer has proved effective for breastfeeding promotion, LAM, and vaccinations. Which parts of these comprehensive packages are key is not clear, although the Ghana study which looked at avenues of information, begins to point more to communications than to community mobilization as the primary source of information (Adjei and Schubert 2002).

Model 2. Case Study 6. Ghana Breastfeeding Promotion at Scale

The Ghana project began with nine districts in the three northern regions of the country in 1999 and was scaled-up in 2001 and 2002 to cover 22 of the 24 districts in those same three regions with a population of 3 million. The general LINKAGES approach used in Madagascar and Bolivia was also used in Ghana: advocacy and information dissemination, community mobilization and behavior change communication. This was achieved through partnerships with local and international NGOs and the health ministry ranging from sub-district to national level, through capacity building with preservice/in-service training of providers and community partners, and through monitoring and evaluation. LINKAGES does not implement, rather it catalyzes activity and provides training at the central level, promotional materials, and technical assistance (e.g., monitoring and evaluation). Originally, LINKAGES partnered with three local organizations; now they are partnering with over 14. Exclusive breastfeeding and timely initiation of breastfeeding increased significantly in all districts although, as efforts were scaled-up, there was some decline in the rates in the original partner areas (Adjei and Schubert 2002). Radio and health workers were the primary sources of information on breastfeeding among mothers as well as fathers and mothers-in-law. Print materials also reached their target audiences with over 50% of mothers having seen them in both the original and new partner areas (Adjei and Schubert 2002).

A cost-effectiveness analysis found that the cost of replicating the package was $16 per targeted child, the cost per new exclusive breastfeeding (EBF) acceptor was $34, and per new timely initiation of breastfeeding (TIBF) acceptor it was $45. Chee et al. counseled LINKAGES that they could improve their cost-effectiveness by selecting partners that were ready to implement relatively intensive community-level activities, selecting areas with larger target populations in program districts, and selecting populations that have lower baseline EBF and TIBF rates (Chee et al. 2002).

Model 3: Home Visits by Community Workers with Referral or Health Facility Support.

Model 3 aims to reduce maternal and newborn deaths as well as promote health by linking community workers closer to homes with facility-based providers. Model 3 is a compromise between Models 1 and 2—a community-based outreach system with emergency referral or health facility support. **Referral hospital support** is assumed to be necessary for the reduction of maternal mortality and severe morbidities, assuming that only through skilled attendance can hemorrhage, pregnancy-induced hypertension, complications of obstructed or prolonged labor and maternal sepsis be managed. **Referral support to health facilities** is needed for family planning programs in the

postpartum period to ensure choice and distribution of all methods and the management of side effects.

Maternal mortality. Two developments in community-level interventions hold promise for managing or preventing maternal deaths from hemorrhage, the fastest and most frequent of maternal postpartum killers. The **Home-based Life Saving Skills (HBLSS) model** trains community workers to identify, negotiate, and manage problem pregnancies, deliveries, and newborn/postpartum maternal problems. This training of community workers (TBAs or others) can result in their learning ways to better manage hemorrhage, when to use the techniques, and actual correct use when faced with a perceived problem (Sibley 2003). (See Case Study 7.)

Model 3. Case Study 7. Maternal Mortality and Newborn Health: Home-based Life-saving Skills (HBLSS)

Efforts to reduce maternal mortality are best illustrated through two projects using the Home-based Life-saving Skills Strategy. HBLSS is a family-focused, community-based program to reduce maternal and neonatal mortality. The goal is to gain consensus on practices that are not only safe but also feasible and acceptable to users in a home setting, until they reach a referral facility. To this end, the HBLSS model emphasizes community involvement at every step and specifically the involvement of those who will be present at the birth in the home (birth team). The training manual for community workers covers 12 topics, including those aimed at recognition and management of complications in the mother (excessive bleeding, sickness with pain and fever, birth delay, swelling, and seizures) and those for the newborn (trouble breathing at birth, born too small, falls ill). There are also introductory core topics: introduction, woman and baby problems, preventing problems and referral. To facilitate learning among community members who may not be able to read, essential content is reinforced through pictorial Take Action Cards that are taken home for reference. Developed with the community workers, the cards allow community workers to recognize a problem when they see it and pictorially guide them through the steps necessary to manage the complication.

HBLSS also provides for training in Life-saving Skills at the hospital level where referrals are to be sent. Support for the trained HBLSS workers must come from clinical supervisors who may be at the referral hospital and who can support them when complications arise.

At the community level, interventions focus on community mobilization (groups of community leaders) for the development of an emergency transportation system, for continuous support of Home-based Life-saving Skills in the community, and for the dissemination of safe motherhood messages within the community, particularly to leaders and men.

In Ethiopia, in a trial of HBLSS, scores for management of perceived complications by the HBLSS Guides were determined. Women who had recently delivered were interviewed about their delivery and the steps taken in managing any perceived complication they or their newborn had experienced; these steps were recorded in a Complications Audit Form. The management scores are the proportion of appropriate management steps recorded in the form over the total number of steps possible for that particular problem, according to HBLSS protocols. Average case management scores varied by type of complication and attendant (Table 10). For example, scores were somewhat higher for maternal complications compared with neonatal complications (specifically, the one newborn complication asked about). Among maternal complications, scores

were twice as high for signs of bleeding, either antepartum or postpartum, compared with maternal signs of infection. However, the case management scores were variable across women, and the number of cases of any maternal complication reported by women was low (Sibley 2003).

Although the number of complications was small when disaggregated by type of attendant, the difference in average case management scores between these groups was sufficiently large for signs of postpartum hemorrhage to attain significance at statistical power =.75.[4] The score was almost twice as high for cases assisted by HBLSS Guides compared with cases assisted by other unskilled attendants.

However, referral was higher for the unskilled providers in comparison to the HBLSS Guides (34% vs. 20%). There were four maternal deaths, two of which had been referred. The one maternal death due to postpartum bleeding attended by an HBLSS Guide was not referred. All six newborn cases included in the review were referred. Among four newborn deaths, three were referred (Sibley 2003). Why there were more referrals for newborns compared with mothers is not clear.

Another promising development is the safe use of **misoprostol** by just-delivered women to prevent hemorrhage, as reported from Indonesia (Kinzie personal communication). Trials of the HBLSS model and of community-based use of misoprostol, however, are small in size and need to be replicated. Policy issues with regard to the use of drugs by community workers and use of misoprostol for obstetric purposes will need to be pursued.

Referral links remain the weakest point in community-based care. Moving the referral centers closer to women may facilitate its use. **Birthing centers** placed in remote and difficult to access localities and staffed by a skilled provider, were part of the successful response to high maternal mortality in Honduras (Danel and Rivera 2003).

Postpartum family planning programs. Community-based postpartum family planning programs are few in number and depend upon community workers to provide information to women and families regarding where and when to visit clinics for contraception (usually on the 40th day). Although these studies do not consistently show higher levels of contraceptive use when compared with control clinics (without community workers), they typically show greater contraceptive choice, method mix use, and continuation rates up to one year postpartum. (See Case Study 8 for a description of the Chile clinic study [Alvarado et al 1999]; Case Study 9 for the Quetzaltenango, Guatemala—integrated project [Jacobs et al., 2002].)

[4] Statistical power indicates the probability that an analysis will be able to reject a false null hypothesis. Studies without sufficient statistical power may encounter a type II error, failing to reject a false null hypothesis. Thus, they may miss a significant effect of an intervention or treatment. One way of using statistical power analysis is to determine the minimum sample size needed to notice an effect at an acceptable level of probability. For a more indepth discussion of statistical power analysis, see Cohen, J. (1992) "A Power Primer," Psychological Bulletin, Vol. 12, No.1, 155-59.

Model 3. Case Study 8. Chile: Postpartum Family Planning Program

In Santiago, Chile, community workers identify and register all pregnant women in a neighborhood for follow-up to ensure they receive the entire range of information and services related to prenatal care, delivery, breastfeeding, contraceptive methods, immunization, and health check-ups (Alvarado et al. 1999). The CHWs visit women at home twice during their pregnancy to discuss breastfeeding and infant care and once at the maternity ward around the time of delivery. The CHWs also conduct weekly group sessions that new mothers are invited to attend on breastfeeding, maternal nutrition, contraception, and disease prevention.

Postpartum visits to an NGO-run neighborhood clinic with a pediatrician and midwife, the Consultorio San Luis de Huechuraba (CSLH), are scheduled for days 10, 20, 30, and monthly intervals up to one year, where mother and infant are seen together. Contraceptives are initiated at 55 days postpartum.

Such a regimen, with community workers supporting clinic efforts through home visits and group sessions, resulted in greater use of contraceptives with continuation rates at 96-100% at the end of a year. Breastfeeding was consistently around 90% at the end of six months and 55% at the end of 12 months (Diaz 1992). No comparative data are available, nor is there information on type of breastfeeding. The CSLH program had a positive impact on child growth and health, and women reported enhanced self-esteem because of their positive experience of motherhood and the respectful attitude of the CSLH providers (Alvarado et al. 1999).

When to provide information on contraceptives and the types of contraceptives offered to postpartum women was the topic of several Population Council workshops in the 1990s (Brady and Winikoff 1993). Research conducted by AVSC (now EngenderHealth) reported that the vast majority of women (all had institutional deliveries) in the Dominican Republic, India, and Kenya, stated that they wanted contraceptive information before or during pregnancy (Landry et al. 1992). Comparable research on preferred timing of information is needed for women who deliver at home.

The few family planning projects that have extended the reach of formal postpartum services through referrals by community workers have not provided strong support for this strategy. However, the studies themselves faced major methodological and logistical limitations. Increased use of family planning in the postpartum period, witnessed in both the Chile and Guatemala projects, cannot be linked with the efforts of community workers (who provided home visits or informational group sessions), due to limitations in design or implementation.

Similarly, the two HBLSS trials have not succeeded in improving referrals for maternal mortality reduction. In the Ethiopia case, referral was made for the newborn but not for the mother for reasons that are not clear (Sibley et al. in press) and, in India, women primarily used local practitioners rather than referral facilities (Fullerton et al. 2003).

A narrative and meta-analytic review of evidence concerning the effectiveness of TBA training to improve referral to skilled birth attendance for obstetric emergencies produced

mixed results. There was a nonsignificant association between TBA training and TBA knowledge of risk factors and knowledge of conditions requiring referral and small, positive, and significant associations between TBA referral behavior and maternal compliance and service use. However, these results could not be attributed to TBA training because of the overall poor quality of the studies in the review (Sibley et al. 2004). Whether referral from the community level can be improved remains a problem, but whether this is due to methodological (measurement issues) or to implementation issues is not clear.

Table 10. HBLSS Case Management: Ethiopia, 2003

Complication	HBLSS guide % (n)	Other unskilled attendants % (n)	P value (z score)
Bleeding in pregnancy	69% (7)	52% (10)	.102
Postpartum bleeding	69 (17)	36 (11)	.000
Sick, pain, and fever	33 (3)	21 (4)	.176
Baby falls ill	60 (3)	53 (3)	.409

Source: Sibley et al. 2004

Model 3. Case Study 9. Quetzaltenango, Guatemala: Postpartum Family Planning Program

TBAs and community health agents were trained to provide women with messages about visits to health centers and posts for needed preventive and emergency care (family planning, immunizations, breastfeeding, pap smears, breast examinations, infections, and hemorrhage) (Jacobs et al. 2002). Doctors, nurses, and nurse auxiliaries at these facilities were trained to respond to the needs of women and babies in four periods of postpartum care (24 hours postdelivery; days 2-7; 7-40; 41st day through 12 months of age). The results showed that visits increased in both the intervention and control areas, and the TBAs and CHWs did not seem to effect any change. Family planning within the puerperal period (first 40 days) did increase in the intervention area (3.1 to 15.6%) compared with the control area (10% pre and post), but there was little difference in other preventive practices (e.g., immunizations) between the two areas.

Mortality reduction was not the overall goal of the project. Women in the intervention areas did improve their knowledge of danger signs for themselves (bleeding, fever, blood clots) but those in the control areas knew more about abdominal pain. The percentage of women with such knowledge was typically low—in the range of 20-30%. Women's knowledge of danger signs for babies actually declined over the intervention period. Use of services to manage such problems was not reported (nor was it reported whether they could have managed such problems at the level of the intervention).

The Quetzaltenango project calls into question whether such integrated services can be successfully implemented after only a brief training of providers (two- to three-day workshops). It also raises questions about the usefulness of TBA and community health agent training (five sessions provided over five days); continued support for these community workers was provided with continuous on-site training.

7. What is perceived as Quality in Community-based Postpartum Care?

Only two studies report on women's perceptions of the quality of community-based postpartum care. In Egypt, women's perceptions of the government health service providers' capacity in service delivery is linked to the resources available (e.g., access to drugs, immunizations, equipment). The role of the primary care nurses armed only with health education messages through home visits therefore is limited (Cairo University et al. 2003). In China, women in a Central Shanghai district stated that postpartum "care providers don't usually give us correct and reliable messages"; "they are usually in a hurry during postpartum home visits"; "in times of need they are difficult to be found or to be contacted"; "they are very brief in giving health education"; "they do not follow us up regularly when we have postpartum problems" (Lomoro et al. 2002, p. 394). The women wanted more information on childcare, health education materials, home care visits in times of need, and not just the officially prescribed visit.

DISCUSSION AND CONCLUSIONS

There is a dearth of programmatic information concerning integrated community-based postpartum care. Reports of "integrated community-based postpartum care" that include efforts to reduce maternal and newborn deaths and improve their health through exclusive breastfeeding, birth spacing, LAM, family planning, improved nutrition (vitamin A, iron folate), prevention or management of infections, and promotion of hygiene (appropriate eye and cord care, and immunizations) were not located. Two types of programs may have such integrated programs, but they are not written up in a way that promotes learning—national postpartum programs and those of PVOs/NGOs. National programs in many countries have policies mandating postpartum care (including home visits), but only four reports described efforts to improve these programs. PVO/NGO projects typically include integrated programs at the community level, but even among the unpublished reports, they did not focus on the postpartum period.

This report is based on 27 studies of community-based postpartum care of one or more of the components of integrated care that include not only a description of the program but a measure of its effectiveness. Eight additional studies describe barriers and facilitators to the use of community or facility-based postpartum care or women's perceived quality of such care, and eight studies provide information on the time and cause of death. A Public Health Nutrition Information (PHNI) report reviewed DHS data from 22 countries that had surveyed women on their use of postpartum care.

Three models have been used to provide community-based postpartum care:

- Model 1: Home visits by professional health care providers
- Model 2: Home visits by community workers
- Model 3: Home visits by community workers with referral or clinical support

Which of the models of community-based postpartum care is best in reducing deaths? Although Model 1 is the ideal (home visits by health professionals) in that both the morbidities leading to death and the health promotion can be addressed, it is probably not a feasible model for most countries where women deliver at home due to the cost of hospital deliveries and the lack of service infrastructure.

Model 2, characterized by community workers making household visits during which they treat the infant or facilitate women's groups to improve their knowledge of newborn care, holds promise for neonatal care and is now being replicated. We know that CHWs who have some education, who receive phased training and under close supervision, can reduce neonatal sepsis with adequate parenteral antibiotics that are provided appropriately and simultaneously can reduce asphyxia and deaths from prematurity. Also under close supervision, TBAs are able to reduce neonatal pneumonia with oral antibiotics and asphyxia through some means of resuscitation and/or improved labor and delivery management.

Model 3 which links community workers with referral support, is needed to reduce maternal mortality and severe morbidities, since skilled attendance is required to manage hemorrhage, pregnancy-induced hypertension, complications of obstructed/prolonged labor and sepsis.

However, two developments in community-level interventions hold promise for managing or preventing maternal deaths from hemorrhage at the community level, the most deadly of maternal postpartum killers. The HBLSS model h has shown that training of community workers (TBAs or others) can result in their learning ways in which to reduce hemorrhage, knowledge of when to use these techniques, and their use when faced with a problem. Another promising development is the safe use of misoprostol by recently delivered women to prevent hemorrhage, as reported in Indonesia (Kinzie personal communication). Trials of the HBLSS model and the community-based use of misoprostol, however, are small and need to be replicated. Policy issues regarding the use of drugs by community workers and use of misoprostol for obstetric purposes will need to be pursued.

Referral links remain the weakest point in community-based care. Moving referral centers closer to women may facilitate their use. Birthing centers placed in remote and difficult to access localities and staffed by a skilled provider, were part of the successful response to reduce maternal morality in Honduras (Danel and Rivera 2003).

What about TBAs? TBAs may or may not be the appropriate group to train to provide community interventions; their roles and skills can vary greatly within and between countries. A meta-analysis of the effectiveness of training TBAs found a 2% reduction in the perinatal and neonatal mortality rate based on 27 data sets with a pooled sample size of 3,238,772 in the treatment and 2,313,472 in the control groups. A significant result was found for asphyxia-specific neonatal mortality with an 11% reduction, based on three data sets and a combined treatment group of 6,217 neonates. Since only two studies looked at maternal mortality reduction following TBA training, the significant reduction of 8% must be interpreted with caution (Sibley et al. 2002). Learning from the meta-analysis of TBA training, their training could be enriched (as with HBLSS), and linkages of post-training to the formal care system are likely to improve mortality outcomes.

Nonetheless, there is little information that supports training TBAs versus the typically more educated CHWs, especially when it comes to recognizing and referring complicated maternal cases. Studies in Northeast Brazil and Guatemala reported positive results for appropriate referrals by TBAs following competency-based hospital training of TBAs and provision of continuous support posttraining (Bailey et al. personal communication; Janowitz et al. 1988). However, other research, including a meta-analysis of TBA training on referral for obstetric complications, does not show that such means bring significant success (Sibley et al. in press; Wollast et al. 1993). As reported in the Gadchiroli study (Bang et al. 1999), where the TBAs deliver a large proportion of the home births, they may be the gatekeepers to the woman's house. Given their role and if

they are amenable, their liaison and social support activities for the mother could be enhanced by a CHW with great benefit and reduced community resistance.

How can these efforts be packaged? The various interventions can be clustered for prenatal care providers, for those conducting the delivery, and for follow-up, e.g., immediately (first day through first week) and later (2^{nd} to 6^{th} week).

- Many of the messages (Table 5) should be given in prenatal care (e.g., breastfeeding—immediate and colostrom feeding; exclusive breastfeeding; normal newborn care; hygiene and nutrition for both mother and newborn; awareness of danger signs; other birth preparedness [funds, transport]; birth kits [or sterilized razors] and misoprostol provided in late pregnancy). Whether birth spacing messages should be started at this time is debatable, since there is no information on this subject. All of these have been provided through community workers, although not necessarily together or at scale.

- During labor and delivery, the attendant must be trained to recognize and manage hemorrhage; prevent, recognize, and manage asphyxia, plus normal newborn and small baby care. If this is a community worker, then training with a partograph and using a HBLSS model may be useful along with use of misoprostol.

- In the immediate postpartum period (days 1-7), hemorrhage remains the prominent threat for mothers, and smallness/poor sucking, asphyxia and infections for the newborn (combination of HBLSS and Bang's neonatal package). CHWs (possibly with TBAs) could play a major role in diagnosis and treatment or diagnosis and referral. As mentioned above, the literature concerning referral by community workers (especially TBAs) is not large and not extremely positive. Alternatively, the medical assistant who provides immunizations to the newborn (at the doorstep) could be trained to assume more of these tasks or link with the CHWs who provide supportive care (with the referral link fostered by the medical assistant). Having two attendants at birth and in the immediate postpartum period would be most useful for both the mother and newborn.

- In the later postpartum period, these same CHWs could follow-up the mother and newborn with special attention to sepsis for both of them. Anecdotal information points to puerperal sepsis in the mother being difficult for community workers to recognize. Health promotion for continuation of exclusive breastfeeding, extra breastfeeds for the sick baby, LAM, birth spacing and family planning, breast and perineum care, and nutrition for the mother can also be provided.

Determining who may be more at risk of death in the postpartum period may be the means by which CHWs/TBAs could determine whom to visit more frequently. Risk factors for postpartum hemorrhage or puerperal sepsis have not been identified, however, **risk signs of newborns** have been used successfully (Daga SR 1993; Pratinidhi et al. 1986a; 1986b), including such signs as low birth weight and small size; preterm

birth; feeding problems; illness and history of prolonged and difficult labor; and foot length less than 6.5 cm (see Appendix 1). In an extensive review of asphyxia, Lawn and Darmstadt (2002) list other **risk factors for perinatal death from asphyxia apparent during labor and delivery**: malpresentation, intrapartum vaginal bleeding, fever during labor (>38 degrees), and meconium staining of the amniotic fluid.

Risk factors for perinatal death related to asphyxia detectable prior to labor were also listed and include: multiple pregnancy, eclampsia, bleeding from the vagina after the eighth month, maternal jaundice, anemia and malaria, and maternal size (<150 cm, prepregnancy weight < 47 kg) (Lawn and Darmstadt 2002). More research is needed to identify sensitive and specific, yet simple indicators of risk for mothers and newborns so that they can be identified and followed more often.

Can postpartum problems be prevented? Infection prevention for women and newborns should reduce sepsis postdelivery, but, to date, this has not proved successful in reducing maternal puerperal sepsis. Training TBAs in hygienic practices and reports of its use in Bangladesh did not result in a reduction in maternal sepsis (Goodburn et al. 2000). The authors assume that other factors continue to contribute to sepsis, such as pre-existing infections, long labor, and insertion of hands into the vagina to assist the delivery (Goodburn et al. 2000).

Administration of misoprostol tablets to prevent postpartum hemorrhage has been successfully implemented through CHWs, who provide the tablets with counseling to women in the eighth month of pregnancy) (Kinzie personal communication). More studies of the efficacy of administration of misoprostol at the community level are needed.

Preventing intrapartum and neonatal asphyxia would be extremely helpful as this is the second largest cause of early neonatal mortality (Lawn and Darmstadt 2002). One promising possibility is a community partograph that may assist community workers to identify and refer problem deliveries, but no reports of trials of partographs have been found to date.

NEXT STEPS

Each cultural setting will dictate the actual configuration of the postpartum package according to the providerss' skill level, use of delivery services, resources, and infrastructure**.** Two models could be considered per setting: with and without the possibility of referral (Models 2 and 3). Country programs will need to address the following questions:

Programmatic Issues

- **How do we find pregnant and just delivered women?**

What would motivate women to register or providers to seek women who delivered at home?

- **What is an effective program model for integrated services?**
  What components should be included (hemorrhage, asphyxia, infection)?
  How frequently should they be delivered?
  Can we prevent some of the problems (hemorrhage, sepsis)?
  Can we predict some of the problems (small babies)?

- **How can the postpartum package be delivered and by whom?**
  Household visits or women's groups?
  How much skill is needed? TBA, CHW, or both?

- **How do we scale-up these efforts?**
  How can we prioritize messages, provide services, and build on present structures?
  Should we target areas of underuse? Of poverty?

Support Issues

- **What behavior change communication (BCC) efforts are needed and how can they be prioritized?**
  What messages and actions for the woman and the family are needed at each period of maternity care (antenatal, labor/delivery, immediate postpartum, late postpartum)?
  Is it more effective to work through women's groups, household visits by community workers, or the mass media?

- **What training materials for community workers are needed?**
  What training materials are already available?
  What is the most effective training means?
  How much support and by whom should this support be provided?

- **What enabling environment, including policies related to PPC, is needed at the national level and international level?**
  How can programs enhance the social, political and economic environment to support informed MCH/FP/RH decision making?
  What are the roles of nonhealth NGOs, community and religious leaders and civil society organizations in education and outreach—especially with regard to enhancing the counseling role of the provider and health system?

Research Issues

Information gaps are multiple, including:

- Appropriate/feasible DHS questions that could assess barriers and facilitators to use, what constitutes quality of postpartum care from the perspective of the woman and husband, along with use of postpartum care, from whom, when, and what was received and understood. It would be useful to ask these questions to all women who recently delivered, not just those who delivered outside of facilities.
- Barriers and facilitators to provision of postpartum care at all levels, including issues of motivation to provide services, how to supervise such care, and when it is best to promote certain types of care (e.g., information on the health consequences of birth spacing).
- Costs of the different components of postpartum care have received little attention (costs exist for breastfeeding promotion [Chee et al. 2002] and for neonatal care [Bang et al. 2001]).
- How much to integrate or how to phase integration remains to be studied as does measuring effectiveness in providing specific integrated services and in making referrals.
- Indicators to measure effectiveness of integrated services should be reviewed, and perhaps new indicators should be determined (e.g., for maternal health in the postpartum period; indicators for community-level involvement).

Whatever package is employed, there must be a communications strategy to identify and disseminate the messages and training materials for community workers, and the health providers who supervise them, and policy efforts to support such packages.

- **The communications strategy will need to determine the doable actions that messages for the woman and family should focus on at each period of maternity care (prenatal, labor and delivery, immediate postpartum, late postpartum).** Representatives from each of the topical groups focusing on breastfeeding, family planning/birth spacing/LAM, neonatal and maternal survival/health could provide this information along with the materials necessary to conduct formative research.

- **Training materials for community workers are likely to be available for each of the topical areas**, but they are not yet coordinated to include both the mother and newborn in the postpartum period (although postpartum training manuals for community workers do exist—PRIME and SNL).

- **What are the implications at the policy level?** More than likely, most countries have a postpartum visit policy (either at the facility or home). These policies will need review and modification, as the packages are developed to refocus efforts made during the postpartum period to the period immediately following birth.

- **Policy at the international level** also needs attention. The WHO regimen schedules the first postpartum visit at 6-12 hours postdelivery, yet many postpartum deaths or morbidities are likely to have already occurred by that time.

This policy needs to ensure that women and newborns are the focus of attention of providers immediately postdelivery and periodically throughout the first week.

Most of the information regarding packages of care is drawn from small projects. Lessons on how to scale-up with community workers could be drawn from those with such experience (e.g., LINKAGES): how to initiate activities, how to promote and support local NGOs to take on the topics, how to measure progress, and how to sustain efforts. Note that LINKAGES began their scaling-up efforts with breastfeeding promotion at the same time as efficacy trials were underway. They reasoned that there was enough information to move to a larger population level without waiting for the RCT results. Other elements of postpartum care are also ready for scaling-up (e.g., birth spacing, normal newborn care, normal maternal care, and nutrition).

MEDICAL GLOSSARY

Allopathy	The system of medical practice which aims to combat disease through the use of remedies which produce effects different from those produced by the specific disease treated; a term invented by Hahnemann to designate ordinary practice, as opposed to homeopathy.
Colostrum	The first milk secreted by an animal coming into lactation.
Eclampsia	A complication characterized by convulsions, sometimes followed by coma, which occurs in a pregnant or puerperal woman and is associated with hypertension, edema, and/or proteinurea.
Fistula	A fistula (i.e., obstetric fistula) is a condition caused by ruptured tissue in the birth canal that can lead to continuous and uncontrollable leakage of feces and urine. A hole forms in the vaginal wall, goes into the bladder and/or rectum, allowing continuous leakage and rendering the woman permanently incontinent. This is a debilitating pregnancy-related condition caused by prolonged, obstructed labor, and women can be shunned by their families and communities.
Fresh stillbirth	The birth of a dead child where intrauterine (fetal) death has occurred during labor and delivery.
Hypoglycemia	A low blood glucose concentration. Neonatal hypoglycemia is not a medical condition in itself, but a feature of illness or of failure to adapt from the fetal state of continuous transplacental glucose consumption to the extrauterine pattern of intermittent nutrient supply. It is more likely to occur in conditions where infants become cold or where initiation of feeding is delayed.
Hypothermia (newborn)	Hypothermia of the newborn occurs when the body temperature (axillary) drops below 36.5 C (97.7 F).
Hypoxia	A state of oxygen deficiency in the body, which is sufficient to cause impairment of function.
Intrapartum asphyxia	Asphyxia or suffocation of the newborn during labor.

Kangaroo Mother Care	A method developed in Colombia as an alternative to placing premature, low birth weight newborns in an incubator. As part of kangaroo care, mothers lay babies against their chest for hours each day, keeping babies upright and switching off with fathers or caretakers when they need a break. The technique is used with premature babies who are medically stable, but cannot yet regulate their body temperatures.
Lactational amenorrhea	Absence of menses (but not necessarily of ovulation) in women who are actively breastfeeding.
Lochia	The vaginal discharge that takes place during the first week or two after childbirth.
Macerated stillbirth	The birth of a dead child where intrauterine (fetal) death has occurred sometime before the onset of labor and delivery; the fetus shows degenerative changes during retention in the uterus, such as reddening or loss of skin and distortion of the features.
Malpresentation	Presentation of a part of a fetus other than the back of the head during parturition.
Mastitis	Inflammation of the mammary gland or breast.
Meconium	The first stools of the newborn. Typically thick, viscous, sticky, and dark green. Usually sterile and odorless.
Micturition	Urination
Misoprostol	An oxytocic drug that stimulates contractions of the muscles of the uterus, the myometrium. It is used to induce labor at term, to prevent or control postpartum or postabortion hemorrhage, and to assess fetal status in high-risk pregnancies.
Morbidity	A diseased condition or state, the incidence of a disease, or the incidence of all diseases in a population.
Parenteral antibiotic treatment	A treatment administered not through the alimentary canal but rather by injection through some other route, such as subcutaneous, intramuscular, intraorbital, intracapsular, intraspinal, intrasternal, intravenous, etc.

Partograph	The graphical representation of the progress of labor. It is a method of displaying progress in cervical dilation as a continuous graph, while at the same time displaying in graphic form as many other features of the state of the mother, the fetus, and labor as possible.
Perineum	In the female, the region between the vulva and the anus.
Peritonitis	An inflammation (irritation) of the peritoneum, the membrane that lines the wall of the abdomen and covers the abdominal organs.
Postpartum depression	A condition that describes a range of physical and emotional changes that many mothers can experience after having a baby. The condition can be treated with medication and counseling.
Prolapse	The slipping or falling out of place of a body part or organ.
Prolapsed uterus	The falling down or sinking of the uterus.
Puerperal infections	Infections present at birth.
Puerperal sepsis	Infection of the genital tract of a pregnant woman occurring at any time between the onset of rupture of membranes or labor and the 42nd day postpartum, in which, apart from fever, one or more of the following symptoms are present: - pelvic pain - abnormal vaginal discharge (e.g., presence of pus) - abnormal smell/foul odor of discharge - delay in the rate of reduction of the size of the uterus (< 2cm/day during the first eight days)
Vesicovaginal fistula	An abnormal passage between the bladder and the vagina.

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APPENDICES

Model 1

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
Ransjo-Arvidson 1998 Lusaka Zambia	Randomized controlled trial: Group A: 208 mothers/babies receiving home visits by a midwife on days 3, 7, 28, 42; Group B: 200 mothers/babies visited only on day 42. Main aim: To discover if a midwife home visit program has a significant effect on the breastfeeding behavior of mothers, who delivered normal, full-term babies, during 42 days postpartum. A second aim: To compare mothers', midwives', and doctors' findings regarding prevalence of health problems at the end of the puerperium.		Day 42, Group A mothers took more actions to solve perceived infant problems (56%) than Group B mothers (41%), (P<0.03). Significantly more mothers Group B giving supplementary feeding (P<0.01)	At 42 days, obstetricians-gynecologists found 13% of the mothers in Group A had one or more abnormal symptom, sign, or diagnosis; Group B-14%; pediatricians found 23% infants with problems in Group A and 28% in Group B.	Mothers in both groups perceived more health problems than the midwives, who perceived more than the doctors.
Achadi et al 2000; South Kalimantan Indonesia	Pre/postsurvey of women of reproductive age (in a population of 1 million in three districts); no control; pre/postmidwifery survey; midwifery registers (92% completed); focus group discussions with trained midwives and with women (recipients of care). Main aims: Can the *bidan di desa* (Bdd) implement this program as defined? Are the content and timing of each visit appropriate to meet the needs of		Midwife registers: At the six-week visit found that 67% women had consumed at least 40 tablets of; only 12% were without a FP method; 74.4% with oral contraceptives, only 0.1% LAM. Survey data: 1996 36% women had a postpartum visit; 1999, 80% women report a visit by a midwife; 70% within 24 hours of birth.		Registers data: 68% visits followed timing and frequency of the postpartum home visit program. 44% women received two visits on day 1; another 17% received the first visit at 7-12 hours after delivery. Most postpartum visits

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
	the woman and baby?				were with women they had attended for birth (79%).
Cairo Univ 2003; Cairo, El-Menoufia, Beni-Suif	Pre/postsurveys, no control, in three MCH centers and two rural health units: 250 women using each of the facilities with the last child 2-3 months old. Main aims: Systems analysis of the MoHP postpartum care program and an operations research intervention study with improved training of providers on communications regarding use of postpartum care.				Increase in home visit postpartum care from 20.3% to 61.4% (N=1,329 pre; 907 post) (OR=6.2); smaller sample shows most visits in the first week; improved in providing educational messages for both the mother and newborn (time between pre/post <1 year).
PATH/Indonesia with MOH, Indonesia, 1998; Stott V 1997; Nusa Tenggara Barat	Pre/postsurveys, no control-420 women (Mataram [M]) and 398 women (Sumbawa [S]) who had given birth in the last 18 months ; and verbal autopsies (63-S; 87-M) Project-1995-97; Mataram N=275,000; Sumbawa N=184,000. Main aims: Improve ANC visits, tetanus coverage, IFA, and vitamin A coverage for mother, lactation management, cord care practices, identification and management of		Mataram: Cutting the cord with a sterile instrument rose from 75 to 87%; 91% women taking IFA (in postpartum 14% to 41%); decrease in harmful substances to treat the cord (63 to 26%); Bdd at birth 40 to 54%; Hepatitis B vaccine given to 76% of newborns within seven days of the birth (up from 24%); breastfeeding rates very high (99%), initiated within eight	Between 1990-93 and 1993-6 rural Lombak, no change in rates of stillbirths, LBW/ prematurity deaths, ARI deaths; tetanus, and diarrhea deaths and death rates decreased (P<0.001) (only a few deaths from pertussis and measles).	No report on the effectiveness of the community-based reporting system in findings and reporting on pregnancies and births; often used routine reports or registers for data; the data reported differ without explanation.

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
	LBW babies; community acceptance of *bidan di desa*, replication of birth-centered approach, and maintain high EPI coverage.		hours increased from 60 to 72% in Sumbawa.		
ASUH, Indonesia PATH 2003; four districts in East and West Java	Pre/postsurveys —March/April 2002 and March/April 2003. Four sentinel surveys in 2003 with mothers of infants <2 mo. Comparison districts used. Project Nov 2000 to Sept 2003; population = 6.2 million. Main aims: Improve and increase the health, nutrition, survival of newborns and infants; enhance the ability of local health management teams and communities to assess health problems and develop, implement, monitor and evaluate activities; improve the timeliness and quality of care at delivery and during the early postpartum period.	Knowledge of the importance of immediate breastfeeding increased 10-15% points. Knowledge of newborn danger signs remained low at 5%.	Hepatitis B injection in first seven days 8.4 x increase in ASUH districts from 9.6 to 35.6%; 1.4 in non-ASUH districts; increases in immediate and exclusive breastfeeding started to show during the last two months of the project.		Increase in timely neonatal first visits within seven days by 17 percentage points; by mother's report of first neonatal visit rose 15-25 percentage points from 25.3% to 42.4% (P<0.001). Data are not consistent throughout the report; planning and training went into the second year of the effort, so there is little time for improvement.

APPENDIX 1

Model 2

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
Daga SR et al 1992; Daga SR et al 1993; Daga AS et al 1997; Ganjad India 1988-91	Pre/post-study, no control; population = 22,000. Main aims: Evaluate the training of TBAs in newborn care (primarily warmth, resuscitation, identify very small baby and safe transport of small baby to health center).		ANC registration increased 30%; birth registration doubled; reports of asphyxiated babies increased over the years, with 83.3% saved in 1989 with mouth-to-mouth resuscitation; increased referrals to hospital by factor of 2 with 18/20 surviving.	Neonatal and perinatal mortality declined from 57.1 and 74.7, respectively, in 1987 to 33.6 and 28.7 in 1990 (41% and 62% decline).	Authors conclude TBAs can be trained in newborn care in warming, resuscitation of the asphyxiated baby, and identification of small baby by foot size for hospital care. No statistical tests.
7Pratinidhi et al. 1986a; Pratinidhi et al. 1986b; Sirur, India 1981-82	Pre/poststudy, no control; population = 47,000. Main aims: To test the risk approach (identify and provide those at risk with more care; risks include LBW or small size; preterm delivery; feeding problem; illness; history of prolonged and difficult labor) on neonatal mortality			28% of newborns found at risk; NMR decreased by 25% from 51.9 to 38.8 in 1981 and 1982; SBR by 24% between 1977-79 and 1982; not significant; LNMR declined by 80.3% in 2,000-2,400g babies ($P<0.05$)	
Kumar R 1995; Kumar 1998; Raipur Rani Community Development	Pre/poststudy; no control, 2,041 births reported with 92% delivered by TBAs at home: 968 by conventionally (clear mouth secretions and			PMR was 49.4/1,000 births by advance trained TBAs, 19% lower than the 61.0/1,000 with conventional trained TBAs;	

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
Block, India; 1989-91	use mouth-to-mouth) trained TBAs, 911 by advanced (mucus extractor and bag and mask ventilation) trained TBAs. Main aims: To test conventional and advanced training of TBAs to prevent, identify and manage asphyxiated babies.			asphyxia-specific mortality was 70% less among babies with advance trained TBAs compared to conventionally trained TBAs (P<0.05)	
O'Rourke et al. 1998; Warmi, Inquisivi, Bolivia	Pre/postcase control study (case—peri/ neonatal death; control—child who survived first month and lived in a similar community); births = 1,347; population = 15,000. Main aims: Evaluate the potential effect of organizing women's groups on perinatal mortality; to identify the impact of specific components of the project (e.g., increase ANC, improve immediate newborn care and breastfeeding, and increase deliveries with trained community workers).		Participation in women's groups increased from 8 to 54% (P<0.001); increase in day 1 breastfeeding (before 25% vs. 50.3% after; P<0.001); immediate attention to newborn postdelivery (P=0.058 approached significance for controls vs. cases)	Peri/neonatal death decreased from 117 (1988-1990) to 43.8/1,000 (1991-93) births, P<0.001.	
Bang A et al 1994; Gadchirola, Maharashtra, India	Pre/postcontrolled trial (nonrandom); population = 83,000. Main aims: To assess TBAs as providers of case management in ARI control and compare them with other types of community-based health workers.				Controlled trial for pneumonia treatment 1988-91: Case fatality from pneumonia decreased from 13.5 to 0.9%; neonatal mortality from pneumonia declined

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
					44% (P<0.01), total neonatal mortality fell by 20%.
Meegan et al 2001; rural Kenya and Tanzania (Maasai area)	Control area with 88,471 births between 1980 and 1999; intervention areas with 29,689.			Total mortality rates in children ages <6 weeks fell from 307 to 50/1,000 in intervention areas, 233 to 294 in control areas. Neonatal tetanus rates fell to 0.75/1,000 births in the intervention areas compared to 82 in control areas by 1988 (no change in control areas after that).	Meegan et al 2001; rural Kenya and Tanzania (Maasai area)
Bang A et al 1999; Gadchirola, Maharashtra, India	Pre/postcontrolled trial (nonrandom); population = 81,000. Main aims: To test a home-based neonatal care package, including management of sepsis with hypothesis that it would reduce neonatal mortality rate by at least 25% in 3 years.			Controlled sepsis trial 1993-95 vs. 1995-98: Reduction of NMR (62%), IMR (45.7%), and PMR (71%) against control (P<0.001). Case fatality in neonatal sepsis declined from 16.6% before treatment to 2.8% after treatment by village health workers (P<0.01).	
Haider et al. 2000; urban area Dhaka, Bangladesh	RCT (randomized zones): Pregnant women 16-35 years old with no more than three living children enrolled; 363 women in the intervention and 363 in the control group at five months postpartum. Main aims: To assess the design and		Prevalence of exclusive breastfeeding was 70% for the intervention group and 6% for the control group at five months postpartum (P>0.0001). Intervention mothers		

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
	implementation of peer counseling to promote exclusive breastfeeding for five months in urban Dhaka.		initiated breastfeeding earlier and were less likely to give prelacteal (31% vs. 89% [P<0.0001]) and postlacteal foods (23% vs. 47% [P<0.0001]).		
Morrow et al 1999; Periurban Mexico City	RCT: Home visits were made during pregnancy and the early postpartum period: Two intervention groups, six visits (44 women), and three visits (52 women) compared with the control group (34) from March 1995-September 1996. Main aims: To test the efficacy of home-based peer counseling to increase the proportion of exclusive breastfeeding among mothers and infants in periurban Mexico City.		At three months postpartum, exclusive breastfeeding was practiced by 67% of those with six visits, 50% by those with three visits, and 12% of the control mothers (intervention vs. control, P<0.001; six visits vs. three visits, P=0.02). Duration of breastfeeding was significantly longer in the intervention groups than the controls, and fewer intervention than control infants had diarrhea episode (12% vs. 26%, P=0.03). Only 6% had delivered at home and 52% at hospitals.		
Dearden et al. 2002; Guatemala City, Guatemala	Pre/post with control; data collected in two program communities and two control communities, Nov 2000 to Jan 2001 one year following the baseline. Main aims: To test La		Women within program communities who participated in La Leche League Guatemala (LLLG) breastfeeding promotion and support activities were		

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
	La Leche League trained, unpaid breastfeeding volunteer for breastfeeding promotion and support for pregnant women and mothers of children under six months of age through home visits, support groups, and informal contacts.		no more likely than those who did not participate to initiate breastfeeding early, but exposure was associated with exclusive breastfeeding (45% for women with home visits and group support vs. 14% based on a 24-hour recall). At the community level, the intervention had no impact as only 31% of women participated in LLLG.		
Bhandari et al 2003, Haryana, India	RCT of 1,115 infants born within nine months of the start of the intervention and living in eight communities randomized; Jan 1, 1998-Mar 31, 2002. Main aims: To test the feasibility, effectiveness, and safety of an educational intervention to promote exclusive breastfeeding for six months.		Three months 483 vs. 412 infants in the intervention and control communities, respectively: Exclusive breastfeeding rates 79% vs. 48% in the control group ($P<0.0001$); seven day diarrhea: Lower in intervention areas ($P=0.028$) (also at six months, although not significant $P=0.04$); mean weights and lengths, and proportion weight for height or height for age Z scores of two or less did not differ much between		Conclusion: Exclusive breastfeeding does not lead to growth faltering for LBW baby and reduces diarrhea.

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
			groups at three or six months. Six month 468 vs. 412 infants in intervention and control communities, respectively: 42% exclusively breastfed vs. 4% (intervention vs. control) (P<0.0001) LBW group: Exclusively breastfed 41% vs. 4% intervention vs. control (P<0.0001).		
Guyon A and Rambeloson 2002. JSI/Linkages, Madagascar	Pre/post with control; data collected by rapid assessment procedure from 2000, 2001, and 2002 in ten districts (nine intervention/one control); population of 6 million. Main aims: To improve the health and nutritional status of women and children through a behavior change strategy (child survival, nutrition, and LAM) that focuses on household members and health workers.		% Women with birth in Health Facility: baseline-53%; 68% in 2001 (P=0.0011); 62% in 2002. % exclusively breastfed to 6 mo: baseline-46%; 83% P<0.00001in 2001; 75% in 2002 Women with children using LAM: baseline 2%; 47% (P<0.0001) in 2001; 22% in 2002 P<0.0001.		
Adjei # and Schubert 2002;	Cross-sectional survey of 795 mothers with children <12		Timely initiation of Breastfeeding (TIBF):		

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
Linkages, Ghana	months in 13 intervention districts of NGO partners, comparing original partners (1998) with new partners (joined in 2001 and 2002); population = 3 million. Main aims: To test the educational package aimed at improving nutritional status of children through early, exclusive breastfeeding for the first six months of life and timely complementary feeding.		Control 14% (2000); Program community. 32% (2000); 62% (2001); original program community 54$ (2002).\ Exclusively breastfed: control 44% (2000); 68% (2000) program community; 78% (2001) program community; Original program community 73% (2002)		
World Linkages 2004; Bolivia	Cross sectional surveys (Rapid assessments) of program sites. Population = 1 million. Major aims: To assess the impact of program (community mobilization and behavior change communications, training of community workers and service providers, policy and advocacy initiatives and M&E) on infant and young child feeding practices.		Timely initiation of Breastfeeding (TIBF): 1998-50% (DHS); 2000-56% in program community; 2001-69% program community. Exclusively breastfed (to 5 months): 1998-39% (DHS); 2000-54% program comm, 2001-56% program comm.		
Center for Development in PHC, Al-Quds Univ, Palestine, 2003	Posttest with control clinic—112 women; intervention group/clinic—145 women. Main aims: To test a second home visit by a CHW to low-parity women; to test a package of quality ANC and PPC services	Knowledge of maternal, newborn complications same in both groups; knowledge and	Second CHW home visit associated with increase in likelihood of visiting MCH clinic on day 40 (49.1% vs. 35.6%, P<0.05); increased husband's support to encourage mother to visit		Selection of women not reported. Intervention and control women differed in terms of age, work status (8.3% of intervention women work for cash vs. 1.8%

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
	aimed at improving health giving behaviors of providers and health-seeking behaviors of women.	practices re breastfeeding, weaning, immunization of newborn similar both groups; knowledge of LAM equally low in both groups (47.7% vs. 39.3%)	clinic on day 40 (51% vs. 29% P<0.05), increased likelihood of husband-wife communication about timing of next pregnancy (86% vs. 77%, P<0.05). Intervention not assoc with increased use of family planning, improved knowledge or more positive attitudes toward family planning.		controls, P<0.05), family expenditure (22.2% intervention mothers average monthly expenditure of > 2000 NIS vs. 10.6% control mothers, P<0.01).
Anon, undated (Population Council). Haiti	Two operations research studies: 1. Pre/post-design in one clinic-reduced stipend of TBA supermatrones; 2. Two commune Postpartum clinics, one with paid and one with unpaid super—TBA supermatrones. Main aims: To test the impact of reduced stipends for enhancing TBAs on client participation at the clinic; to compare two postpartum care clinics, one with paid and one with unpaid supermatrones.		1. High vs. low stipend for supermatron made no difference re the number of clients seeking care or the number of clients referred directly by supermatrones. 2. Paying supermatrones did increase postpartum referrals, but this was offset by the larger number of referrals from other staff members. 3. Large percentage of women took clinic FP methods in three month period postdelivery from postpartum clinic		Possible to reach rural pop where home deliveries with hospital—or clinic-based postpartum program. Nearly 66% women made at least one ANC visit, more than 40% had postpartum visits in new clinics.

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
Barbey et al. 2001; CARE-Dinajpur, Bangladesh	Nonrandomized trial-factorial design. a) Birampur upazila-Upgraded EmOC + Community mobilization; b) Bochaganj-Upgraded EmOC; c) Debiganj—no input; Population: 170,000 each upazila; May 1998-June 2000; population-based post-survey N = 400 women, 400 husbands, 200 decision makers, 200 newborn caretakers, 100 community agents from each study site. Main aims: To test community mobilization and upgraded EmOC on increased use of facilities for birth; on use of EmOC.	1. Knowledge of danger signs—three of five signs unprompted 44% in a, 4% in b) and 6% in c). 2. Awareness of blood pressure index (three of five actions) 19.2% in a), 1% in b), and 1% in c).	Changes in EmOC use rates (not clear if this is met need) (hospital regulation): a) 16 to 39.8%; b) 12.5 to 25.5%; c) 11.1to 12.1 %		1. No specific info re postpartum care; no questions in survey re quality of care. 2. Facility registers but missing maternal death data, and other. 3. No questions in registers re use of blood pressure card, or use of community committee funds/transport. 4. Exposure to intervention not monitored/reported. 5. Some statistical tests.
Ahluwalia et al. 2003; Tanzania, CARE	Pre/post-April 1998 baseline to 2001; 500,000 in two districts. Main aims: To evaluate the community capacity building and empowerment project (training, TA and support for VHWs, develop community-based plans for transport to health facilities; increase participation of community members in planning and		Women's participation in meeting—assisting with decisions 6/52 (12%); birth plan in place—not in baseline vs. 48% 2001; use of health provider: 56% (1998) vs. 49 % (2001); use of hospital for obstetric complications 4% (1998) vs. 15% (2001)		Transport: 44 of 52 villages had transport plans (85%); 12 (23%) had a specific system to implement transport system (e.g., collected funds); and 10 had used it. Village health workers: Compensated at some level at least

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
	decision making.				some of the time 17/52 (33%); village health worker satisfaction: High 1/52; medium 32/52 (62%).
Sibley et al. 2003; Ngelle, Ethiopia	Pre/postperformance assessment in four health postcatchment areas; no controls; Apr 2000 to Feb 2003. Main aims: To test the transfer of learning to HBLSS guides and to mothers				1. Small negative and significant decreases in performance at one-year post-training compared with immediate post-training scores; with exception of baby fall sick, all ex-posttests scores remained>=70%. 2. Large positive and significant difference in case management of signs of PPH by guides vs. unskilled attendants (69% vs. 36%, P=0.000). 3. Average management scores for safe referral for both women and newborns, once decision made, was <70% for HBLSS Guides and could be improved. (34% vs.

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
					20% unskilled attendants vs. guides) 4. Exposure of pregnant women and families to HBLSS teaching is low (34% or fewer of women attended by Guides, and only 38% exposed to teaching among cases reviewed).
Fullerton et al. 2003; Maitha Block, Kanpur, Uttar Pradesh, India	Pre/postassessment with MIS system vs. population-based baseline; 1998-June 30, 2002; population: 20,000-23,000. Main aims: To increase knowledge and change behaviors toward improved maternal outcomes	Knowledge retention by women who were at least six weeks postpartum or three weeks postabortion. Unprompted knowledge: Hold womb with two hands 39%; press on place where bleeding is coming 36%. Baby problems: Keep baby warm 44%; wipe fluids	The majority of women reported making a birth plan with funds saved, selected referral site, and prior transport arrangements; consumption of 100 iron folate tablets (0.9 to 36%), use of postpartum family planning within six weeks (13.5% to 61.4%), breastfeeding within 1 hour (1.7 to 76%).		1. Knowledge retention by master trainers (4) and guides (14) trained 12-24 months prior to assessment considered satisfactory (attained target). 2. The project could be confounded due to presence of another family planning project in the area.

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
		from baby mouth and nose 41%.			
Alvarado et al 1999; Consultorio San Luis de Huechuraba (CSLH), Santiago, Chile	Pre/post with control. Clinic data for both intervention (CSLH) and control groups, +35 IDIs +3 FGDs for intervention group women. Intervention group: All pregnant women (N=200) in defined area of Conchali between Jan 1991 and Mar 1992. Controls were 200 consecutive infants (and their mothers) who attended a public clinic in a nearby similar area in the same time period. Main aims: To test the impact of a health care program on maternal and infant health.		Family planning initiation same in both groups but more contraceptive types selected among CSLH group as have more choice, including more progestin-only pills; clinic copper T. Continuation rate at year end high for CSLH—74% initial method, 23% changed, 4% discontinued (no data from Public Clinic). Breastfeeding fully significantly higher in CSLH-at six months 74% fully breastfed vs. 10% in control (P<0.0001). Mean child visits 7.5/child at CSLH in one year; 5.3 in clinic (P<0.0001); birth weight and length similar for two groups of infants at birth but at six and 12-month visits, both birth weight and length significantly higher in	Risk of diarrhea was 11 times higher (P=0.00001) and % infants hospitalized >3x (P=0.02) in clinic than in CSLH group.	

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
			CSLH. Women highly satisfied with CSLH.		
Jacobs et al 2002; Quetzalte-nango, Guatemala	Pre/post-controlled study. Facilities randomly assigned to intervention/control areas. Exit interviews of women from facilities where trained provider was present over a five- day period pre/postintervention/control areas. Main aims: To test a job aid to provide comprehensive care to mothers and children during first year postpartum, to train doctors, nursed, auxiliary nurses and social workers in its use, and to develop and test strategies and materials for training community health agents to promote services for new mothers during year 1 postpartum.	More women in intervention group could mention danger signs of delivery.	1. Exclusive breastfeeding decreased in both intervention and control groups. 2. Family planning use within three months increased in intervention from 18.1 to 24.7% compared to a decrease in the control group from 20.4 to 14.3%. 3. Family planning use within the first 40 days increased from 3.1 to 15.6% in intervention, remained constant in control at 10%. 4. More women offered methods in the experimental group (37.6 to 52.5%) than the control group (30.8 to 40.4) 5. Other reproductive health preventative measures, such as TT, pap smear, self-exam for breast		Referrals by TBAs increased over the project period but more so in the control area. CHA visits did not increase over the projected period. 12% women visited in first 40 days postpartum; no significant difference between control/intervention group, or over time. 19.8% increased to 24.2% in the experimental group while 15.6 to 25.9% increase in control group for visit within three months postpartum over period of project (18 months). Mean number of visits of 1.3 visits increased to 2.31 visits over one year postpartum period for experimental group, while it increased from

Author	Study Design	Results		Health Outcomes	Comments
		Knowledge	Women's Behaviors		
			cancer, STD prevention methods, and increases in childhood immunization similar in both intervention/control areas.		1.46 to 2.27 for control group, both statistically significant changes. From registers 46% increase in postpartum visits compared with corresponding part of year in 2000 in the experimental group. In control area HC/P also found a similar increase with a one-month lag.