

Community-Based Maternal and Neonatal Care Program (CB-MNC)

*Summative Report on Program Activities and Results in
Banke, Jhapa and Kanchanpur districts
from September 2005 – September 2007*

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The Government of Nepal has identified the reduction of maternal and neonatal deaths as an important development priority. Two occupants, in particular, of the post of Director of the Family Health Division of the Department of Health Services have made important contributions to the work described here. Former Director, YV Pradhan, played a leadership role in technical consensus building among government and professional stakeholders for some of the more innovative technical elements of the work and has successfully attracted government and donor interest to this area. He has also championed scale up of a related package of community-based neonatal interventions. The current Director, BK Subedi, has closely monitored implementation and actively supported scale-up of related activities. Working under him, Sita Gurung has provided consistent helpful support. Actual implementation has been done largely by workers within the district health system, under the leadership of District Public Health Office staff. Several have played prominent roles, notably: Nava Raj Subba, initially in Morang and then in Jhapa; Ram Dhan Meheta, Anjana Karki, and Narendra Chauhan (all in Jhapa); Bhanu Yangden and Tek Raj Koirala (in Morang); Jaya Bdr. Karki, Kehar Singh Godar, and Angad Shahi (in Banke); and Mahendra Dhawaj Adhikary, Bal Bdr. Mahat, and Ganesh Joshi (in Kanchanpur).

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Under CB-MNC there has been piloting of new service delivery approaches (notably community level outreach antenatally and through an early postnatal home visit) as well as specific new interventions, particularly the use of misoprostol for prevention of post-partum hemorrhage. As such, rigorous performance documentation has been an important priority. USAID/DC has supported Johns Hopkins Bloomberg School of Public Health through the Global Research Activity (GRA) cooperative agreement to provide technical assistance for this monitoring/ documentation/ applied research function. Specifically this has included ongoing support by JHU consultant, Robert McPherson, who has been the main author of this report. Support from Johns Hopkins has also included assistance from Abdullah Baqui, Peter Winch and Saiffudin Ahmed, who have made significant contributions to M&E and applied research functions related to CB-MNC, including assistance in the preparation of this report. Stephen Hodgins (NFHP) has been involved with Robert McPherson in all aspects of preparation of this report.

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List of Acronyms and Abbreviations

AHW	Auxiliary health worker
ANC	Antenatal care
BCC	Behavior change communication
BEOC	Basic emergency obstetric care
BL	Baseline (survey)
BPP	Birth preparedness package
CB-IMCI	Community-based integrated management of child illnesses
CB-MNC	Community-based maternal and neonatal care
CEOC	Comprehensive emergency obstetric care
CHDK	Clean home delivery kit
CHW	Community health workers
DHS	Demographic health survey
DoHS	Department of Health Services
DPHO	District public health office
ENC	Essential newborn care
EOC	Emergency obstetric care
EPI	Expanded program of immunization
FCHV	Female community health volunteer
FGD	Focus group discussion
FHD	Family Health Division
FIL	Father-in-law
FP	Family planning
FU	Follow-up (survey)
GoN	Government of Nepal
HF	Health facility
HHS	Household survey
HMIS	Health management information system
HP	Health post
IPC	Interpersonal communication

JHSPH	Johns Hopkins Bloomberg School of Public Health
JSI	John Snow, Inc.
KC	Keychain
LBW	Low birth weight
M&E	Monitoring and evaluation
MCH	Maternal and child health
MCHW	Maternal and child health worker
ME&AR	Monitoring, evaluation and applied research
MIL	Mother-in-law
MINI	Morang Innovative Newborn Initiative
MIS	Maternity Incentive Scheme
MMR	Maternal mortality ratio
MNH	Maternal and neonatal health
MoHP	Ministry of Health and Population
MSC	Maatri Surakchya Chakki; i.e., misoprostol
NFHP	Nepal Family Health Program
NGO	Non-governmental organization
NSMP	Nepal Safe Motherhood Program
OR	Odds ratio
OTHW	Other trained health worker
PE	Process evaluation
PHCC	Primary health care center
PNC	Postnatal care
PPH	Postpartum hemorrhage
PPS	Probability proportional to size
PSBI	Possible severe bacterial infection
PW	Pregnant women
QMR	Quarterly monthly report
RDW	Recently delivered women
RH	Reproductive health
SBA	Skilled birth attendant
SC/US	Save the Children, United States
SES	Socioeconomic status
SHP	Sub-health post
SM	Safe motherhood
SNL	Saving Newborn Lives Initiative
SSI	Semi-structured interview
TBA	Traditional birth attendant
TFH	Traditional faith healer
ToT	Training of trainers
TP	Target population
TSV	Technical support visit
USAID	United States Agency for International Development
USD	United States dollars
VaRG	Valley Research Group
VDC	Village development committee
VHW	Village health worker
WHO	World Health Organization
WI	Wealth index

Executive Summary

I. Background

Current statistics show that, despite improvements over the past two decades, the health status of mothers and newborns in Nepal remains low. The maternal mortality ratio in Nepal was estimated to be 281 deaths per 100,000 live births in 2006, a decrease from the previous estimate of 539 in 1996. Major causes of maternal death in Nepal include postpartum hemorrhage (PPH), obstructed labor, eclampsia, and puerperal sepsis. Eighty-one percent of births in Nepal take place at home while skilled birth attendants (SBA: defined as a doctor, nurse, or midwife) are present at only 19 percent of all births. The neonatal death rate was estimated to be 33 deaths per 1,000 live births in 2006—a decrease from 39 deaths per 1,000 live births as measured in 2001. Over the past two decades, due to rapidly falling infant and under-5 mortality rates, the relative proportion of neonatal deaths among all infant and under-5 deaths has risen to 66 percent and 54 percent, respectively. Studies of hospital and community-based mortality data suggest that the major causes of neonatal death in Nepal include preterm birth, infection, hypothermia, and birth asphyxia. Many maternal and newborn deaths can be averted through changes in household-level practices regarding delivery and newborn care.

II. The Community-Based Maternal and Neonatal Care program

The Community-Based Maternal and Neonatal Care (CB-MNC) program was designed to address key health needs of mothers and newborns in Nepal who live in rural locations and have limited or no contact with facility-based health services. The goal of CB-MNC is to have a marked, measurable impact on the health status of these groups. Nepal's well-established cadre of Female Community Health Volunteers (FCHVs) forms the backbone of on-the-ground CB-MNC activities. In essence, CB-MNC is a broad program framework that supports (i) activities historically performed by government health workers; (ii) recently evaluated initiatives that show promise (e.g., the Birth Preparedness Package (BPP)); and, (iii) field trials of new interventions and strategies. CB-MNC includes both facility-based and community-based elements and is centered on two newly-established community-level *platforms* or *vehicles* through which a set of core services are delivered: (1) antenatal contacts between FCHVs and pregnant women; and, (2) early postnatal home visits by FCHVs to postpartum women. The services provided through these vehicles include counseling, dispensing commodities, documentation, assessment and referral as needed. The BPP keychain is an important tool containing messages promoted by CB-MNC that was distributed to pregnant women through their FCHVs in Banke and Jhapa districts.

While all three districts had a basic “core” package of CB-MNC content based on BPP, there were important inter-district differences in CB-MNC content. Banke district alone had an initiative to provide misoprostol to pregnant women prior to their delivery to give some protection against PPH. Postnatal care (PNC) visits in Jhapa district were guided by a specially designed job aid while CB-MNC in Kanchanpur was conducted without the BPP keychain and implemented with a complementary low birth weight (LBW) intervention delivered under ACCESS/USAID.

The District Public Health Offices (DPHOs) in Banke and Jhapa districts began implementing CB-MNC in November 2005 with support from Nepal Family Health Program (NFHP). CB-MNC was introduced in Kanchanpur district in July 2006. CB-MNC is designed to be implementable at scale through Government of Nepal (GoN) health sector staff and resources and (eventually) fully integrated with government programs. CB-MNC is

implemented by the Family Health Division of the Department of Health Services (DoHS), the NFHP and other partner organizations. Funding for CB-MNC has been provided by the United States Agency for International Development (USAID), through NFHP.

III. Monitoring, evaluation and applied research

Given the experimental, pilot nature of CB-MNC, it has been implemented with provisions for rigorous monitoring, evaluation and applied research (ME&AR) to guide mid-program modifications in program design and strategy, experiment with the use of program tools that serve both as job aids as well as sources of monitoring data, and measure impact. NFHP collaborated with a team from Johns Hopkins School of Public Health team to design the CB-MNC ME&AR framework. DPHO staff at district and community levels and FCHVs implemented the monitoring and evaluation system with guidance from NFHP staff.

ME&AR efforts in CB-MNC were based on three central elements: (i) detailed baseline and follow-up household surveys in each program district to measure change in key indicators (n = 2,640 at baseline and follow-up across the three districts); (ii) a comprehensive monitoring system based on an innovative approach that introduced simple one-page pictorial pregnancy registers that served as both job aids as well as sources of monitoring data; and, (iii) a number of special studies to investigate important applied research questions. CB-MNC used survey data to develop a wealth index based on principal component analysis of domestic assets and household possessions and characteristics and then used it to stratify respondents into quintiles based on socio-economic status (SES). Special study topics included a detailed process evaluation of CB-MNC and a maternal mortality registration system.

IV. Results

The comprehensive monitoring and evaluation effort conducted under CB-MNC produced a vast array of information regarding how it was conducted as well as the outputs, outcomes and impact of the program. The main body of this report presents the most important aspects of this information, while the text directly below highlights a condensed version of the primary findings.

FCHV services

FCHVs vastly expanded the percentage of pregnant women to whom they provided services or advice from 35 percent at baseline to 80 percent at follow-up across the three CB-MNC districts. Seventy-six and 77 percent of all pregnant women received the BPP keychain in Jhapa and Banke, respectively. Not only did *population coverage* more than double following the CB-MNC, but FCHVs also began to provide more *comprehensive services* (i.e., advice and counseling) to their clients. Major increases in *population coverage* and *comprehensiveness of services* provided by FCHVs combined to yield four-to-ten-fold increases in the population-level coverage of the various services that FCHVs provide at the time of the follow-up survey, as compared to baseline levels. For example, seven percent of all pregnant women were advised to delay bathing their newborn until at least 24 hours following birth at baseline, as compared to 63 percent at follow-up. These huge increases in program output lead to corresponding improvements in outcome and impact reported below.

Postnatal home visits

Another important activity introduced by CB-MNC was an early home visit by FCHVs during which they counsel recently delivered women (RDW), provide them with vitamin A and iron-folate, conduct a basic assessment of the condition of the mother and neonate based on the mother's report, and refer as appropriate. Survey results estimate that 26, 44 and 62

percent of RDW were visited by an FCHV in Jhapa, Banke and Kanchanpur within seven days of delivery, as compared to five, nine and fifteen percent at baseline.

Commodities

Substantial across-the-board increases in use of commodities by pregnant and postpartum women were observed over the course of CB-MNC—both among commodities that FCHVs promote *and* distribute as well as among those that they promote but *do not* distribute. The percentage of pregnant women who receive iron-folate tablets increased substantially from 73 percent at baseline to 91 percent at follow-up while the average number of days that iron was taken (among users) increased from 87 to 113 days. A modest nine percent increase in an already-high level of TT vaccination was observed over the duration of CB-MNC while the use of deworming tablets increased more substantially from 35 to 77 percent. The use of vitamin A and iron-folate by postpartum women also increased markedly during CB-MNC.

Health service utilization

Sizable increases in health service utilization by women and newborns were observed across districts and types of services. Examples of these achievements include the following:

- *Antenatal care:* An average 20 percent increase across the three districts in the percentage of pregnant women who made *at least four* ANC visits (at least one with a trained provider) was observed from a baseline level of 40 percent.
- *Delivery care:* A seven percent increase in both the percentage of births that were attended by a SBA as well as those that took place in a health facility was noted. Almost all of the increase in SBA attendance was due to "non-emergency" use. A five percent increase in the percentage of births attended by Other Trained Health Workers (OTHW: health workers from the formal health sector who are not SBAs) was noted.
- *Postnatal care:* The proportion of postpartum women and newborns who received care from a trained provider in the week following delivery mirrored the increases in attendance of SBAs and OTHWs at delivery. Across CB-MNC districts, 36 percent of newborns received care at follow-up from a health provider in the formal sector within seven days of delivery, up from 25 percent at baseline. In contrast, 44 percent of newborns were seen by a FCHV at follow-up during the same time period.
- *Family planning (FP):* FCHVs increased their coverage of FP counseling over the duration of CB-MNC and performed this counseling earlier in the postpartum period. This performance improvement was not correlated with increased use of contraceptives.
- *Management of emergencies:* CB-MNC counseled clients regarding recognition of danger signs and promoted the message that a woman or newborn should seek care from a qualified provider immediately if a danger sign is observed. Care-seeking for emergencies increased only marginally; adoption of this behavior may be limited by other barriers—financial, geographical, or cultural—not readily influenced by the types of interventions used under CB-MNC.
- *Care-seeking for sick newborns:* The percentage of sick newborns seen by a trained health provider increased only marginally over the duration of CB-MNC (79 percent at baseline versus 84 percent at follow-up). More importantly, care was sought more quickly after onset following CB-MNC (from an average of just under three days since onset before CB-MNC to just under two days post-intervention).

Essential newborn care (ENC) practices

Seven key ENC practices promoted under CB-MNC included clean cord care, immediate drying and wrapping of the newborn, delaying a newborn's first bath, immediate breastfeeding, feeding colostrum to the newborn, and correct pre-lacteal feeding. The average baseline-to-follow-up increase across behaviors and districts was 16 percent. The largest gains were made in Banke district where they averaged 30 percent.

Birth preparedness

The term birth preparedness (BP) is used for a set of messages that are contained in the BPP keychain, a tool that is widely used to promote maternal and newborn health (MNH) in Nepal. Key measures of BP that were measured through the household surveys, and the change from baseline to follow-up, include the following:

- Percentage of RDW who know at least three danger signs relating to 1) pregnancy, 2) delivery, and 3) the postpartum and 4) neonatal periods: an average 33 percent increase across CB-MNC districts and the four periods.
- Percentage of RDW who made at least two preparations for delivery (among financial, transport, food, identification of SBA, identification of facility, blood, materials for clean delivery): 50 percent to 77 percent.
- Percentage of RDW who set aside money for delivery: 31 percent to 83 percent.
- Percentage of RDW who arranged for a health worker or TBA to attend their last delivery: 14 percent to 24 percent.
- Percentage of RDW who made at least two preparations for emergencies: eight percent to 29 percent.

Misoprostol and prevention of postpartum hemorrhage

The field trial of misoprostol (*Maatri Surakchya Chakki*: MSC) was conducted in Banke district alone. Data from supervision visits show that health facilities and FCHVs maintained adequate stocks of MSC. The follow-up survey found that 89 percent of all pregnant women in Banke district were informed about PPH while 75 percent received information about a drug to prevent it, reflecting the wide coverage of the MSC initiative. Seventy-three percent of all pregnant women reported receiving MSC from their FCHVs—53 percent of all the RDW in the Banke follow-up survey reported taking MSC while 20 percent received MSC but did not use it. Among women who took MSC, correct use was almost universal; 98 percent took the full dose while nobody took it (incorrectly) before the delivery was completed. Only six percent of women who received MSC but did not take it (1.2 percent of all pregnant women) remained unprotected from PPH through other means.

Protection from postpartum hemorrhage

The objective of the MSC intervention has been to increase the proportion of women who are protected from PPH during the immediate post-delivery period. A woman is considered to be protected from PPH if she takes MSC correctly, delivers in the presence of a SBA, receives an oxytocin injection immediately following delivery, and/or delivers in a qualified health facility. A baseline-follow-up comparison of the percentage of women protected from PPH in Banke and Jhapa districts reveals the power of the MSC intervention. Four out of five RDWs surveyed at follow-up in Banke received some protection against PPH (up from 28 percent at baseline). In Jhapa (where MSC is not offered) 52 percent of women were protected from PPH at follow-up (versus 41 percent at baseline).

Newborn mortality

Newborn deaths were identified among household survey respondents and defined as infants who were born alive but died within the first month of life according to the mother's report. The newborn mortality rate decreased from eighteen deaths per thousand live births across the three districts at baseline to eight deaths per thousand live births at follow-up. The significance of changes in the newborn mortality rate in each of the three program districts, as well as a pooled rate across the three districts, was calculated using logistic regression. The 66 percent reduction in newborn mortality in Banke was highly significant—both statistically as well as programmatically—as was the estimate of a 53 percent reduction in newborn mortality across the three districts. The reduction in mortality was observed across all five household assets wealth quintiles.

Equity of benefits

The concentration index (an extension of the Gini coefficient) was used to document reductions in health care inequity across five representative indicators of antenatal, delivery, postpartum and newborn care. This finding suggests that the CB-MNC is a pro-poor program that reduces inequities in health care utilization and delivers benefits across all SES strata.

Associations between exposure to messages, knowledge and behavior

Logistic regression analysis was used to investigate the degree of association in the follow-up survey data between exposure to BPP message (i.e., the independent variable), knowledge and behavior (i.e., the outcome variables) for two behaviors: *practiced immediate breastfeeding* and *made 4+ ANC visits*. Exposure to each message was found to be strongly and positively associated with knowledge of the message content and practice of the behavior it promotes. In order to further explore the relationship between message exposure and behavior, the practice of *immediate breastfeeding* was disaggregated among survey respondents who report *exposure* or *no exposure* to the message at baseline and follow-up. The practice of the behavior among the *unexposed population* is equivalent at baseline and follow-up, but two factors contributed to higher levels of practice at follow-up: 1) a higher level of practice among the *exposed population* (64 percent vs. 56 percent at baseline), perhaps due to more effective communication methods; and, 2) a higher percentage of the overall population of RDW exposed to the message (81 percent vs. 48 percent at baseline). These findings suggest that promotion of messages through CB-MNC has directly led to improved knowledge and healthy practices.

Program cost

Core CB-MNC costs for the first two years of operation in a typical district would total \$92,000 with a continuing annual recurrent cost of approximately \$6,000 (costs do not include non-district-level technical support nor M&E costs). Cost projections suggest that CB-MNC can reach a mother-neonate pair for approximately \$2.30 over a five-year program time horizon. Costs of CB-MNC, as actually implemented in Jhapa, Banke and Kanchanpur districts, were substantially higher and included costs for core components as well as other optional components and costs associated with rigorous M&E functions.

V. Conclusions

CB-MNC results have surpassed expectations. Coverage of FCHV services has skyrocketed while FCHVs' clients have adopted new behaviors and increased their use of health services. The CB-MNC community-based approach has been implemented in a scaleable, replicable manner through the government health services and substantially reduced neonatal mortality.

Role of FCHVs in MNH: CB-MNC has established FCHVs as a cadre of first contact for many pregnant women and their family members. The FCHV cadre has been energized through CB-MNC and greatly increased its role in providing key MNH services.

Skilled birth attendance: The experience in Banke with misoprostol makes it clear that community-level safe motherhood work does not need to *compete* with institutional deliveries. Safe motherhood practitioners should seek to develop a combined strategy whereby the use of SBAs is promoted while other community-level interventions that contribute to lowering mortality (e.g., misoprostol to prevent PPH) are also pursued.

BPP tools: By implementing CB-MNC in Kanchanpur district without the BPP keychain, CB-MNC posed the following question: "Can results achieved using the BPP keychain be replicated without distributing a keychain to every pregnant woman?" Results from Kanchanpur suggest that public health officials in Nepal should consider alternative ways of promoting MNH messages that do not require the ongoing expense of providing a BPP keychain to every pregnant woman in Nepal.

Inter-district findings: A comparison of results and experiences across the three CB-MNC districts suggests that the type of districts that are most likely to achieve maximum benefit from CB-MNC are less prosperous districts with high levels of newborn mortality, a strong group of population-based FCHVs and motivated district-level government counterparts.

Next steps: CB-MNC is a highly relevant and effective program for Nepal. CB-MNC has built upon a history of innovative MNH efforts by the MoHP and its national and international partners over the past decade to develop an effective community-based model for improving maternal and neonatal health. Plans for scaling up interventions similar to CB-MNC are already in progress. Active, committed leadership from DPHOs appears to have played a significant part in the success of the program. Ultimately, CB-MNC achievements are primarily the result of the dedicated services provided by FCHVs in Banke, Jhapa, and Kanchanpur. This document provides one more piece of evidence that FCHVs are saving lives of many women and children across Nepal every day.

I Background

Mothers and their children have long suffered from low health status in Nepal. Although public health interventions have succeeded in raising their health status over the past two decades, improvement in the health of neonates has lagged behind that of children aged between one month and five years.

Sustainable improvements in maternal and child health status are best achieved through multiple strategies that address different causes of poor health. Community-based strategies can play a crucial role in addressing health problems in countries such as Nepal where lack of resources, a weak health system and geographic barriers to accessing health care limit the effectiveness of facility-based health initiatives. Community-based strategies are implemented in Nepal by Female Community Health Volunteers (FCHVs), a globally-recognized cadre that has played a vital role in the success of several community-based maternal and child health (MCH) programs.

0.1 *Maternal health in Nepal*

Programs that seek to improve maternal health status in Nepal must overcome contextual factors that contribute to poor health including deep-seated poverty, political instability and armed conflict, poor transportation infrastructure and geographically isolated communities, and cultural preferences regarding delivery practice that place women and newborns at risk of adverse outcomes. The Nepal Demographic and Health Survey (DHS) 2006¹ provides information about a variety of aspects of maternal health. The maternal mortality ratio (MMR) in Nepal is estimated to be 281 deaths per 100,000 live births (95% CI 178-384), a value that—while high—is substantially lower than the previous estimate of 539 in 1996². Major causes of maternal death in Nepal include postpartum hemorrhage, obstructed labor, eclampsia, and puerperal sepsis³.

Forty-four percent of the women who delivered in the five years preceding the DHS survey received antenatal care (ANC) from a skilled birth attendant (SBA: defined as a doctor, nurse, or midwife) prior to their most recent birth, an increase from 28 percent in 2001. Twenty-nine percent of respondents made four or more ANC visits as recommended by the World Health Organization (WHO). Birth preparedness is increasingly recognized as an important element of program efforts to improve maternal and neonatal health (MNH). The 2006 DHS found that 37 percent of respondents saved money for delivery, 18 percent used a clean home delivery kit (CHDK), four percent contacted a health worker to arrange for them to attend their delivery, one percent arranged for emergency transportation prior to their delivery, 0.3 percent identified a blood donor, while 46 percent did not make any preparations. Eighty-one percent of births in Nepal take place at home while SBAs attend 19 percent of all births. Thirty-three percent of respondents received postnatal care (PNC) – 19 percent from SBAs, three percent from other trained health workers, and 11 percent from traditional birth attendants (TBAs). The total fertility rate decreased from 4.1 in 2001 to 3.1 in 2006, although

¹ *Nepal Demographic and Health Survey 2006*. Kathmandu, Ministry of Health and Population, New ERA, Macro International Inc., 2007.

² *Nepal Family Health Survey*. Kathmandu, Family Health Division, Department of Health Services, Ministry of Health, Government of Nepal, New ERA, Macro International Inc., 1996.

³ Pathak LR et al. *Maternal Mortality and Morbidity Study*. Kathmandu, Family Health Division, Department of Health Services, Ministry of Health, Government of Nepal, 1998.

many women still have short intervals (56 percent less than 36 months) between their two most recent births. Forty-four percent of married women report current use of a modern contraceptive method.

0.2 *Newborn health in Nepal*

The 2006 Nepal DHS found that 33 out of every 1,000 infants who are born alive in Nepal die during the first 28 days of life (neonatal death)—a decrease from 39 deaths per 1,000 live births as measured in the 2001 Nepal DHS. An examination of child, infant and neonatal mortality rates in Nepal over the past two decades reveals that neonatal mortality has decreased at a slower rate than infant and child mortality, with the result that neonatal deaths have risen to now comprise 66 percent of all infant deaths and 54 percent of under-5 deaths. Studies of hospital and community-based mortality data suggest that the major causes of neonatal death in Nepal include preterm birth, infection, hypothermia, and birth asphyxia⁴. A recent study of newborn health in Nepal reported that underlying risk factors for newborn mortality include inadequate access to and use of health care during pregnancy, delivery and post-delivery periods; poor maternal nutrition including micronutrient deficiencies; unsafe newborn care practices; and early childbearing⁵.

Key DHS 2006 indicators measured behaviors and practices that can lead to neonatal hypothermia and infection. Twenty-two percent of newborns do not have the cord cut with a sterile instrument such as a new / boiled blade or instruments from a CHDK while 26 percent of newborns have a potentially harmful substance such as oil or ash applied to their cord stump. Only 43 percent of newborns were dried and 44 percent were wrapped in cloth before the placenta was delivered; both practices can prevent hypothermia. Unsafe newborn bathing practices in Nepal also hold the potential to lead to hypothermia, as 73 percent of newborns were first bathed within one hour of birth and an additional 17 percent were bathed within the first 2-24 hours of life. Only 35 percent of newborns are breastfed within one hour of birth, a practice that has health benefits for both mother and newborn.

0.3 *Community-based approaches to improve newborn and maternal health in Nepal*

The majority of mothers and newborns in Nepal live in more or less isolated rural locations and have limited or no contact with facility-based health services. Health programmers often address this context by designing and implementing *community-based* MNH programs. Many of these programs build on the strong system of community-level health volunteers (i.e., FCHVs) in Nepal. A number of community-based MNH pilot programs have been implemented in Nepal to test interventions that may be suitable for national scale-up. Information in Table 1 summarizes leading efforts in this regard and—for each initiative—describes the primary program strategy as well as key results and lessons learned.

A review of the information presented in the table shows that community-based strategies to improve MNH that have been tested in Nepal include demand creation through community mobilization, provision of new services through community health workers (CHWs), and strengthening facility-based services through training of health workers, development of systems and physical infrastructure, and quality improvement initiatives. The potential to scale up and sustain these interventions varies markedly.

⁴ *Newborn Health and Programs in Nepal*. Kathmandu, Department of Health Services, Ministry of Health, Government of Nepal, Save the Children, 2007.

⁵ Ibid.

Table 1: Community-based maternal and neonatal health programs conducted in Nepal

Program	Principal strategies	Major lessons learned and achievements
Nepal Safer Motherhood Project [NSMP: ten districts]	<p>The NSMP was implemented in ten districts from 1997 to 2004 by FHD and Options. The goal of NSMP was to reduce maternal mortality Nepal by increasing the use of quality obstetric and midwifery services; its central outputs were as follows:</p> <ol style="list-style-type: none"> 1. Improve the quality and quantity of midwifery and emergency obstetric care (EOC) services through strengthened service provision (establishing systems to manage RH services including physical infrastructure, equipment/ supplies, and staff training). 2. Increase access to services by stimulating demand for EOC services and reducing barriers to access through improving the social context for midwifery / obstetric services. 3. Influence and inform government policy and planning processes through the dissemination of lessons learned from the NSMP 	<p>The NSMP strengthened 24 hour delivery services, including basic emergency obstetric care (BEOC) and comprehensive emergency obstetric care (CEOC), at community and Primary Health Care Center (PHCC) levels and in district hospitals. Increases in service utilization as well as met need for CEOC and BEOC were observed in project areas. Clients' knowledge of MNH danger signs improved and timely referral of clients to appropriate health facilities increased. The project found working with and through community groups to be a powerful approach for introducing and reinforcing information. The NSMP and its partners established functional emergency transport, blood and financing schemes in project areas including provisions to make blood available free of charge to the poor.</p>
Mother and Infant Research Activities [MIRA]	<p>The MIRA program has designed and tested several community-based strategies to improve maternal and neonatal health (MNH) over the past two decades. As an overarching input, different cadres of health workers in Makwanpur and Dhanusha districts, including FCHVs and TBAs, were trained in essential newborn care. In these two districts, key efforts include the following:</p> <p><u>Makwanpur district:</u> A local female facilitator was employed by MIRA to facilitate monthly women's group meetings through a participatory, action-learning strategy to identify local perinatal problems and develop strategies to address them in consultation with their communities. In the current phase of the study, new women's groups have been formed to discuss MNH while existing women's groups are working to address childhood illness in the community. All groups continue to use the action-oriented methodology from the first phase. Men are being involved more substantially in the intervention.</p> <p><u>Dhanusha district:</u> The current study will evaluate the impact of training FCHVs to recognize and manage neonatal sepsis on child health outcomes. The additional effect of women's groups facilitated by FCHVs (on a voluntary basis) using the participatory-action approach is also being tested. A second study examines the impact of the inclusion of diet as a discussion issue for women's groups on maternal and infant nutritional status. The study has provided basic equipment for peripheral health facilities including resuscitation of newborns and warm cots for low birth weight (LBW) babies.</p>	<p><u>Makwanpur district:</u> The first phase of the study showed that a community-based, participatory intervention to improve essential neonatal care in rural areas of Nepal substantially reduced neonatal and maternal mortality. A 30 percent reduction in neonatal mortality was achieved in intervention areas and significant differences in care-seeking behavior during illness were also observed. An 80 percent reduction in maternal mortality was observed; although results were statistically significant they should be interpreted with caution. Community members were found to prefer local treatment options for newborns.</p> <p>Formative and baseline research provided important data on birth practices during the perinatal period at the community level while an economic evaluation of the intervention found it to be cost-effective.</p> <p>The study provided important evidence that large-scale monitoring of community-based participatory and dynamic interventions are acceptable to communities.</p> <p>Research is ongoing to further explain the results of the trial and explore the sustainability of the intervention.</p> <p>In total, 250 groups meet on a monthly basis, 111 of which have been meeting for over 6 years. 137 of these groups manage maternal child health funds.</p> <p><u>Dhanusha district:</u> The study is currently in progress.</p>

Program	Principal strategies	Major lessons learned and achievements
SUMATA Initiative [Maternal and Neonatal Health Program: Lalitpur and Baglung districts]	The SUMATA campaign targeted pregnant women and their families with messages to encourage them to prepare and plan for births and the postnatal period and complications / emergencies that may occur. Specific activities conducted during the campaign included: i) radio spots; ii) print materials (e.g., posters); iii) street theater; iv) TV drama; v) job aid for MCHWs; and, vi) the <i>Jeevan Surakchya</i> (i.e., Birth Preparedness Package) keychain and supporting materials. FCHVs and TBAs delivered messages through IPC with household members using BPP flipcharts and keychains. The NGO <i>Ama Milan Kendra</i> provided supervision and monitoring support in Baglung district. In Lalitpur Municipality, the BPP was adapted to an urban setting in collaboration with the <i>Yala Urban Health Program</i> .	The ability of the evaluation of the SUMATA initiative to measure change in outcomes was limited by the short duration of the program. The BPP keychain provided a useful tool for catalyzing ongoing dialogue in the community regarding MNH issues. The radio campaign served as the primary source of information about MNH issues among respondents to the follow-up survey. Preparations for birth increased with the exception of financial planning.
Strengthening Essential Newborn Practices [SNL: Kailali district]	FCHVs promoted a focused set of essential newborn care (ENC) messages through IPC within the framework of existing MoH safe motherhood (SM) programs during 2003-04. Messages delivered by FCHVs were reinforced by a multi-media communication campaign.	Large positive changes in household-level ENC practices were achieved in a short time frame through the delivery of a small number of specific, uniform messages through multiple channels. IPC through FCHVs and interactions within Mothers Groups are the key channels to achieve behavior change and community acceptance.
Birth Preparedness Package [Saving Newborn Lives (SNL): Siraha district]	CHWs used interpersonal education (IPC) supported by educational tools to encourage pregnant women (PW) and family members to plan for normal pregnancies, deliveries, and postnatal periods, including newborn care, as well as how to manage emergencies if they occur. The program was implemented through Government of Nepal (GoN) health services in 2003-04 with minimal operational support from SNL in order to maximize sustainability of the model.	Program coverage was ~ 50 percent. Most aspects of birth preparedness—including women's knowledge, utilization of health care, and preparation for delivery—improved substantially during the program period. Utilization of a skilled birth attendant was a key indicator that did not change.
Increasing Access to Quality Postnatal Care [SNL: Kailali district]	Local government and non-government organizations (NGOs) partnered in 2003-04 to train and support community-based volunteer health workers to provide structured post-delivery care to postpartum mothers and newborns.	Health workers provided effective home-based postnatal care of reasonable quality, especially during the first week post-delivery. High coverage levels of ~ 50 percent were due to acceptability of services to clients as well as abilities and motivation of volunteers.
Bara Child Survival Project, Plan Nepal	During 2 nd year of the project a very low coverage of maternal health service i.e. TT, ANC was found on routine monitoring of activities. To reach these mothers, a sub-group of the mothers group was piloted in few VDCs – <i>the pregnant women's group</i> – and found to be an effective strategy to reach the majority of pregnant mothers. It was subsequently scaled up to the whole district.	The evaluation, comparing infant, neonatal and maternal death among participants found lower rates than among non-members. District-wide antenatal service coverage increased.

Program	Principal strategies	Major lessons learned and achievements
Morang Innovative Neonatal Intervention (MINI)	The MINI project was established in 2004. FCHVs make early post-delivery home visits to all newborns in their catchment areas to provide counseling and assess neonates for danger signs. Family members also participate in the identification of danger signs. FCHVs treat newborns with danger signs with cotrimoxazole for presumptive infections and call trained health workers to treat with gentamicin injection. Community health workers, including FCHVs, have been trained to use simple clinical algorithms to identify and manage neonatal infections.	FCHVs accurately use the algorithm to identify sick neonates, initiate treatment, and refer. Eighty percent of expected <i>possible severe bacterial infection</i> (PSBI) cases receive treatment through the government health system in the intervention area compared to 35 percent in the control area. Village Health Workers (VHWs) and Maternal and Child Health Workers (MCHWs) can provide gentamicin with high treatment completion rates. Providers and clients alike find the care provided through the MINI algorithm to be acceptable.
Birth Preparedness Package (BPP) National Program	Under the national BPP program, FCHVs use BPP tools (flip chart and keychains) to communicate health messages to pregnant women and their family members through IPC. Based on successful pilot efforts described elsewhere in this table, the Family Health Division (FHD) began implementing the BPP program in 2005/06 as a government program in nine districts. Current plans call for the expansion of the BPP program into 25 additional districts this fiscal year. UNICEF, BNMC, ADRA, CECI, NSMP, EAP, and Merlin have all supported the use of the BPP tools in additional districts.	Both health workers and clients find the BPP tools be easy to understand and use, even those who are illiterate or semi-literate. The utilization of ANC, PNC and delivery services has climbed steadily in districts where the BPP has been implemented. Families and communities have established functional emergency transport, blood donor and financing schemes in BPP districts. The BPP keychain has multiple effects—in addition to serving as a source of information, it catalyzes communication between spouses and among family members. Clients like the keychain and find it to be informative, attractive and handy. The best results have been achieved when the BPP has been introduced in the entire district rather than in selected Village Development Committees (VDCs).
Maternity Incentives Scheme [GoN; national implementation]	The GoN introduced the Maternity Incentive Scheme (MIS) in 2006 to encourage women to deliver in health facilities where services are available from skilled birth attendants. The MIS seeks to alleviate the high financial cost of delivery by providing a cash incentive to women to help offset the cost of transport and medical costs that they incur in a facility delivery. Health service providers also receive an incentive for deliveries that they attend.	A recently conducted process evaluation ⁶ of the MIS found that many clients have not received their incentive in a timely manner while health workers often do not claim the incentive for institutional deliveries. There is significant variation between policy and practice with regards to how the MIS is implemented. Funding for the MIS has been delayed, the monitoring of the MIS needs to be strengthened, and the availability and quality of care is inadequate.

⁶ SSMP. Summary Report on the Process Evaluation of the Maternity Incentive Scheme in Nepal. Kathmandu, Nepal, 2007.

0.4 Future directions for MNH programming in Nepal

The innovative, active programming and research agenda described above illustrates the priority that donors and policy makers in Nepal have given to maternal and neonatal health. District-level field trials in Nepal have lowered neonatal mortality and successfully promoted household practices that are associated with improved newborn health. Programmatic efforts to increase the proportion of deliveries attended by SBAs in Nepal have achieved modest effect; the rate of attended births is rising slowly but remains low in most parts of the country. While public health practitioners continue efforts to identify a model of SBA services that will markedly increase use, complementary efforts to design and test community-based interventions that address specific causes of maternal and neonatal mortality may hold greater promise to reduce the MMR, at least over the short to medium term.

While a number of promising interventions that have positive impact on specific aspects of MNH have been identified, the need remains for a sustainable, overarching programming framework that can incorporate effective new initiatives as they are developed and tested. This document describes the development of such a program—the Community-Based Maternal and Neonatal Care program (CB-MNC)—and presents the results that have been achieved and the lessons that have been learned during its initial trial. CB-MNC is implemented by the Family Health Division of the Department of Health Services (DoHS), the Nepal Family Health Program (NFHP) and other partner organizations. CB-MNC is a comprehensive community-based MNH program framework that incorporates (i) activities historically performed by government health workers, (ii) recently evaluated initiatives that show promise (e.g., the Birth Preparedness Package), and (iii) field trials of new program interventions and strategies.

This initial chapter has presented background information regarding MNH in Nepal. Subsequent chapters describe the design of CB-MNC, the methodologies that were used to monitor and evaluate the program, the results of monitoring and evaluation activities, and the significance of the findings for future MNH programming in Nepal. The CD-ROM that accompanies this report contains annexes to the report.

1 CB-MNC intervention design

1.1 Background

The concept for CB-MNC emerged from strategic planning activities that took place during the early stages of the NFHP in 2002-03. The Family Health Division (FHD) of the Ministry of Health and Population (MoHP), along with NFHP and its partners, envisioned the need for a sustainable community-level programming “platform” for safe motherhood and neonatal health. CB-MNC is designed to build on existing services and includes program elements—such as the Birth Preparedness Package (BPP)—that have achieved success in Nepal. CB-MNC is also designed to incorporate and field-test new interventions such as the provision of misoprostol through FCHVs to pregnant women, to be taken immediately after delivery to prevent postpartum hemorrhage (PPH). CB-MNC thus follows a strategy of consolidating proven community-based maternal and neonatal health (MNH) interventions under a single programmatic “umbrella” while at the same time testing and evaluating promising new initiatives. CB-MNC has implemented a somewhat different “programmatic mix” of interventions and strategies in each of the three districts in which it has been conducted, reflecting the experimental nature of the program at this early stage of its development.

This chapter provides an overview of the design and content of CB-MNC and the strategies that it has followed. The various partner organizations and their roles in CB-MNC are described as are key aspects of the program including goals, objectives, and activities. The chapter closes with a brief description of a separate intervention—the Morang Innovative Newborn Initiative (MINI). MINI was funded primarily⁷ by Save the Children-US/ Saving Newborn Lives Initiative (SC-US/SNL) and implemented by John Snow, Inc. (JSI), in close collaboration with staff from NFHP, SC-US/Nepal and SC-US/HQ. The MINI project is described in this document because of important similarities in objectives and methods to CB-MNC and because it is likely to be included in future iterations of CB-MNC.

1.2 CB-MNC strategic framework

The strategic framework of CB-MNC rests on a number of key design and implementation strategies. These strategies, along with the assumptions that must be fulfilled if they are to achieve impact, are described below.

Design strategies

CB-MNC seeks to optimize coverage of a package of high-impact, cost-effective, community-based interventions that have the potential to significantly reduce maternal and neonatal mortality within the duration of the program and beyond. Guided by the following *design strategies*, CB-MNC is intended to be:

- implementable at scale through Government of Nepal (GoN) health sector staff and resources;
- fully integrated (eventually) with government programs, structures and activities—and integrated immediately with some activities in program districts such as iron-intensification and pregnancy registration;
- selectively focused on specific interventions that have high potential impact;
- closely documented and monitored (initially), so that partner organizations progressively refine its approach to maximize impact and ease of implementation; and,
- inclusive of interventions of established effectiveness as well as new initiatives.

⁷ Though exclusively funded by USAID, through NFHP, from October 2006 through December 2007.

Implementation strategies

The complementary strategies through which CB-MNC activities are implemented include the following:

- communication of health messages through multiple channels with a primary focus on interpersonal communication (IPC) through FCHVs, particularly with pregnant women;
- creation of demand for and facilitated provision of basic commodities such as tetanus toxoid, iron-folate, albendazole and misoprostol that decrease the risk of adverse maternal and neonatal outcomes;
- provision of (previously unavailable) postnatal home-visit services by FCHVs; and,
- strengthened provision of selected facility-based delivery and postpartum services including management of complications and Emergency Obstetric Care.

Assumptions on conditions required to achieve impact

The strategies that are outlined above are designed to achieve substantial impact if:

- program clients practice the behaviors that are promoted through CB-MNC;
- clients seek appropriate care when they experience danger signs; and,
- clients are able to access appropriate services of acceptable quality on a timely basis.

1.3 CB-MNC program framework and activities

This section describes the framework of CB-MNC and summarizes its activities.

The content in this section is presented according to the following structure:

1. Program goals, objectives, and target groups
2. Program framework
3. Program activities including district-specific intervention models

1.3.1 CB-MNC goals, objectives and target groups

The focus of CB-MNC is on the promotion of household-level practices and creation of demand for health services. Limited additional support creates new services and strengthens existing services. The goal and objectives of CB-MNC are listed below.

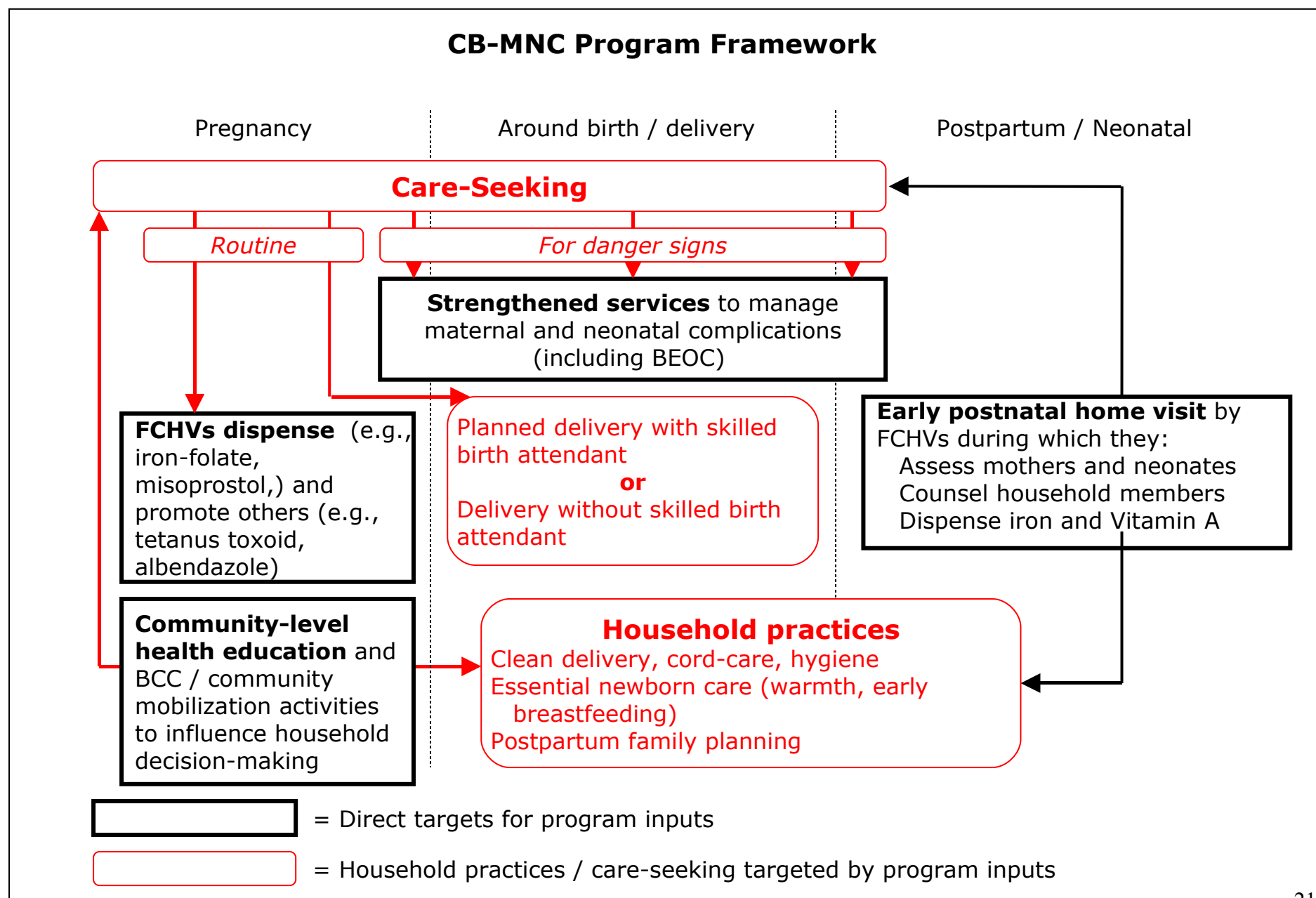
CB-MNC program goal

To improve the health and survival of mothers and neonates by providing a continuum of effective, primarily community-based services to women and neonates from the time a woman becomes pregnant, around delivery and through the early postnatal period.

CB-MNC program objectives

1. *To increase knowledge and healthy practices* of pregnant women and key family members regarding safe pregnancy and delivery, and essential newborn care, including recognizing and appropriately responding in the case of danger signs.
2. *To improve the quality of MNH services* provided by community health workers.
3. *To increase the utilization of facility-based maternal and neonatal care services.*
4. *To promote and strengthen birth preparedness practices* for normal deliveries as well as obstetric emergencies.
5. *To determine the feasibility, achievable coverage level, and safety of providing misoprostol* through FCHVs to pregnant women to decrease their risk of PPH.

Figure 1: CB-MNC program framework



Target groups

The client groups targeted by CB-MNC include pregnant women, neonates and key family members such as mothers-in-law, fathers-in-law, and husbands.

1.3.2 Program framework

The figure outlines the CB-MNC program framework in terms of key program inputs and the areas where those inputs promote desired household-level behaviors and decision making. These inputs and outcomes are mapped across the continuum of a woman's pregnancy, delivery, and postpartum period (including the neonate). The rectangular boxes in the figure represent the direct focus of program inputs while the round-cornered boxes signify care-seeking and household practices promoted through CB-MNC.

1.3.3 Major activities

The District Public Health Offices (DPHOs) in Banke and Jhapa districts began implementing CB-MNC in November 2005 with support from the NFHP. CB-MNC was subsequently launched in Kanchanpur district in July 2006. As a community-based program, CB-MNC was designed to be implemented only in rural areas. CB-MNC was ultimately fully implemented in all rural areas in the three program districts as well as in the municipalities of Mechi in Jhapa district and Mahendranagar in Kanchanpur district (per requests from the DPHOs). FCHVs in Nepalgunj municipality in Banke district were also trained.

CB-MNC consists of a core set of activities that are implemented in all program districts as well as a number of pilot interventions that have been implemented selectively among the three districts in order to test their feasibility and effectiveness. A number of orientations and trainings form the heart of program activities. Core activities and pilot interventions, as well as the districts in which they were implemented, are described in the table. This textual description of program activities follows the program framework presented in the figure below.

Table 2: Overview of CB-MNC activities across program districts

Components	Core intervention (all districts)	Additions and/or modifications to core intervention		
		Banke	Jhapa	Kanchanpur
Antenatal health education and counseling	<p>Community-level antenatal health education / counseling / health & service promotion with pregnant women and household decision-makers. FCHVs conduct most program activities. FCHVs use materials adapted from the Birth Preparedness Package (BPP), including the BPP keychain, to promote the following topics through interpersonal counseling (IPC):</p> <ol style="list-style-type: none"> 1. Utilization of specific <i>antenatal services</i> (e.g., antenatal checkups, tetanus toxoid, deworming) provided by health workers (HWs); 2. Planning to use a <i>skilled birth attendant</i> at delivery, including financial and transport planning; 3. Recognition and prompt care-seeking for <i>maternal and neonatal danger signs</i> (including specific information on where care is available); 4. Practice of <i>essential neonatal care</i> at the household level including appropriate cord-care, breastfeeding and temperature control; 5. Seeking <i>immunization and postpartum family planning</i>; and, 6. <i>Informing FCHV</i> of the delivery in a timely manner to trigger early postnatal home visit. 7. Specific information on where and how to seek locally available services - skilled birth attendants and for management of maternal / neonatal complications. <p>FCHVs dispense commodities to pregnant women, including iron-folate tablets and misoprostol (in Banke district only).</p> <p>Complementary behavior change communication (BCC) / community mobilization activities, such as radio drama serial, street theater, and wall paintings that promote key MNH messages.</p>	<p>Prevention of postpartum hemorrhage through counseling and distribution of misoprostol.</p> <p>Intensified promotion of family planning (FP).</p>	<p>As described in “Core intervention” column.</p>	<p>Intensified contact with other adult household members (mothers-in-law, husbands, sisters-in-law) as well as pregnant women.</p> <p>Group counseling using active, group-based, participatory, problem-posing / solving strategy.</p> <p>BPP keychain is not provided to clients; FCHVs counsel clients using BPP flip charts and participatory card game.</p> <p>Key BPP messages are reinforced through “card game” used to promote interaction in mothers’ group meeting.</p>
Service delivery strengthening	<p>Strengthening existing services, including the following:</p> <ol style="list-style-type: none"> 1. Training for community-based staff, provision of equipment for selected BEOC sites, and minor facility renovations and repairs; and, 2. Monitoring logistics and health worker performance. 	Strengthening EPI services	As described in “Core intervention” column.	As described in “Core intervention” column.

Components	Core intervention (all districts)	Additions and/or modifications to core intervention		
		Banke	Jhapa	Kanchanpur
PNC	<p>Postnatal home visits by FCHVs within three days post-delivery to perform the following activities:</p> <ol style="list-style-type: none"> 1. <u>assessment of mother and neonate</u>: inquire regarding presence of danger signs (<i>for the newborn</i>, by following the Community-based Integrated Management of Child Illnesses (CB-IMCI) protocol; <i>for the mother</i>, by questioning on danger signs) and referral, as appropriate; 2. <u>counseling / negotiation</u> (focus on essential newborn care practices, breastfeeding, and recognition of danger signs—but also including immunization and family planning); 3. <u>dispensing of commodities</u> (iron-folate tablets and vitamin A to mother); and, 4. <u>birth recording</u> to support civil registration. 	Recovery of unused misoprostol and documentation of process and results of use.	<p>Intensive PNC contact with mother and neonate guided by laminated job aid.</p> <p>Birth recording intervention <u>not</u> conducted</p>	<p>Screening for low birth weight (LBW) neonates (designed and implemented under ACCESS program)—and, <i>for identified LBW neonates</i>:</p> <ol style="list-style-type: none"> 1. Counseling / support for kangaroo-mother-care and feeding; and, 2. Five follow-up home visits (1: within 72 hours; 2: 4-7 days; 3 more visits – one each week until the baby is 28 days old) to provide extra care for LBW newborns. Care includes assessment of neonate for danger signs, assessment of feeding practices and counseling and support to reinforce KMC.

1.4 Partnerships

The table below lists the major partners that collaborated in the design and implementation of CB-MNC as well as the role they played.

Table 3: CB-MNC partners

Partner	Summary of role
Department of Health Services <i>[including Family Health Division, Logistics Management Division, Child Health Division, and National Health Training Center]</i>	<ol style="list-style-type: none"> 1. Provide technical assistance to plan and implement CB-MNC. 2. Provide appropriate logistical support to supply commodities, counseling materials, and registers and forms. 3. Supply medical equipment and furniture to CB-MNC districts for maternal and neonatal services (basic and comprehensive obstetric care, etc.). Support the repair and maintenance of health facilities in program districts. 4. Provide technical assistance to design and organize <i>training activities</i>. 5. Monitor and supervise the implementation of CB-MNC as appropriate.
District (Public) Health Offices (<i>in Banke, Jhapa and Kanchanpur districts</i>)	<p>Lead the planning and implementation of CB-MNC at the district level including the following tasks:</p> <ol style="list-style-type: none"> 1. Plan and manage CB-MNC training activities. 2. Recruit additional FCHVs as necessary on a population basis. 3. Ensure the supply to health facilities of commodities, counseling materials, registers and forms. 4. Manage the supply of medical equipment and furniture for maternal and neonatal services (comprehensive and basic emergency obstetric care, PAC, etc.). 5. Monitor and supervise the implementation of CB-MNC as appropriate. 6. Conduct a needs assessment for repair, maintenance and strengthening basic infrastructure in health facilities (HFs) focusing on reproductive health (RH) services. Based on this assessment, manage the repair and maintenance of HFs. 7. Appoint a CB-MNC focal point person within the DPHO 8. Update record keeping and reporting system in the health facilities to incorporate the CB-MNC monitoring and recording system. 9. Coordinate with all district-level CB-MNC stakeholders.
Health Posts and Sub-Health Posts	<ol style="list-style-type: none"> 1. Take part in CB-MNC training activities as facilitator/participant. 2. Provide services including antenatal care, immunizations, deliveries, and management of complications. 3. Organize and facilitate monthly facility-level FCHV meeting. 4. Provide logistical support to FCHV/TBAs including distribution of commodities, counseling materials, and CB-MNC registers and forms. 5. Monitor and supervise the FCHVs with regards to CB-MNC. 6. Maintain and support the CB-MNC record keeping, monitoring and reporting system for health facilities and FCHVs.

Partner	Summary of role
Nepal Family Health Program	<ol style="list-style-type: none"> 1. Provide technical assistance to DoHS and DPHOs to plan and implement CB-MNC in areas that include the following: <ol style="list-style-type: none"> i. planning, management and facilitation of training activities. ii. monitoring and evaluation. iii. conduct of a needs assessment for minor repair and maintenance and strengthening basic infrastructure in the health facilities. 2. Provide material support to CB-MNC as appropriate, complementary to technical assistance described directly above. 3. Support the position of district-based CB-MNC Coordinator for a limited duration of one to two years.
The Johns Hopkins Bloomberg School of Public Health (JHSPH)	Provide technical assistance to CB-MNC in monitoring, evaluation, and operations research. In addition, JHSPH contributed to local capacity building to use advanced research techniques in a programmatic setting.
ACCESS project	Design and implementation of LBW intervention in Kanchanpur district that is integrated with CB-MNC activities there.
Saving Newborn Lives, Save the Children, US	Provide funding and technical input for the MINI intervention in Morang district; development and implementation by JSI. The MINI intervention, while outside of the CB-MNC program, is closely related to CB-MNC activities and is envisioned to be included in future iterations of CB-MNC.
Local NGOs	<ol style="list-style-type: none"> 1. Develop and produce materials to support CB-MNC BCC activities (street theater, radio, etc.) in collaboration with the DPHO and NFHP. 2. Implement BCC activities that support CB-MNC.
Valley Research Group	Conduct baseline and follow-up household surveys in collaboration with NFHP. Perform detailed analysis of survey results and document the findings.
PLAN	Procurement of misoprostol.
Venture Strategies	Provision of misoprostol.
United States Agency for International Development (USAID)	Provide funding support, technical assistance and ongoing oversight to the planning and implementation of CB-MNC.

1.5 The Morang Innovative Neonatal Intervention (MINI)

Infections have been estimated to account for at least 30 percent of neonatal deaths in Nepal.⁸ In a similar programmatic context, the SEARCH project in Gadchiroli, India has shown that community health workers can competently identify and manage neonatal infections, resulting in a large reduction in neonatal mortality.⁹ FCHVs in many districts in Nepal currently diagnose and treat pneumonia in children aged two months to five years. However, they do not provide such care for infants below two months of age. The Department of Health Services, in collaboration with its partners, decided to determine whether or not FCHVs could correctly assess and initiate management of infections in sick newborns and young infants less than two months of age, resulting in an improvement in the early identification and management of neonatal infections. The Morang Innovative Neonatal Intervention (MINI) field trial was conducted in Morang district, where all 585 FCHVs previously had been trained to assess and manage childhood pneumonia.

⁸ *State of the World's Newborns: Nepal*. Kathmandu, Save the Children, 2002.

⁹ Bhang A et al. Is home-based diagnosis and treatment of neonatal sepsis feasible and effective? Seven years of intervention in the Gadchiroli field trial (1996-2003). *Journal of Perinatology*, 2005, 25 (suppl.): S62-S71.

Saving Newborn Lives (SNL), Save the Children, United States (SC/US), through its Bill & Melinda Gates Foundation grant, provided funding to JSI R&T, Inc. for MINI activities that took place from December 2003 to October 2006. In 2006, USAID (through NFHP) provided financial assistance to expand MINI from the original 21 Village Development Committees (VDCs) to all rural areas in the district (65 VDCs) and continued, through NFHP, to cover program costs from October 2006 through the end of 2007. Further support is now being provided by SAVE/SNL.

Key activities

Under the MINI project, several cadres of community health workers (CHWs)—including Maternal Child Health Workers (MCHWs), Village Health Workers (VHWs), Auxiliary Health Workers (AHWs) and FCHVs—were trained in the use of clinical algorithms to diagnose cases of neonatal infection, perform case management and, as appropriate, to refer. Most project activities were carried out by MoHP staff working within the district health system, while MINI project staff provided support for training (although most trainers were government staff), supervision, data collection and analysis. MINI staff also supported logistic supply for the intervention through the District Public Health Office (DPHO) channels and conducted regular monitoring and supervision visits to all CHWs and HFs.

Description of intervention

In the initial MINI project, the intervention was conducted in 21 VDCs in Morang district, while 36 other VDCs in Morang served as a control area. CHWs worked according to the following protocol in intervention VDCs:

1. FCHVs visit each newborn within 24 hours of birth. They weigh the babies, record births and counsel caretakers on essential newborn care and danger signs.
2. FCHVs assess neonates for danger signs. If present, they classify the illness as Possible Severe Bacterial Infection (PSBI) and treat with oral Cotrimoxazole-P antibiotic, twice daily, for 5 days. They later perform a follow-up visit three days after initiating treatment.
3. FCHVs also complete a call form to request the VHW / MCHW / AHW to come to the home to give the newborn gentamicin intramuscular daily injections for 7 days.
4. If the newborn is below 2.5 kg (i.e., low birth weight, or LBW), FCHVs advise the family on care of the infant including frequent breastfeeding and skin-to-skin care. If the baby weighs less than 2 kg, FCHVs refer the family to the nearest HF. FCHVs make four weekly follow-up visits to all LBW infants over the first month of life.
5. FCHVs/ VHWs/ MCHWs/ AHWs are also trained and equipped to treat *local* bacterial infections in the eyes, umbilicus or skin.
6. As a part of an impact assessment, FCHVs conduct a two-month follow-up visit to all newborns to determine survival status and treatment outcomes.

CHWs worked according to the following protocol in control VDCs:

- FCHVs visit all newborns within 24 hours of birth. They record births and counsel caretakers on essential newborn care.
- FCHVs perform follow-up visits to all infants at two months to determine survival status.

In chapters four and five of this document there is a brief description of preliminary results from MINI as well as next steps that are being contemplated.

2 Methods for CB-MNC monitoring, evaluation and documentation activities

Introduction

CB-MNC has been an ambitious attempt to field-test a package of complementary community-based interventions that are designed to improve the health status of mothers and their newborns. Given that CB-MNC is a piloting effort, it is of crucial importance to assess the effectiveness of the various approaches and elements of CB-MNC. CB-MNC has been implemented with provisions for rigorous monitoring, evaluation and applied research (ME&AR) to guide mid-program modifications in program design and strategy, experiment with the use of program tools that serve both as job aids as well as sources of monitoring data, and measure impact. The NFHP collaborated with the JHSPH-HARP team to design the CB-MNC ME&AR framework. DPHO staff at district and community levels and FCHVs implemented the monitoring and evaluation (M&E) system with guidance and supervision from NFHP staff.

CB-MNC monitoring, evaluation and applied research activities

ME&AR efforts in CB-MNC relied primarily on two elements: (i) baseline and follow-up household surveys in each program district to measure change in key indicators, and (ii) a comprehensive monitoring system. These efforts were complemented by a number of special studies conducted during CB-MNC including a process evaluation of CB-MNC (with a special focus on behavior change elements), an investigation of why some pregnant women receive *Maatri Surakchya Chakki* (MSC) from the FCHV but do not take it following delivery, and a maternal mortality registration system. A brief description of these activities can be found below along with an outline of the methodologies used to gather data.

2.1 Baseline and follow-up household surveys

Baseline and follow-up household surveys (HHS) were conducted in Jhapa, Banke and Kanchanpur districts to measure change in indicators of program output (e.g., knowledge of members of target population) and outcome (e.g., utilization of health services, household-level behaviors) over the duration of CB-MNC. The text below describes key methodological aspects of the surveys. Further details, including survey questionnaires, can be found in the survey reports in the CD-ROM.^{10,11,12,13} The surveys were conducted in rural areas of the three districts; all municipalities were excluded from the sample frames. The surveys were conducted by Valley Research Group (VaRG), a private Kathmandu-based research firm. The table describes the timing of the surveys.

Table 4: Timing of baseline and follow-up household surveys

Survey timing	Banke	Jhapa	Kanchanpur
Baseline	May / June 2005	May / June 2005	June / July 2006
Follow-up	June / July 2007	June / July 2007	September / October 2007

Respondents: There were four categories of respondents in the baseline surveys: recently delivered women (RDW), their husbands, mothers-in-law (MIL) and fathers-in-law (FIL). RDW comprised the principal respondent group and were defined as women who have delivered during the 12 months prior to the survey (regardless of whether the infant is

¹⁰ Baseline Survey for CB-MNC Program in Banke District. Kathmandu, VaRG, December 2005.

¹¹ Baseline Survey for CB-MNC Program in Jhapa District. Kathmandu, VaRG, December 2005.

¹² Baseline Survey for CB-MNC Program in Kanchanpur District. Kathmandu, VaRG, December 2006.

¹³ CB-MNC Comprehensive Survey Report (currently in draft). Kathmandu, VaRG.

currently alive or dead), including stillbirths. All categories of respondents except FIL were interviewed at follow-up.

Sample design: A three-stage cluster sampling method was used in each survey to select respondents. Thirty clusters (i.e., wards) were selected randomly in the first stage using *probability proportional to size* (PPS). In the second stage, clusters were mapped and divided into segments, following which one segment was then chosen using PPS. In the third stage, an index household was chosen in the selected segment using “spin the bottle” methodology. Surveyors used the screening questionnaire to determine if there was an eligible respondent in this household and then proceeded to the next closest house, etc., until they had interviewed the required number of respondents in each of the four respondent categories. Depending on the district, surveyors had to visit an average of seven to ten households to identify a household with an eligible RDW respondent.

Sample size: STATA Version 8 statistical software was used to determine the sample size that could detect a 10 percent baseline-to-follow-up change in key indicators based on the assumptions of 50 percent baseline prevalence, five percent type I error and 20 percent type II error, ten percent non-response, and a design effect of two. These assumptions yielded a required sample size of 898. Thirty RDW were thus selected in each of 30 clusters to achieve a total sample size of 900 RDW. Sampling protocols called for ten husbands, ten MIL and ten FIL to be interviewed in each cluster to yield a sample size of 300 for each group. In practice a somewhat smaller sample size was achieved for husbands, MIL and FIL because respondents were unavailable.

Data collection instruments: Five questionnaires were used to collect information through the surveys. The screening questionnaire was used to identify whether or not there are eligible RDW in each selected household. The household

questionnaire was administered in all eligible HHs to gather basic information about HH members and possessions and the condition of the house. The RDW questionnaire contained questions in twelve topic areas that are outlined in the box to the right. The husbands and mothers-in-law questionnaire and father-in-law questionnaire contained a subset of the questions on the RDW questionnaire.

Box 1: Sections of RDW questionnaire

Section 1: Respondent's Background
Section 2: Fertility
Section 3: FCHV Services: General and Antenatal
Section 4: Antenatal Care
Section 5: Delivery Care
Section 6: Misoprostol and Postpartum Hemorrhage
Section 7: Postpartum Care
Section 8: Postpartum Family Planning and Birth Spacing
Section 9: Immediate Newborn Care
Section 10: Newborn Care During First Month
Section 11: Birth Preparedness
Section 12: Access to Emergency Funds and Transportation

Data Quality Assurance: All questionnaires and data forms were reviewed by the study supervisors and study investigators for accuracy, consistency and completeness. Whenever necessary, the data collectors made additional field visits to clarify inconsistencies or collect missing information. After editing, the data were entered in databases using custom-designed data entry programs with necessary range and consistency checks. Data were periodically checked by running and reviewing frequency distributions and cross-tabulations.

Analytical procedures: Means and proportions of the background characteristics were calculated for baseline and follow-up surveys. Where results are presented as pooled or combined across two or three districts, the statistics are simple unweighted means or proportions. At baseline and follow-up, a wealth index (WI) score was constructed for each household using principal component analysis of household durable goods and household conditions. The analysis generated weights for each of the variables which comprised the standardized first principal component of the variance-covariance matrix of the observed household assets. This procedure has been previously described in the literature¹⁴ and used extensively with Demographic Health Survey data.^{15,16} Households were ranked according to the total wealth score and then divided into wealth quintiles. The chi-square test was used to determine the strength of association between selected variables. Logistic regression was used to test the significance of baseline-follow-up differences for key indicators, adjusting for the cluster design. Data were analyzed using SPSS and STATA statistical software.

2.2 *Monitoring system*

CB-MNC program sought to develop a wide-ranging monitoring system that had two primary goals: (1) to provide timely, comprehensive information regarding different aspects of CB-MNC, and (2) to experiment with innovative monitoring approaches that improve job performance and might be adapted and merged into the government health management information system (HMIS) in the future.

The CB-MNC monitoring system periodically assessed the progress and achievements of the program at the levels of inputs, processes, outputs and coverage. The cornerstone of the system consisted of simple one-page registers maintained by FCHVs that served as both sources of monitoring data as well as job aids to improve performance. The text below describes major CB-MNC monitoring activities and the content areas they cover, data sources, and approaches to monitoring data analysis. Further details regarding the monitoring system can be found in the Quarterly Monitoring Reports (QMRs)¹⁷ and the Monitoring and Evaluation Plan.

Data sources and content

CB-MNC monitoring data were primarily gathered from two types of data sources: (1) the three FCHV Registers introduced under CB-MNC and (2) the Technical Support Visits (TSVs) that CB-MNC and DPHO staff conduct during routine field visits. The table outlines the content of the data collected through each tool.

¹⁴ Filmer D and Pritchett LH. Estimating Wealth Effects Without Expenditure Data—or Tears: An Application to Educational Enrollments in States of India. *Demography*, Volume 38-Number 1, February 2001: 115-132.

¹⁵ Gwatkin, D., Rutstein, S., Johnson, K., Pande, R. & Wagstaff, A. (2000) *Socio-Economic Differences In Health, Nutrition, And Population*. Washington, DC, The World Bank.

¹⁶ Gwatkin, D. R., Rutstein, S., Johnson, K., Suliman, E. A. & Wagstaff, A. (2003) *Initial country-level differences about socio-economic differences in health, nutrition, and population* (second edition). Washington, DC, The World Bank.

¹⁷ CB-MNC Quarterly Monitoring Report (I – VI). Kathmandu, NFHP, September 2007.

Table 5: Data sources and content for CB-MNC monitoring activities

Data source	Content
FCHV CB-MNC Register (C-R)	FCHVs record information for each pregnant woman (PW) they register including counseling history, use of iron, Vitamin A and deworming medicine, birth preparedness, delivery practice, essential newborn practices, and postnatal care.
FCHV Misoprostol Register (M-R)	Content includes counseling history, client's knowledge of safe utilization of MSC, dosage and timing of usage, and experience of side effects and hemorrhage.
FCHV Birth Registration Register (B-R)	Content includes family names, address, date and place of birth, delivery-related details, gender, and live/dead at birth and at 4 weeks of age.
Technical Support Visit (TSV) checklists	Checklist content included exposure of target population (TP) to messages, TP's perception of services, TP's and health providers' knowledge of health issues, TP's birth preparedness practices, service coverage, health facility and FCHV stock levels, and accuracy checks on VHW data compilation.

Source: Monitoring and Evaluation Plan: Community-Based Maternal and Neonatal Care Program. Kathmandu, NFHP, November 2006.

Copies of all registers and data collection forms can be found in the CD-ROM annex to this report. The strengths and limitations of these data sources are described in the table.

Table 6: Strengths and limitations of monitoring data sources

Data source	Strengths	Limitations
FCHV registers	Measure program performance among beneficiaries reached by program.	1. Indicators are not population-based; results may thus appear to be positive even though population coverage is low. 2. Accuracy of data may be limited due to over-reporting by FCHV or their misunderstanding of recording/reporting protocols.
TSV	Produces important information that cannot be determined otherwise.	Sample of respondents is purposive (accessible respondents who are known to health staff) and thus results are not generalizable to general population.

CB-MNC monitoring system: Analysis issues

CB-MNC Monitoring Indicators (MIs) were developed by CB-MNC program and technical personnel and are defined in the CB-MNC M&E Plan document. MIs that are calculated from data from the FCHV Registers were estimated using one of two denominators: number of estimated pregnancies (to determine population-based indicator estimates) or number of women registered (to determine indicator estimates among those who are reached by program). Each of these denominators has limitations. Limiting the denominator to registered program clients excludes from consideration all clients not registered and can produce “rosy” estimates. However, using a denominator of expected pregnancies produces conservative (i.e., lower-than-true) estimates when program coverage is low, since it is assumed that all unregistered women did not receive the service or practice the behavior specified by the indicator. Furthermore, as discussed below, denominator estimates have proven higher than actual, resulting in lower-than-accurate point estimates of indicators.

2.3 Research studies

One of the long-term goals of CB-MNC is to develop an integrated package of evidence-based interventions that are strategically selected for maximum feasible impact on the health status of mothers and neonates. Given the focus on rigorous documentation within CB-MNC, small-scale studies were periodically conducted: (1) to better understand how core components of CB-MNC perform; and (2) to gain insight into how new interventions might

best be introduced in future iterations of CB-MNC. This section describes four small-scale studies conducted during CB-MNC.

2.3.1 CB-MNC process evaluation

CB-MNC provided an excellent opportunity to use process evaluation to gain a fuller understanding of how community-based antenatal health education interventions are implemented and perceived at the district, community and household levels. The overall objectives of the process evaluation were to document the processes of program implementation, to evaluate the quality of FCHVs' performance and identify factors that influence it, and to explore how the intervention was perceived and utilized at the household level. The study was conducted in three phases; data from each phase were processed and analyzed before proceeding to the next phase. The text below describes key aspects of the evaluation. Further details can be found in the evaluation report in the CD-ROM annex.

Respondents included national, district and community-level government health staff, NFHP staff, FCHVs, RDW, MIL and husbands of RDW. The study team selected district-level respondents based on their positions (as “key” to the program). The guiding factor in selecting FCHVs was to recruit respondents who were knowledgeable about CB-MNC and who implemented it actively. Community-level respondents were selected in consultation with FCHVs based on specified criteria.

The study team was comprised of NFHP and JHU technical personnel who collaborated in design of the study. A consultant hired by NFHP conducted the study, in close coordination with the study team.

Data collection instruments consisted primarily of interview guides for semi-structured interviews. The study team developed the instruments in a sequential, iterative manner—results from each phase were used to develop the instruments for subsequent phases.

All interviews were tape-recorded and transcribed. The ATLAS-Ti program was used to analyze data from Phase I. Interviews from all phases were coded and then manually compiled and tabulated. Data were then cross-checked with field notes for verification.

2.3.2 Follow-up of non-users of MSC

CB-MNC monitoring data gathered during the first year of the program revealed that 20-25 percent of pregnant women who received Maatri Surakchya Chakki (MSC, or misoprostol) from their FCHVs returned it unused. CB-MNC managers decided to conduct a small survey to (i) investigate the reasons for non-use of MSC among RDW who received it and (ii) estimate the percentage of these clients who were protected from the risk of postpartum hemorrhage (PPH) through some other means such as delivering with a skilled birth attendant and receiving an injection of oxytocin immediately post-delivery.

Survey respondents were defined as RDW who received MSC but did not take it (as recorded in the FCHV MSC Register) in the three months prior to the survey in eleven randomly selected VDCs in Banke. All RDW who fit these criteria (n = 117) were eligible for inclusion in the survey. Eighty-nine of the 117 eligible RDW were interviewed; the remaining 28 were unavailable for interview. NFHP and JHU technical personnel worked together to design the study and the data collection instruments. NFHP hired two surveyors to collect data from the

selected respondents. Further detail regarding this study, including its findings and conclusions, can be found in the survey report.¹⁸

2.3.3 Maternal mortality surveillance in Banke district

The NFHP has put into place a maternal mortality surveillance system in Banke district to identify deaths and conduct verbal autopsies with family members of women who have died of maternal causes. The purpose of this effort is to gather information to be used to assess the impact of the misoprostol intervention. The DPHO and NFHP used the forum of the monthly health facility review meetings to ask all FCHVs in Banke to make efforts to identify any maternal deaths that occur in their catchment areas and report them to their health facility using a form that had been developed for that purpose. An FCHV who has identified a potential maternal death and filled out this form is met by a NFHP staff person who travels with the FCHV to the house of the deceased, confirms that a maternal death has taken place, and conducts a structured interview (adapted from an instrument developed by JHPIEGO for use in Indonesia). An FCHV who correctly identifies and reports a maternal death receives an incentive payment of 300 rupees (approximately five US dollars). Results of this study are presented below in chapter 4.5.

2.3.4 Formative research on cord-cutting practices

Unhygienic cord care practices contribute to preventable newborn mortality. Research conducted earlier in Nepal has shown that application of a chlorhexidine solution on the newborn's cord stump reduces the probability that the cord stump will become infected and that the newborn will die. The NFHP is exploring different interventions that could be included in a future iteration of an expanded CB-MNC. NFHP therefore conducted a formative study to explore current cord stump and newborn skin care practices among different ethnic groups in Bardiya district (immediately to the west of Banke). The study also investigated the reactions of respondents to different possible formulations of chlorhexidine.

Respondents included RDW and their mothers-in-law (drawn from Tharu, Muslim and Brahmin/Chhetri castes), FCHVs, and members of cord-cutting occupational groups in six VDCs in Bardiya. VDCs were selected based on the presence of different ethnic groups and their distance from the district center. Data were collected through 45 semi-structured interviews (SSI) and ten focus group discussions (FGD). A number of SSI and FGD interview guides were developed for the different respondent categories. *Respondents* were identified in consultation with health facility staff, FCHVs and members of cord-cutting occupational castes based on specified criteria. The study was conducted internally by NFHP with technical assistance from JHU personnel.

Information collected from the interviews and FGDs was transcribed, coded, and processed manually. NFHP and JHU personnel then reviewed the information critically and analyzed it to draw conclusions.

¹⁸ *Barriers to Taking Maatri Surakchya Chakki (Misoprostol) in Banke District*. Kathmandu, NFHP, July 2007.

3 Results

Under CB-MNC, NFHP has conducted extensive monitoring and evaluation (M&E) activities that include baseline and follow-up household surveys (HHS), ongoing monitoring reported in quarterly monitoring reports (QMR), and a process evaluation (PE). This chapter presents a summary of key M&E findings.

In the CB-MNC Monitoring and Evaluation Plan CB-MNC M&E activities were organized by five evaluation levels: input, process, output, impact, and outcome. These five levels, which are defined and illustrated in the table, are used to structure the initial sections of this chapter. The final section describes results from the evaluation of additional topics (e.g., equity). This report then concludes with a discussion of the implications of CB-MNC evaluation results for future programming.

Table 7: Levels of evaluation

Level	Definition	Illustrative content
Input	Human or non-human resources used to carry out the program.	Tools; commodities; infrastructure; personnel.
Process	1 The specific set of activities, their sequencing and timing	Training; supervision.
Output	2 Intermediate goods and services that the program provides.	Clients contacted and counseled; commodities received.
Outcome	3 The specific, observable effect on the target population resulting from program activities.	Knowledge levels; behaviors; commodities used; service utilization; referral.
Impact	Changes in health status	Mortality rates.

3.1 CB-MNC inputs

CB-MNC inputs are described in the following five sections: tools and activities; commodities distributed during pregnancy; misoprostol (*Maatri Surakchya Chakki* in Nepali, or MSC); inputs intended to improve the provision of facility-based services; and, program cost.

3.1.1 Tools and activities

CB-MNC used a number of tools and activities to influence household-level planning and decision making for pregnancy, delivery and the post-delivery period. These tools and activities are listed in the table.

Table 8: CB-MNC BCC tools and activities and quantity delivered

Tool / activity	Banke	Jhapa	Kanchanpur
Keychains	17,500	30,000	N/A
BPP flip chart	1115	900	880
MSC flip chart	1115	N/A	N/A
Radio serial drama ¹⁹	20 + 20	40	20
Street theater	40	40	40
Wall paintings	47	47	19

¹⁹ The radio drama serial *Jeewan Ko Jimewari* was developed in Nepali and Awadhi languages. The drama serial consisted of 20 15-minute episodes on different MNH topics. The entire serial was aired through FM radio stations in Jhapa (twice), Banke (once in Nepali, once in Awadhi) and Kanchanpur (once) in 2006/07.

3.1.2 Commodities distributed during pregnancy

One important element of CB-MNC has been promotion of the use of commodities demonstrated to have a positive effect on women's and neonates' health. Tetanus toxoid vaccine and albendazole are supplied through government health facilities and outreach sites. Vitamin A and iron-folate are made available through these channels as well as from FCHVs. The uninterrupted availability of these commodities is essential to achieve continuing high coverage and program impact. RDW were asked on the follow-up household survey if they ever requested specific commodities during the previous year and been told that they were not available. In both Banke and Jhapa districts, less than three percent of respondents reported unavailability of iron-folate, vitamin A, or tetanus toxoid.

3.1.3 Misoprostol

Perhaps the major "experimental input" in CB-MNC was the provision of MSC to pregnant women in Banke district to prevent postpartum hemorrhage (PPH). MSC is provided to pregnant women who are registered with the MSC "Distributor FCHV"²⁰ in their area. Monitoring data show that 96 percent of health facilities and 92 percent of Distributor FCHVs had adequate MSC in stock at the time of supervision visits.

3.1.4 Inputs to improve the provision of facility-based services

Prior to the commencement of program activities, NFHP conducted peripheral HF-level needs assessment which included MNH-related equipment. The needs assessment revealed that many facilities did not have an adequate supply of basic equipment in working condition that is needed to provide routine antenatal and postnatal care. Health facilities providing delivery services were also found to be lacking basic equipment. Equipment was thus provided to all health posts (HPs) and sub-health posts (SHPs) in Banke and Jhapa district and to two HPs in Kanchanpur district to strengthen antenatal and post-delivery services. Additional equipment to strengthen routine delivery services was provided to selected PHCCs and HPs. Equipment and technical assistance was provided to establish BEOC services in two PHCCs in Jhapa and to strengthen hospital-based CEOC services in all three districts. BEOC training (six weeks) and midwifery refresher training (MRT: four weeks) was provided to limited number of service providers in each of the three districts as outlined in the table. A detailed list of equipment that was provided can be found on the CD-ROM that accompanies this report.

Table 9: Number of participants trained to strengthen delivery services

Training	Banke	Jhapa	Kanchanpur
BEOC	1	3	1
MRT	3	8	7

3.1.5 Program cost

The costs incurred by NFHP in its support of CB-MNC are outlined in the table below. These costs have been standardized for the rollout of CB-MNC in a "typical *terai* district" with a total

²⁰ One FCHV in every ward in Banke was designated as a Distributor FCHV and trained to provide specific counseling regarding MSC, distribute it, and collect relevant information regarding use of MSC following the client's delivery. In wards where there are more than one FCHV, only one was designated as a Distributor, while the remaining FCHVs provide basic information regarding the dangers of PPH and the availability of MSC for its prevention. These FCHVs then refer their clients to a Distributor FCHV for more detailed counseling regarding MSC.

population of 500,000, 15,000 expected pregnancies per year, 500 FCHVs, and 50 VDCs. Costs that are in **bold font** should be considered as **core costs**, while those that are in normal font are optional costs. The figures that are presented do not include technical support from outside of the district nor the costs incurred under CB-MNC that were related to the rigorous M&E functions necessary as a pilot activity.

Table 10: CB-MNC program costs

Rollout phase	
Training (including district-level orientations, TOTs, and CHW-level training of 9 days)	\$40,000
Printing (including job aids, forms, registers, etc.)	\$5,000
Health facility service strengthening (including facility upgrading, equipment, in-service training)	up to \$40-50,000
Complementary BCC activities including radio drama, printed materials, street theater (could include local language adaptation of radio drama serial)	up to \$20-30,000
Total roll-out	\$45,000 - \$125,000
Early maintenance phase (year 1 & 2 combined, post training)	
Staffing (1 position x 2 years, variable rate depending on employer)	\$20,000
CHW review trainings (conducted annually at end of years 1 & 2)	\$15,000
Total early maintenance	\$35,000
Recurrent (yearly costs beginning from year 1)	
Printing (especially for materials to be distributed to pregnant women; higher amount reflects BPP keychain cost)	\$3,000-10,000
Drugs (misoprostol)	\$3,000
Total recurrent (annual)	\$6000 - \$13,000

Core costs presented in the table for the first two years of operation total \$92,000 with a continuing annual recurrent cost of approximately \$6,000. Considered over a five-year time horizon, with 75 percent coverage, the program would reach approximately 55,000 mother-neonate pairs at a total marginal cost of about \$130,000 (i.e., about \$2.30 per mother-neonate pair).

3.2 CB-MNC processes

A process evaluation examines the operation of a program in terms of specific activities, how they are ordered and the timing of their implementation. In an overall sense, the process evaluation of the CB-MNC found that the program was “implemented as planned” with relatively little deviation from the original plan in terms of activities and timing. The comprehensive CB-MNC monitoring system was designed to identify strong and weak points of the program and point out aspects of the program that required extra, unplanned action—but this was also, in a sense, part of the plan. The text below describes two key aspects of the process of implementing CB-MNC: training and supervision.

3.2.1 Training

Training was arguably the most important, intensive and costly CB-MNC input. CB-MNC training activities are described in the table.

Table 11: Major CB-MNC training and workshop activities

Activity	Participants	# days
District-level planning meeting	DPHO, district supervisors and Health post in-charges	1
Program orientation	Members of the District Development Committee and VDCs and other district stakeholders	1
District Training of Trainers (ToT)	Health post in-charges and DPHO supervisors	4
CB-MNC program orientation	Senior staff from health posts (HPs) and sub-health posts (SHPs)	2
CB-MNC basic training	FCHVs, VHWs, MCHWs	5
MSC Distributors training	FCHVs	2
CB-MNC refresher training to FCHVs	FCHVs, VHWs, MCHWs	2
M&E training	VHWs and MCHWs	1
Annual review/monitoring meeting	Health facility in-charges and district supervisors	2

Process evaluation findings: CB-MNC training for FCHVs

The basic and refresher CB-MNC FCHV trainings were designed according to a modified version of the traditional “cascade model”. Under this model, district-level “Master Trainers” are trained and then travel individually to VDCs to simultaneously train small “batches” of FCHVs. During implementation of CB-MNC, the tight program schedule at times resulted in the simultaneous conduct of an excessive number of batches with the result that an insufficient number of qualified trainers were present during trainings. These problems were exacerbated by insufficient provision for hands-on practice in the training curriculum and deficiencies in the teaching materials used. As a result, some FCHVs did not gain adequate skills to perform their CB-MNC duties at a desired level and remedial training needed to be provided.

3.2.2 Monitoring and supervision

Both NFHP and government (i.e., FHD/DPHO/HF) staff have supervisory functions under the CB-MNC. However there are significant distinctions in the support roles of these two groups. HF staff provide supplies and support to FCHVs during monthly FCHV meetings at the health facility as well as during routine field activities such as Expanded Program of Immunization (EPI) outreach. Supervision provided by HF staff is performed on a systematic, comprehensive basis and tends to focus primarily on administrative, reporting and logistics functions. NFHP staff supervise FCHVs in the field primarily during Technical Support Visits (TSVs) at which time they check FCHV registers, provide on-the-spot feedback, and assess FCHVs’ knowledge and counseling skills. NFHP staff visit HFs during TSVs to assess logistical support and also visit the homes of RDW and PW to assess their knowledge and household practices. TSVs are planned to a certain extent to reflect a representative sample, but with special emphasis given to working with FCHVs and health facilities that are perceived as under-performing. TSVs by project staff are not conducted in a comprehensive or systematic manner and serve a different function from the institutionalized government supervision. Data from the TSVs are used to monitor performance of the CB-MNC at the district-level.

CB-MNC planners have intended that TSVs be conducted as much as possible jointly by NFHP and DHPO staff; in practice, participation by DPHO staff in joint TSVs has remained relatively low. The table lists the number of TSVs that were conducted in Banke district during the first six quarters of the CB-MNC; results from Jhapa and Kanchanpur are similar and are not included here.

Table 12: Number of TSVs conducted in Banke district, by quarter

Description	Q1	Q2	Q3	Q4	Q5	Q6	Total
TSVs to HFs	77	81	67	62	65	83	435
TSVs to FCHVs	93	121	93	109	83	107	606
TSVs to PW	87	129	100	77	124	103	620
TSVs to RDW	55	49	32	41	42	38	257

Process evaluation findings: Supervision

Supervision activities are very important to the achievements of CB-MNC. Part of the success of programs such as CB-IMCI and CB-MNC seems to come from intensive supervision and guidance during the initial stages of the programs. This supervision includes DPHO and program staff engaging providers at community and health facility levels to address performance issues. As CB-MNC is scaled up, this function needs to be addressed in a way that adequately contributes to program performance but is, at the same time, feasible to be implemented at scale with resources available within the government system.

3.3 Output

An evaluation of program outputs describes and assesses the goods and services that are produced by the program. Outputs are necessary precursors to what the program is ultimately trying to achieve—improvements on health behaviors and health service utilization and impact on mortality. This sub-section describes the receipt of commodities (including misoprostol), FCHV services, the birth registration and misoprostol interventions in Banke, and intra-household decision making in the context of the CB-MNC.

3.3.1 Delivery and receipt of commodities

The delivery of commodities that have a positive impact on clients' health status is a key element of CB-MNC. While some commodities (e.g., TT vaccine, deworming tablet) are directly administered by health workers or in their presence, others (e.g., iron-folate, MSC) are left with the client for her to consume at the appropriate time.

Table 13: Receipt of commodities by RDW

Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
Percentage of RDW who received antenatal iron supplements	73	94	68	90	80	91
Percentage of RDW who received MSC prior to delivery	N/A	73	N/A	N/A	N/A	N/A

Note: BL = Baseline, FU = follow-up

Results presented in the table show that the percentage of survey respondents who received iron-folate tablets during their pregnancies increased substantially to above 90 percent in all CB-MNC districts at the time of the follow-up household survey. Seventy-three percent of RDW in Banke received MSC prior to their deliveries.

3.3.2 FCHV services

Services provided by FCHVs represent the central pillar of CB-MNC activities. FCHVs' primary tasks in CB-MNC are to identify PW (registering them in the CB-MNC Register), and counsel them and their family members on key topics that include antenatal care, maternal and newborn danger signs, birth preparedness, postpartum and newborn care, and family planning.

Level of contact between FCHVs and clients

As can be seen in the figure, CB-MNC made huge strides in increasing the percentage of PW who receive services and advice from FCHVs from baseline to follow-up, as measured through the household survey. Follow-up levels of this indicator (75, 78 and 89 percent in Jhapa, Kanchanpur and Banke, respectively), along with the indicator percentage of PW who receive the BPP keychain (76 and 77 percent in Jhapa and Banke, respectively; see table) represent the two best measures of overall CB-MNC program coverage.

Figure 2: Percentage of all PW contacted by FCHV

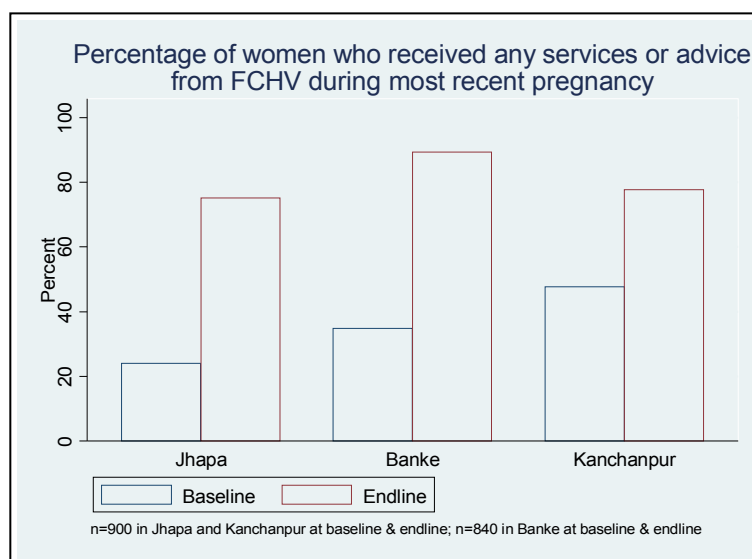


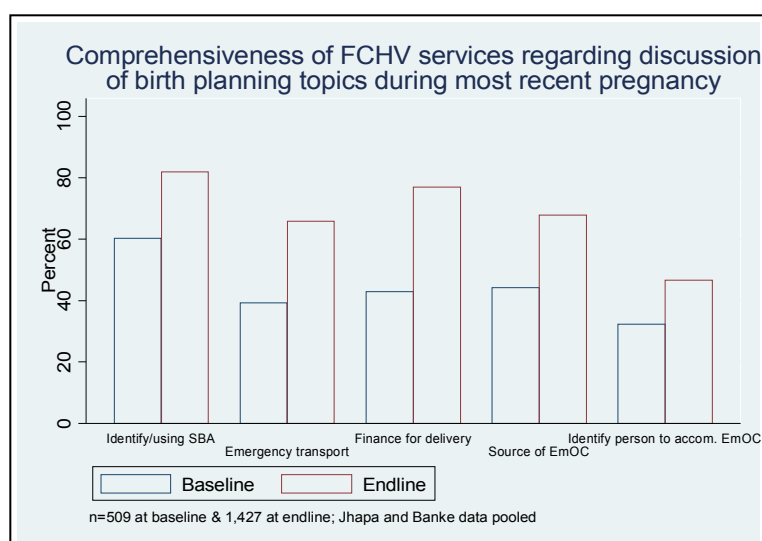
Table 14: CB-MNC coverage as measured through clients' receipt of BPP keychain

Indicator	Jhapa	Banke
Percentage of RDW who received the BPP keychain at follow-up	76	77

Comprehensiveness of services provided by FCHVs during encounters with clients

CB-MNC not only increased the coverage of contact between FCHVs and clients. It also strengthened the *comprehensiveness* of those services. The figure shows, among RDW who received services or advice from FCHVs, the proportion at baseline and follow-up who discussed specific aspects of birth planning with a FCHV. These statistics are based on pooled, unweighted data from Banke and Jhapa. Similar increases were measured (but

Figure 3: Percentage of clients receiving specific BP services



are not presented here) for advice regarding pregnancy, delivery, and postpartum care for mothers and newborns. These across-the-board increases clearly demonstrate that, following the inception of CB-MNC, FCHVs make better use of their contacts with pregnant women and provide more comprehensive advice and counseling to their clients.

Putting “contact” and “comprehensiveness” together: Level of coverage of FCHV services

The results presented immediately above demonstrate major increases in the percentage of all PW who are contacted by their FCHV during pregnancy as well as a substantial increase in the comprehensiveness of services provided by FCHVs among those women whom they contact. Putting these two indicators together yields the most important indicator of the three: the population-level coverage of the various services that FCHVs provide. As above, the results are based on pooled, unweighted data from Banke and Jhapa. The two figures make clear the four-to-ten-fold increases in counseling received on specific topics of birth preparedness and newborn care compared to before CB-MNC implementation. Increases in coverage of services regarding pregnancy and delivery and postpartum care are similar and not shown here. These huge increases in program process indicators set the stage for the corresponding improvements in outcome and impact that are reported below.

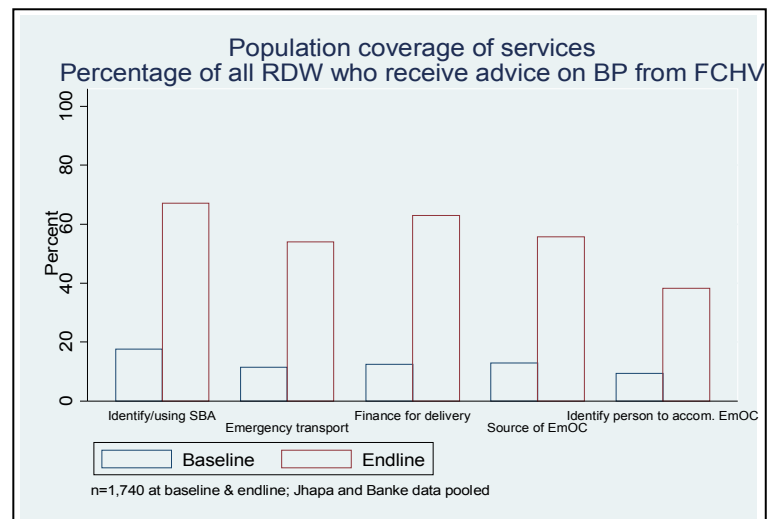
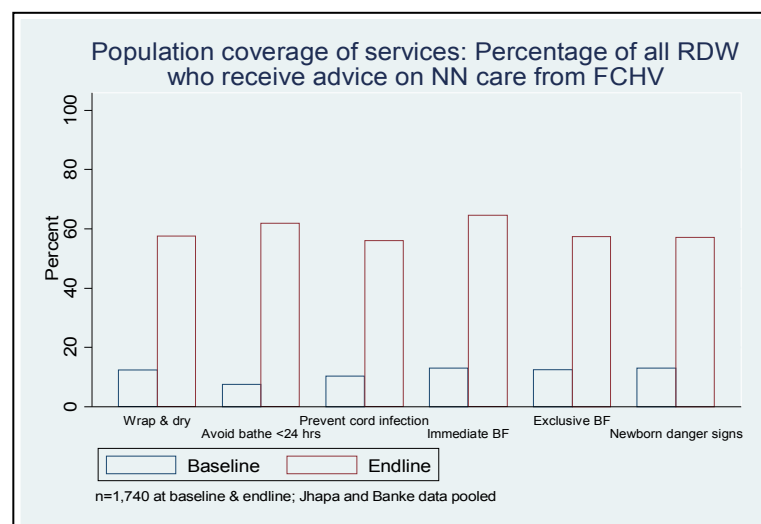


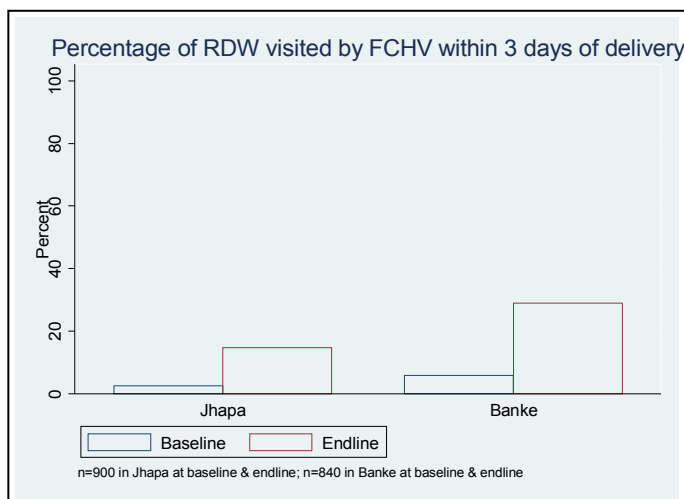
Figure 4: Coverage among all RDW of NN advice from FCHV



Early postnatal home visit by FCHVs to mothers and neonates

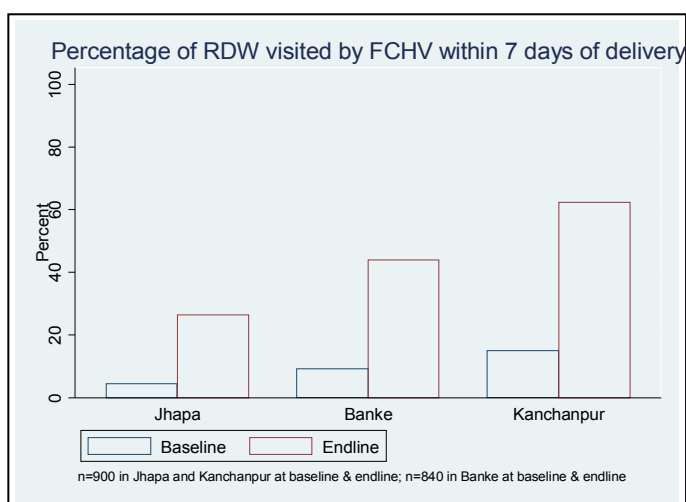
An important CB-MNC activity has been an early home visit by FCHVs. During these visits, FCHVs provide counseling, vitamin A and iron/ folate to the mother. They also conduct a basic assessment of the condition of the mother and neonate based on observation of danger signs and refer as appropriate. FCHVs in Banke used the occasion of this service to collect unused MSC as well as information about the client's experience with it while FCHVs in Jhapa were provided with a laminated job aid to guide their assessment of the mother and neonate. FCHVs in Kanchanpur have been screening the neonate for LBW status during this visit, with this element of the program developed and managed under the ACCESS project.

Figure 5: FCHV home visits within 3 days post-delivery



RDW who served as respondents on the baseline and follow-up household surveys were asked how many days following their most recent delivery they first met with their FCHV. Their responses indicate that 15 percent of RDW in Jhapa, 29 percent in Banke and 48 percent in Kanchanpur (three, six and ten percent at baseline, respectively) were visited by an FCHV within three days of delivery as measured during the follow-up survey while 26, 44 and 62 percent were visited in Jhapa, Banke and Kanchanpur within seven days of delivery (five, nine and fifteen percent at baseline) —all marked increases from baseline levels (see figures). Data that describe the results of the FCHV assessment of mother and neonate are presented in Section 4.4 below.

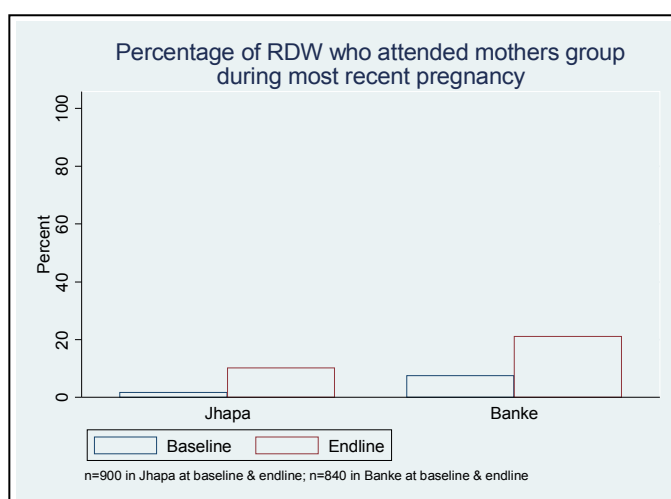
Figure 6: FCHV home visits within 7 days post-delivery



Mothers groups

Every FCHV in Nepal is supposed to establish a Mothers Group (MG) with which she meets regularly, shares information, and which she can call on for support. The percentage of RDW who know that there was a MG in their area increased from 13 to 28 percent in Jhapa and 23 to 44 percent in Banke. The figure to the right shows RDWs' increased attendance of MG meetings over the same time period. While the absolute value of these indicators remains low—illustrating the relatively low population coverage achieved by FCHVs through this forum—the increases parallel the improvements presented above and reinforce the conclusion that FCHVs have become notably more active under CB-MNC.

Figure 7: Attendance of pregnant women at mothers groups



Process evaluation: FCHVs and their clients

The PE explored FCHVs' and community members' attitudes on FCHVs and their work. Community members appreciate FCHVs and the educational materials they distribute as important sources of information for MNH-related issues, although some community members think (incorrectly) that anybody who works as hard as FCHVs must be receiving payment for their work. The PE study team conducted structured observation of FCHVs while they counseled their clients. They found that there is room for improvement in FCHVs' counseling skills although many perform adequately. Some FCHVs provide specific information on available services while others do not; community members want this type of information. Also, FCHVs should play a more proactive role in lobbying other household members for appropriate use of care and services for RDW.

3.3.3 Birth recording

Civil registration is a fundamental means for guaranteeing every child's right to a name, nationality and protection from being deprived of his or her own identity. Under CB-MNC, FCHVs in Banke supported civil registration by offering to "pre-register" the births of neonates in their communities using the FCHV Birth Registration Form (see CD-ROM that accompanies this report). This form includes information required for civil registration. Survey respondents whose infant was still alive at the time of the survey were asked if the FCHV had recorded the birth of their youngest child and if the birth was registered with government. The survey documented an increase in civil registration in both Banke and Jhapa. There is a strong statistical association between civil registration status and FCHV birth recording in Banke at follow-up ($\chi^2 = 83.7$; $p < 0.001$) suggesting that the CB-MNC birth recording intervention had a significant positive effect on civil registration.

Table 15: Birth registration

Indicator	Jhapa		Banke	
	BL	FU	BL	FU
Percentage of infants whose birth is documented by FCHV	N/A	N/A	N/A	45
Percentage of infants whose birth is registered with government	26	35	19	44

3.3.4 Misoprostol

The CB-MNC protocol states that a pregnant woman should be counseled once by a MSC Distributor FCHV following her registration, again during the eighth month of her pregnancy (when she is given the MSC tablets), and visited again following her delivery. Eighty-nine percent (749/840) of RDWs who participated in the follow-up survey in Banke reported that they received information about PPH. Among these 749 respondents, 624 (83 percent) learned about PPH from a FCHV. Seventy-five percent of follow-up survey respondents received information about a drug that can reduce PPH, reflecting the wide coverage of the MSC initiative.

Table 16: RDW exposure to information regarding PPH and MSC

Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
Percentage of RDW who received information about bleeding after childbirth during their last pregnancy.	63	89	54	73	N/A	N/A
Percentage of RDW who received information about a drug that can reduce bleeding after childbirth during their last pregnancy.	23	75	16	19	N/A	N/A

Process evaluation: Distribution of MSC

CB-MNC developed a model for MSC distribution under which most FCHVs were designated as Distributor FCHVs and the rest as Counselor FCHVs. This was done because certain FCHVs were unable or unwilling to take on the distributor function and because in some VDCs the number of FCHVs was more than necessary to cover the population; using a smaller number as distributors simplified supervision and performance monitoring. However, some FCHVs and supervisors feel that this model has placed excessive burden on Distributor FCHVs and creates confusion among clients regarding which FCHVs provide what type of MSC-related services. CB-MNC planners are considering training all FCHVs to serve as Distributors as the MSC intervention is introduced in new districts.

3.3.5 Household-level decision-making

Understanding who within the household makes decisions on maternal-neonatal care and effectively targeting these decision-makers with key messages is important in maximizing the effectiveness of CB-MNC. CB-MNC did not seek to directly change decision-making dynamics within households although, during home visits in Kanchanpur, FCHVs did target household members in addition to PW. The baseline household survey collected information on decision-making dynamics within households. Husbands, mothers-in-law (MIL) and fathers-in-law (FIL) were asked two questions: 1) who in your household is involved in making financial and transportation decisions in case of emergency needs during pregnancy or delivery; and, 2) who is the family member most responsible for making a final decision?

Table 17: Intra-household decision-making dynamics in Jhapa district

Indicator	Respondent (%)		
	Husbands	MIL	FIL
Persons involved in making the decision regarding emergency financial and transportation issues (multiple response)			
Father-in-law	25	54	84
Mother-in-law	23	76	63
Husband	89	62	62
Wife / DIL	32	20	16
Other (family members and neighbors)	9	4	4

<u>Person most responsible</u> for making the final decision			
Father-in-law	13	31	56
Mother-in-law	77	34	28
Husband	6	30	13
Wife / DIL	2	3	2
Other (family members and neighbors)	2	1	2

Results presented in the table are from Jhapa district and indicate that husbands, MIL and FIL all play substantial roles in the decision-making process while RDW are much less involved. Members of the three respondent groups have a more favorable impression of themselves as the primary decision-maker than do other groups. Results are very similar in Jhapa and Kanchanpur while it appears that husbands in Banke have a somewhat more prominent role in decision-making than in the other two districts.

Process evaluation: Decision-making

The PE also explored the role of different household members in decision-making processes. Care-seeking seems to be controlled primarily by husbands and MILs (the latter especially for decisions related to delivery and newborn care). This finding, coupled with the quantitative data presented above, suggests that husbands, MIL and FIL should be directly targeted by CB-MNC strategies and messages as was attempted in Kanchanpur.

3.4 Outcomes

This section of the report documents the outcomes achieved by the CB-MNC—defined here as the specific, observable effect on the target population resulting from program activities. Measures of outcome that are used below include knowledge, behaviors, the use of commodities, utilization of health services, and referral for emergencies. This section is the most comprehensive and important part of the chapter. The extensive evaluation of CB-MNC has involved many different indicators, only some of which are reported below. Readers who desire further details regarding the results of the CB-MNC HHSs are referred to the final survey report that documents results from baseline and follow-up surveys in all three program districts.

3.4.1 RDW knowledge

RDW knowledge regarding danger signs during pregnancy, delivery, and the postpartum / neonatal period increased markedly between baseline and follow-up in all CB-MNC districts (see table). Baseline knowledge levels were extremely low in Kanchanpur where the mean increase was also the highest (42 percentage points). Follow-up knowledge levels are notably higher in Banke than in the other two districts.

Table 18: RDW knowledge of danger signs

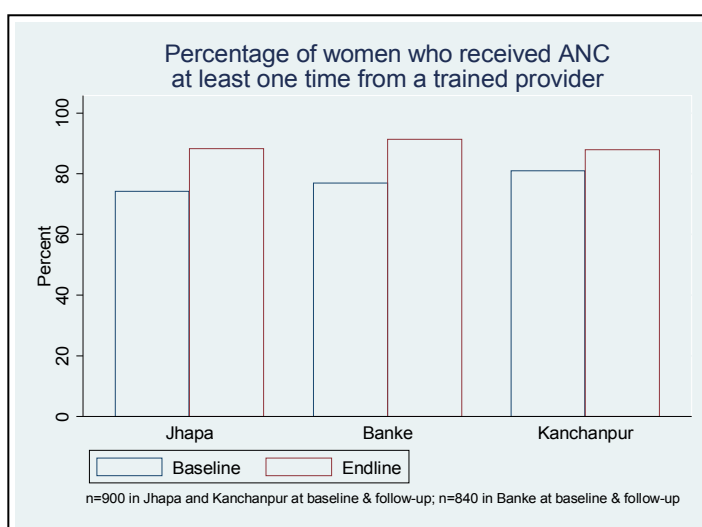
Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
Percentage of RDW who know at least 3 pregnancy danger signs	45	87	26	54	17	67
Percentage of RDW who know at least 3 delivery danger signs (among RDW with live birth)	64	93	52	70	16	59
Percentage of RDW who know at least 3 maternal danger signs during postnatal period (among RDW with live birth)	58	84	40	66	26	64
Percentage of RDW who know at least 3 newborn danger signs (among RDW with live birth)	35	68	26	51	17	54
Average level of four knowledge indicators	50	83	36	60	19	61

3.4.2 Antenatal indicators

Utilization of antenatal care

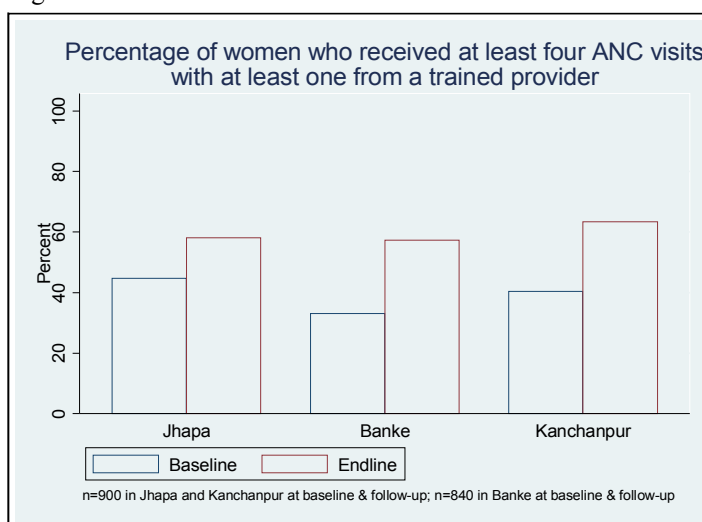
CB-MNC promoted the use of ANC services including the message that a PW should make at least four ANC visits during her pregnancy. The figure to the right displays changes in the percentage of PW who received ANC *at least once* from a trained provider during their most recent pregnancy. Despite the high levels of this indicator at baseline, improvements can be seen in all three districts, although more modest in Kanchanpur.

Figure9: Utilization of ANC from a trained provider



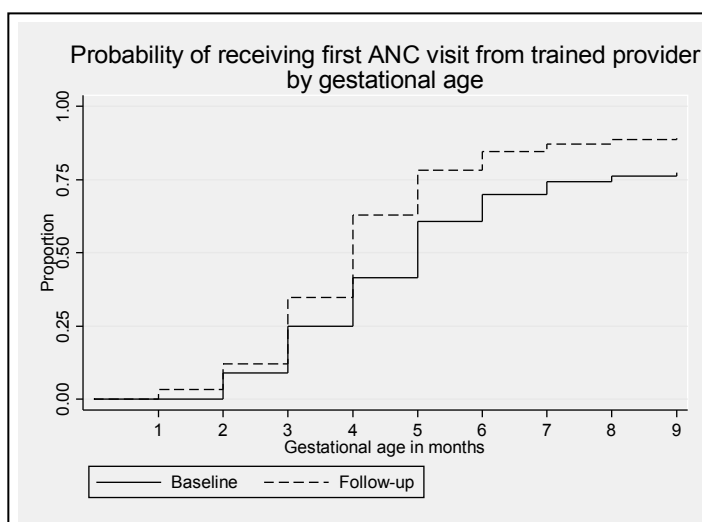
The increase in PW reporting having made *at least four* ANC visits (at least one with a trained provider) was even more pronounced (see figure 10), averaging 20 percent from baseline to follow-up across the three districts. Much of the increase in utilization of ANC has come from increased use of mobile outreach clinics.

Figure 10: Utilization of ANC at least four times



CB-MNC also promoted the message that a PW's first ANC visit should be made as soon as possible after she knows that she is pregnant. The figure displays the proportion of women who make their first ANC visit by each month of the gestation period. These data make it clear that CB-MNC has achieved a reduction in the gestational "age" when a PW makes her first ANC visit.

Figure 11: Timing of first ANC visit



Use of commodities

Data presented below show changes in PW's use of commodities that improve health during pregnancy. Modest increases in already-high levels of tetanus vaccination were observed over the duration of CB-MNC while the use of deworming tablets increased more substantially. The percentage of women who took iron-folate during pregnancy increased across all districts while the average number of days that PW took iron-folate increased notably, especially in Kanchanpur. The final row of the table shows high *compliance* with use of iron-folate; approximately 95 percent of iron tablets that are distributed are reported to have subsequently been consumed.

Table 19: Pregnant women's use of tetanus toxoid vaccination, deworming and iron-folate tablets

Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
Percentage of PW who received at least two doses of TT during last pregnancy or five doses lifetime (based on recall)	81	94	71	82	82	85
Percentage of PW who took deworming tablets while pregnant.	29	81	25	73	51	77
<i>Iron-folate</i>						
Percentage of PW who took iron-folate while pregnant	73	94	67	90	80	90
Mean number of days that PW took iron-folate during pregnancy.						
• Among all PW	56	87	68	107	67	115
• Among PW who took iron while pregnant	77	92	100	119	84	127
<i>Iron-folate receipt and compliance</i>						
• Mean # of tablets received (among PW who received iron)	N/A	98	N/A	125	N/A	N/A
• Mean # of tablets taken (among PW who received iron)		92		119		
• Mean difference in number of tablets received and taken		6		6		

3.4.3 Delivery indicators

CB-MNC strongly promoted various aspects of planning for delivery including finance, emergency transportation, delivering with a skilled birth attendant (SBA), and hygienic birth conditions (e.g. use of Clean Home Delivery Kit = CHDK). There is some controversy in Nepal regarding which providers should be classified as SBAs. For the purpose of this report, SBA is defined as including physicians, nurses, and Auxiliary Nurse Midwives (ANM). The term Other Trained Health Worker (OTHW) is defined here to include Maternal and Child Health Workers (MCHW), Health Assistants (HA), and Certified Medical Assistants (CMA), all of whom are also eligible to receive payment for delivery services under the government's Maternity Incentive Scheme, although they cannot be considered to be SBAs. This category does *not* include traditional birth attendants (trained or untrained). It is important to note that for the purpose of this analysis, SBA and OTHW are mutually exclusive categories.

Skilled birth attendance and deliveries at health facilities

As can be seen in the figure and table, there was a modest increase in both the percentage of births attended by a SBA as well as the percentage of births taking place in a health facility. All of the increase in SBA attendance can be attributed to increased "non-emergency" use, as the percentage of women who delivered at a health facility due to an obstetric emergency remained constant over the program duration to date. The proportion of births attended by OTHWs increased in all districts by a somewhat larger percentage than births attended by SBAs, especially in Banke.

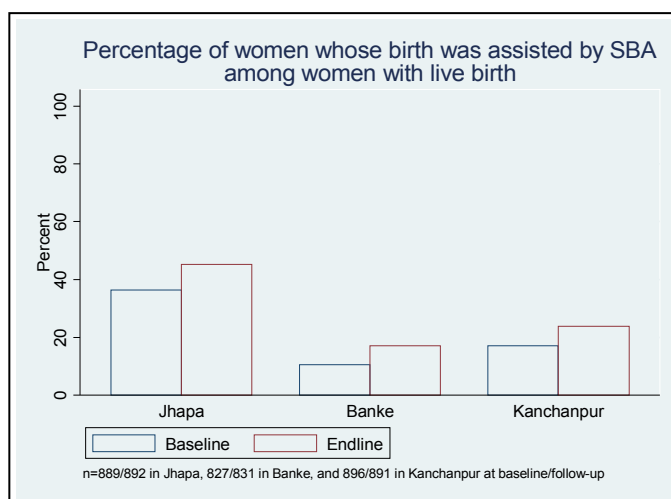
Table 20: Deliveries attended by SBA or OTHW and taking place at health facilities among live births

Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU

Percentage of births attended by a skilled birth attendant	11	17	36	45	17	24
Percentage of births attended by a OTHW (and not by SBA)	8	17	7	11	5	8
Percentage of births taking place at a health facility	10	16	35	42	13	20
Percentage of births taking place at a health facility due to obstetric emergency	6	6	21	20	6	7

Ninety-seven percent of RDW survey respondents across the three districts stated that it is important for a SBA to be present during delivery. RDW who stated that the presence of a SBA was important but whose birth was not attended by a SBA were asked why a SBA was not present. Seventy-eight percent stated that they did not have a problem during delivery and thus it was not necessary. This finding is supported from other studies in Nepal²¹ and suggests that there is still a widespread social norm supporting using SBAs *reactively* (after an obstetric emergency has emerged) rather than *proactively* as a routine precaution.

Figure 8: Use of skilled birth attendant in CB-MNC districts



Home delivery practices: Use of Clean Home Delivery Kit and cord-care

High baseline levels of certain clean cord care practices were found, as displayed in the table. The percentage of home deliveries in which CHDK use was reported increased dramatically in Banke but decreased slightly in Jhapa and Kanchanpur. Reasons for the observed decrease are being investigated but are suspected to be supply-side issues.

Table 21: Home delivery practices

Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
Percentage of RDW <u>delivering at home</u> whose newborns' cord was cut with a clean / new instrument OR a CHDK was used	96	97	90	90	95	95
Percentage of RDW <u>delivering at home</u> whose newborns' cord was tied with a clean / new thread OR a CHDK was used	98	97	95	94	N/A	N/A
Percentage of RDW using CHDK during most recent home delivery	18	45	17	12	36	32

3.4.4 Postnatal maternal and neonatal indicators

RDW and newborns generally receive care during the first month post-delivery at the same time from the same provider. For this reason, indicators of use of post-delivery care by RDW and newborns are generally very similar. Data presented earlier in this chapter documented FCHVs' provision of postnatal home-based services to RDW. This section presents data regarding: 1) provision of care to newborns by health personnel from the formal (non-volunteer) health sector, 2) commodities received by RDW, and 3) the practice of essential newborn care (ENC) behaviors.

²¹ McPherson RA et al. Are Birth-preparedness Programmes Effective? Results From a Field Trial in Siraha District, Nepal. *Journal of Health, Population and Nutrition*, 2006 December, 24(4): 479-488.

Routine care-seeking and use of commodities

Data that describe the provision of care to newborns (and, by implication, postpartum women) by health workers from the formal sector (i.e., not FCHVs and TBAs) are presented in the table. There is a modest increase in the provision of such service in all districts over the duration of CB-MNC. The proportion of newborns who receive this service is similar to the proportion of women whose birth is attended by a SBA or other trained health worker (see table), suggesting that most women who deliver in the presence of a health worker and their newborns receive an assessment at the time of the birth but then do not receive further services later during the first week post-delivery. Across CB-MNC districts, at follow-up 36 percent of newborns receive care from a health provider in the formal sector within seven days of delivery. In contrast, 44 percent of newborns in the three districts are seen by a FCHV during the same time period.

Table 22: Routine provision of care to newborns and RDWs' use of commodities

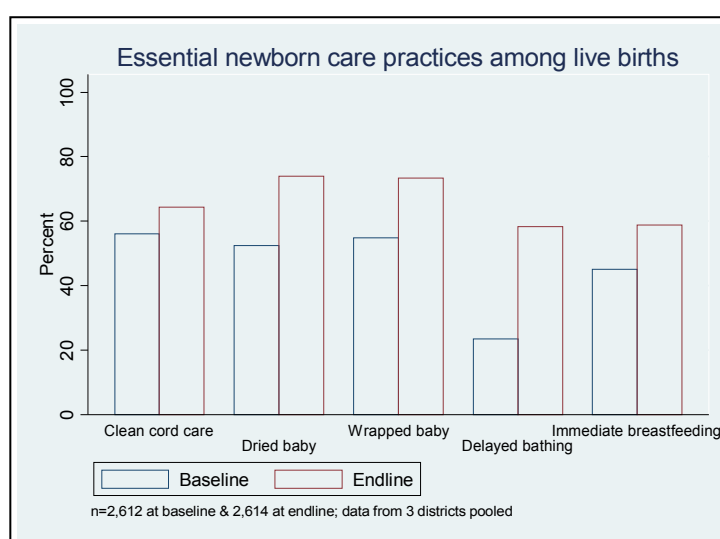
Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
<i>Provision of care to newborns</i>						
Percentage of newborns who receive care within 7 days post-delivery from a trained health provider from the formal health sector	19	27	41	49	16	32
<i>Use of commodities by RDW</i>						
Percentage of RDW who took vitamin A within 6 weeks of delivery	32	64	36	69	62	77
Percentage of RDW who took iron-folate within 6 weeks of delivery	20	60	27	65	47	75
Mean number of days that RDW took iron-folate following delivery up to 6 weeks after delivery:						
• Among all RDW	6	20	9	25	15	29
• Among RDW who took iron following delivery	29	34	33	38	31	36

The use of vitamin A and iron-folate by postpartum women increased markedly during CB-MNC. The consumption of vitamin A increased most notably in Banke and Jhapa, where baseline levels were lower than in Kanchanpur. The percentage of RDW who took iron-folate during the postpartum period rose significantly while there were also gains in the average number of days that women took it.

Essential newborn care practices

The promotion of home-based essential newborn care (ENC) practices has been a focus of MNH activities in Nepal over the past decade. In order to reduce neonatal mortality rates due to sepsis and hypothermia, five practices that have been advocated include clean cord care (i.e., put nothing on the stump), immediate drying and wrapping of the newborn, delaying a newborn's first bath to more than 24 hours post-delivery, and immediate breastfeeding. The figure to the right displays achievements made in these behaviors pooled across

Figure 9: Essential newborn care practices across CB-MNC districts



CB-MNC districts; gains are largest in the practice of delayed bathing (where progress was made in all three districts) and lowest in clean cord care (where progress was only achieved in Banke). The table below makes it clear that for clean cord care the largest gains were made in Banke, where the average level of this practice was lowest at baseline but highest at follow-up.

Table 23: Essential newborn care practices (as a percentage of live births) at baseline and follow-up

Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
Percentage of newborns that have nothing applied on cord stump	41	68	59	57	67	68
Percentage of newborns dried before the placenta was delivered	46	84	50	67	61	72
Percentage of newborns wrapped before the placenta was delivered	48	81	52	65	64	75
Percentage of newborns not bathed during first 24 hours after birth	14	65	17	51	38	60
Percentage of newborns breastfed within one hour of birth	34	70	33	41	68	66
Percentage of newborns given colostrum	78	94	79	90	90	93
Percentage of newborns given only breastmilk in first 3 days after birth	59	70	57	54	90	93
<i>Average level of practice across all seven behaviors</i>	<i>46</i>	<i>76</i>	<i>50</i>	<i>61</i>	<i>68</i>	<i>75</i>

3.4.5 Family planning

Although it was not a major emphasis of CB-MNC, FCHVs were asked to counsel RDW and their family members to use modern family planning (FP) methods. The BPP keychain contained two cards on the use of contraception and the importance of birth spacing. As seen below, FCHVs and health workers did indeed become more active, both increasing the coverage of FP counseling as well as counseling earlier in the postpartum period. However, among women who had delivered 6-11 months preceding conduct of the baseline and follow-up household surveys (i.e. who potentially had an unmet need for FP), this change in level of *counseling* received was not correlated with any increase in the *use* of modern contraceptives.

Table 24: Family planning counseling and RDWs' use of modern contraceptives

Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
Percentage of RDW counseled by FCHVs or health worker to use FP (among RDW who delivered between 2-11 months prior to HHSs)	28	50	24	45	32	50
Mean number of weeks post-delivery at which RDW were first counseled on FP (among RDW who were counseled to use FP and who delivered between 2-11 months prior to HHSs)	7.1	4.7	5.5	4.0	6.5	2.9
Percentage of RDW currently using a modern FP method (among women who delivered between 6-11 months prior to HHSs and who were not currently pregnant)	25	24	39	38	32	27

3.4.6 Birth preparedness

The term birth preparedness (BP) is used for a set of messages that are reflected in the Birth Preparedness Package (BPP) keychain,²² a tool that is widely used to promote MNH in Nepal. Although there is no single definition of BP, some or all of the following content is found in many programs and tools that promote BP: (1) preparation for routine birth by selecting a SBA and delivery location; (2) gathering key items for delivery such as a CHDK; (3) knowledge of maternal and neonatal danger signs including when to seek help; (4) knowledge of location of emergency services and providers; (5) planning for finances, emergency transportation and medical care; and, (6) identification of potential blood donors.²³ This section of the

²² The BPP keychain includes topics that lie outside of BP, such as postnatal and newborn care.

²³ *Monitoring birth preparedness and complication readiness: tools and indicators for maternal and newborn health*. Baltimore, MD: JHPIEGO, 2004:1-19.

report describes indicators that measure how BP practices in CB-MNC districts changed over the duration of the program.

General birth preparedness

The Birth Preparedness Index (BPI) is a 100-point index composed of seven discrete indicators that measure different aspects of birth preparedness, including knowledge, household practices and utilization of services. The BPI, which was developed during the SUMATA program and used by SNL as a central indicator of progress in its program in Siraha, is calculated at the individual RDW level as the proportion of the following seven indicators where the respondent demonstrates correct knowledge or reports healthy behaviors: 1) received *ANC* at least one time from a trained provider during last pregnancy; 2) names *prolonged labor* as a danger sign during delivery; 3) names *heavy bleeding* as a danger sign during delivery; 4) family made *financial preparations* for emergencies during last pregnancy; 5) family made preparations for *emergency transportation* during last pregnancy; 6) last birth was attended by a *SBA*; and, 7) received *PNC* within 6 weeks of delivery from a trained provider. The table outlines how values for BPI and its components changed during CB-MNC.

Across the three districts, mean BPI increased from 47 percent to 58 percent, with roughly equivalent gains in each district. Despite the high coverage achieved by CB-MNC and the large gains in many indicators reported in other sections of the report, the BPI shows only modest progress. With the exception of knowledge that prolonged labor is a danger sign, which remained static (but at a high level even at baseline), most components have showed modest gains during CB-MNC.

Table 25: Birth preparedness indicators

Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
Mean value of <u>birth preparedness index</u> (BPI) among RDW who delivered between 2-11 months prior to the HHSs:	45	56	51	60	44	57
1. received ANC at least one time by a trained provider	78	92	74	89	81	88
2. names <u>prolonged labor</u> as a danger sign during delivery	87	85	87	79	80	82
3. names <u>excessive bleeding</u> as a danger sign during delivery	58	66	66	74	59	83
4. family made financial preparations for <u>emergencies</u> .	57	69	48	65	37	67
5. family made preparations for <u>emergency transportation</u> .	1	17	3	10	5	13
6. birth was attended by <u>skilled</u> provider.	11	17	36	45	17	24
7. received PNC within 6 weeks of delivery from trained provider.	24	48	46	61	28	44
Percentage of RDW who made at least two preparations for delivery (among financial, transport, food, identification of SBA, identification of facility, blood, materials for clean delivery)	49	80	51	78	51	72
Percentage of RDW who set aside money for delivery	34	81	35	84	24	83
Percentage of RDW who arranged for a health worker or TBA to attend their last delivery	14	28	11	24	18	20
Percentage of RDW who arranged to deliver in a health facility	6	15	15	27	11	17
Percentage of RDW who made at least two preparations for emergencies (among financial, transport, identification of SBA, identification of facility, blood)	4	42	10	22	10	24

Other indicators of BP that are presented in the table show stronger gains. Preparations for delivery, especially financial preparedness, increased impressively. Arrangements to deliver in a health facility or in the presence of a trained provider almost doubled although from a

low baseline level. Preparations for emergencies more than doubled in Kanchanpur and Jhapa and increased tenfold in Banke (from 4 to 42 percent).

3.4.7 Management of emergencies

Four of the eighteen cards on the BPP keychain describe serious danger signs that can be experienced by newborns and by women during pregnancy, delivery and postpartum periods. The message promoted by CB-MNC is that a woman or newborn should seek care from a qualified provider immediately if a danger sign is observed. RDW who served as respondents on the baseline and follow-up household surveys were asked if they or their newborn experienced a danger sign at any time (the respondent was asked about each of the danger signs individually) and—among those who did—whether they sought care at a health facility. The danger signs that they were queried on are listed in the table.

Table 26: Danger signs that survey respondents were queried on

Pregnancy	Delivery	Postpartum	Newborn
1. Blurred vision 2. Severe lower abdominal pain 3. Severe headache 4. Convulsion 5. Swelling of the hands, body or face 6. Vaginal spotting or bleeding	1. So much bleeding that it wet her clothes and she feared it was life-threatening 2. Convulsions 3. Prolonged labor (>8 hours) 4. The baby's hand, leg or cord came out first	1. So much bleeding that it wet her clothes and she feared it was life-threatening 2. High fever 3. Severe lower abdominal pain 4. Convulsions	1. Fever 2. Feeding problem 3. Trouble breathing 4. Fast breathing 5. Chest indrawing 6. Drowsy 7. Abdominal tenderness 8. Convulsions 9. Persistent vomiting 10. Unconscious 11. Red/discharging eye 12. Skin pustules 13. Skin around cord red 14. Felt cold

The results of this inquiry are presented in the table. There are clear, albeit modest, trends across these data. The self-reported incidence of maternal danger signs has slightly decreased from baseline to follow-up while care-seeking among those RDW who experience a danger sign has moderately increased. Trends for newborn danger signs are mixed although it appears that both perceived incidence as well as care-seeking has increased to some extent. With regards to care-seeking, there are some between-district differences. Banke and Kanchanpur exhibit similar trends of increased *maternal* care-seeking (pre-, peri- and postpartum) but no change in care-seeking for *newborns*. Data from Jhapa show increases only in care-seeking for mothers during the postpartum period and for newborns.

Table 27: Reported incidence of danger signs and subsequent care-seeking

Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
Percentage of RDW <u>who experienced a danger sign</u> during:						
◆ most recent delivery	47	32	48	42	48	35
◆ most recent pregnancy	33	23	34	35	31	23
◆ postpartum period following most recent delivery	33	20	30	27	28	20
◆ newborn experienced danger sign	16	26	22	26	21	18
Percentage of RDW <u>who sought care at a health facility</u> among those who experienced a danger sign during:						
◆ most recent pregnancy	45	55	57	58	56	69
◆ most recent delivery	25	31	54	55	30	46
	17	29	29	39	29	38

◆ postpartum period following most recent delivery	52	54	48	64	50	50
◆ newborn experienced danger sign						

While the increase in care-seeking is a desired CB-MNC outcome and may be explained by program activities, the decrease in incidence of reported maternal danger signs in Banke and Kanchanpur is somewhat harder to explain. Sampling differences may explain part of the difference—baseline and follow-up respondents are similar with respect to respondent age; the literacy level of respondents in Banke is higher at follow-up than baseline (37 vs. 29 percent) but equal in the other two districts; and, parity levels are slightly lower in all three districts at follow-up as compared to baseline (2.4 vs. 2.2 in Jhapa, 3.1 vs. 2.7 in Banke, 2.8 vs. 2.6 in Kanchanpur: see comprehensive CB-MNC 3-district Survey Report on CD-ROM for more details). Possible explanations for the change include secular trends and changes in the population over the duration of the program; a more informed population with better knowledge of what danger signs are identifying them more accurately; or, a primary prevention effect (e.g., due to improved nutrition or other improvements in self-care during pregnancy) resulting in an actual reduction in the incidence of danger signs.

Care-seeking patterns for sick newborns

RDW respondents to the household surveys were asked if their infant experienced a danger sign during the neonatal period. Among those who did, respondents were asked if their neonate received care from any type of provider. Respondents who sought care for their newborn were asked what type of provider *first* saw their infant and what type(s) of provider(s) *subsequently* provided care. As the two figures demonstrate, there appears to have been a modest “substitution effect” in Banke, where sick newborns are first taken to the FCHV at a higher rate following implementation of CB-MNC. Most of the increase has come at the expense of doctors/nurses, who were first consulted at a lower rate in the follow-up survey. This effect is not seen in Jhapa, where there is relatively little difference between baseline and follow-up care-seeking patterns with regards to first provider seen. Patterns in Kanchanpur district (not shown here) lie somewhere between Jhapa and Banke. The table below describes the proportion of sick newborns who were taken at any time to a health

Figure 10: *First provider* who sees sick newborn in Banke

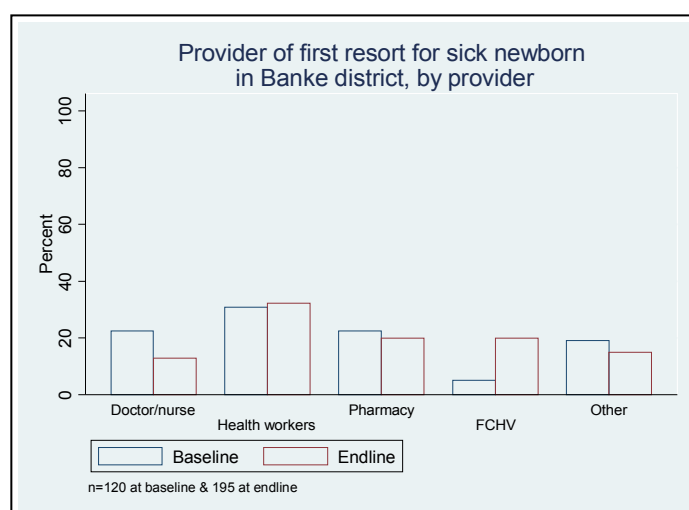
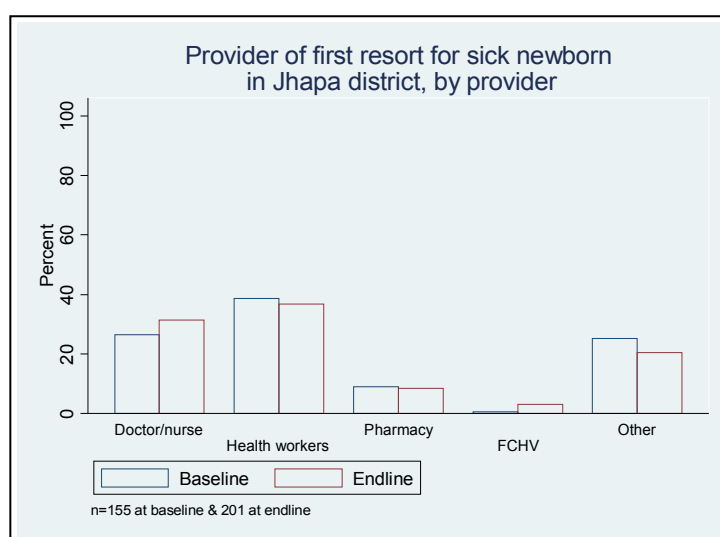


Figure 11: *First provider* who sees sick newborn in Jhapa



provider from the formal health sector²⁴ for treatment (among sick newborns who were provided with care of any type) and the average number of days that caretakers waited between appearance of symptoms and seeking care. These results suggest that the CB-MNC has resulted in two important changes: 1) care being sought more quickly for sick newborns (from an average of just under three days since onset before CB-MNC to just under two days post-intervention); and, 2) a higher percentage of sick newborns being seen by a trained health provider. Such improvement in care-seeking was an important objective of CB-MNC.

Table 28: Care-seeking patterns for sick newborns

Indicator	Banke		Jhapa		Kanchanpur	
	BL	FU	BL	FU	BL	FU
Percentage of sick neonates who were <u>first taken</u> to a health worker from the formal health sector (among sick neonates provided care <u>of any type</u>)	52	45	64	68	58	55
Percentage of sick neonates who were taken <u>at any time</u> to a trained health worker or a health facility (among sick neonates were provided care <u>of any type</u>)	75	84	79	85	83	83
Mean number of days delay before seeking care for sick neonate (among neonates were provided care <u>of any type</u>)	2.8	1.9	2.1	1.6	3.1	1.9

Process evaluation: Care-seeking during emergencies

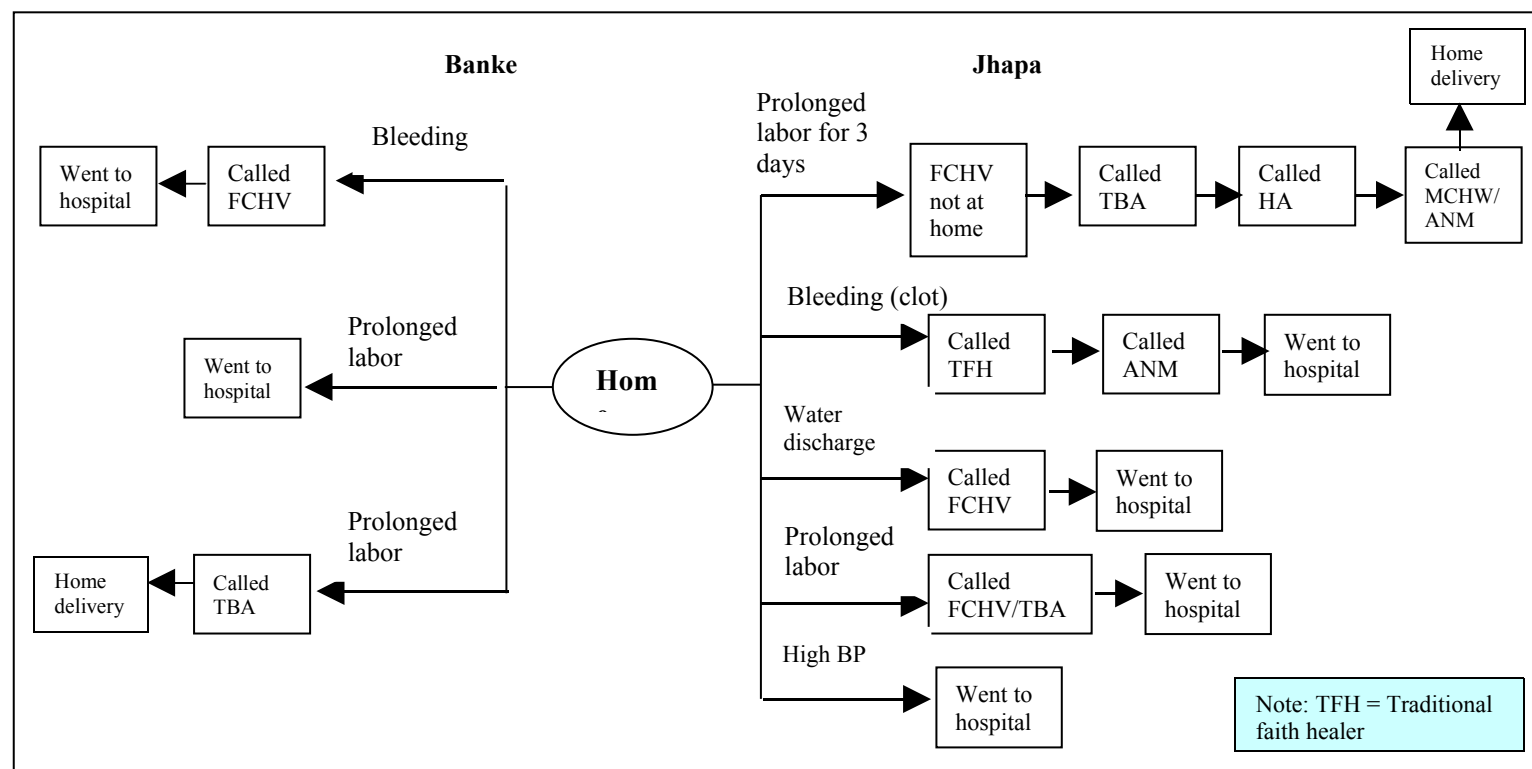
CB-MNC program and DPHO staff, as well as clients, perceived the BPP cards on danger signs to be among the most important and useful cards in the keychain. An overarching analysis of the information provided by the respondents during the process evaluation suggests that clients who experienced complications *during pregnancy* generally did seek care in a health facility. Clients who experienced danger signs *during delivery* at times called their FCHV, who subsequently referred clients to the correct facility, resulting in timely care-seeking. In other cases clients called a TBA, who generally tried to manage the delivery herself.

The figure and case study on the next page were developed from information collected during the process evaluation of the CB-MNC. These data illustrate how care-seeking behavior actually occurs in districts where CB-MNC has been implemented and how even families that plan for emergencies can be confronted with unforeseen obstacles.

²⁴ Includes physician, nurse, ANM, HA, AHW/CMA, MCHW, and VHW.

Case study: Care-seeking behavior when complications arise during labor and delivery

Figure 12: Care seeking behavior during delivery complications as described in CB-MNC process evaluation



The figure maps the experiences of eight RDW (three in Banke and five in Jhapa) who served as informants to the process evaluation regarding how they managed complications experienced during delivery. Many of these women experienced prolonged labor (ten hours to three days) while two experienced heavy bleeding and clotting. Almost all the women went to the hospital to deliver when the complications started. One respondent in Banke reported that she and her mother-in-law decided ahead of time to go to the hospital if she faced any complications; however, on the day of the delivery, her husband and father-in-law were not at home, so they could not arrange for transportation. The FCHV was also not at home so they received assistance from a TBA. The FCHV had told them that if they had any problem they should take a *ladiya* (bullock cart) from the village or carry the woman but the FCHV had not specified how to arrange for the *ladiya*. The baby was born at home with the help of the TBA.

3.4.8 Misoprostol

Results presented earlier in this chapter showed that health facilities and FCHVs have adequate stocks of MSC, that the vast majority of pregnant women in Banke district are informed about PPH and drugs that prevent it, and that 73 percent of household survey respondents reported having received MSC from their FCHVs. The table presents data from the follow-up household survey in Banke and describes different outcomes of the MSC intervention on women's health including how many women take it and whether they take it as directed.

Table 29: Use of misoprostol

Indicator	Banke	
	BL	FU
Percentage of women who take MSC	—	53
Percentage of women who receive MSC from FCHV but do not take it	—	20
Percentage of women who took MSC by time of ingestion (among women taking MSC):		
1. Before delivery		0
2. After delivery of baby but before delivery of placenta	—	86
3. Immediately after delivery of placenta		13
4. Later, in response to excessive bleeding		1
Percentage of women who (correctly) took three MSC tablets (among women taking MSC)	—	98

The work in Banke has successfully provided protection, through community-based MSC distribution, from PPH to 53 percent of the women who deliver there. Another twenty percent of women who deliver in Banke receive MSC but do not use it; the dynamics regarding this issue are described in detail below.

Among those women who do take MSC, correct use is almost universal; 98 percent take the full dose while none report taking it (incorrectly) before the delivery. It should be noted that because the field trial of misoprostol for this indication (i.e., to prevent PPH) was conducted under a special piloting registration, rigorous follow-up monitoring was done both to document adverse effects and ensure that misuse did not take place. Out of approximately 12,000 women who received misoprostol over the first 18 months of implementation, all were followed up and only one took the drug while still pregnant. Investigation of this sole case found that she was well aware of the instructions only to use it after delivery; that she took the drug related to social/mental health problems, and that she suffered no adverse effects.

Protection from postpartum hemorrhage

The objective of the MSC intervention has been to increase the proportion of women who are protected from PPH during the immediate post-delivery period. One way to measure success of the MSC intervention is to look at differences in the proportion of women, in Jhapa and Banke, who are protected from PPH between baseline and follow-up²⁵. In this analysis, a woman is considered to be protected from PPH if she meets one or more of the following criteria: 1) takes MSC correctly; 2) delivers in the presence of a SBA; 3) receives an injection in the thigh or buttocks immediately after delivery (presumed to be oxytocin); and/or, 4) delivers in a health facility (hospital, PHCC, or health post (HP)). The results, presented in the table below, make clear the power of the MSC intervention. Four out of five women who deliver in Banke now receive some protection against PPH and it has moved far ahead of Jhapa (where MSC is not offered) in this regard.

²⁵ A key question used in this analysis was omitted from the Kanchanpur follow-up survey.

Table 30: Changes in protection from postpartum hemorrhage in Banke and Jhapa districts

Indicator	Banke		Jhapa	
	BL	FU	BL	FU
Percentage of women who are protected from PPH	28	80	41	52

Missed opportunities: Women who receive MSC but deliver unprotected from PPH

The final exploration of the MSC intervention that will be described in this report describes the protection status of women who receive MSC but do not take it and their reasons for not doing so.

Table 31: Women's use of MSC and their protection status from PPH, among MSC recipients

	Not protected from PPH	Protected from PPH	Total
Received MSC and took it	0 (0%)	447 (73%)	447 (73%)
Receive MSC and did not take it	36 (6%)	132 (21%)	168 (27%)
Total	36 (6%)	579 (94%)	615 (100%)

As the table makes clear, among those women who receive MSC, 73 percent take it and thus receive protection from PPH. An additional 21 percent receive MSC, do not take it, but receive protection from PPH through other means (as described above). The remaining six percent receive MSC but do not take it or receive any other intervention reducing PPH risk. These women represent a missed opportunity for the MSC initiative. The reasons why the 36 unprotected women who fall into this category did not take MSC are listed below.

Table 32: Reasons why women received MSC but did not take it, remaining unprotected from PPH

Reason for not taking MSC	n	%
1. Forgot to take	11	31
2. Fear of side-effects	7	19
3. The placenta came out before I could take MSC	5	14
4. Delivery at somebody else's home	3	8
5. Lost the tablets (some or all)	3	8
6. Provider (non-SBA) came to house for delivery	2	6
7. Person who kept MSC was not present during delivery	1	3
8. Misplaced the MSC tablets	1	3
9. The FCHV didn't bring me the MSC on time	1	3
10. Baby was born dead	1	3
11. Other	1	3
Total	36	101

Many of the reasons cited for not taking MSC are clearly avoidable, either through more effective education ("fear of side effects", "placenta came out before I could take MSC") or the development of some kind of reminder system ("forgot to take"). While the overall "missed opportunity rate" of six percent is low, it remains substantial enough to target for reduction as the MSC initiative matures over time.



3.5 *Impact*

3.5.1 Newborn mortality

The CB-MNC household surveys were not designed to definitively measure change in neonatal mortality—the relatively small sample size was considered insufficient to detect small changes that may occur. Nevertheless baseline and follow-up surveys did inquire concerning neonatal deaths. Survey personnel identified and interviewed women who had delivered in the year prior to the survey (stillbirth or live birth); a newborn death was defined as an infant who was born alive but died within the first month of life according to the mother’s report. The same technique was used at both baseline and follow-up. The newborn mortality rate was calculated as the number of newborn deaths divided by the number of live births and is expressed in terms of deaths per 1,000 live births. Changes in the newborn mortality rate in each of the three program districts, as well as a pooled rate across the three districts, are presented in the table. Logistic regression has been used to calculate an odds ratio (OR) for the change in mortality and the p-value for the statistical significance of the change, taking into account the cluster design of the surveys.

Table 33: Newborn mortality rates at baseline and follow-up in CB-MNC districts

Indicator	Banke		Jhapa		Kan-pur		3 districts	
	BL	FU	BL	FU	BL	FU	BL	FU
# of newborn deaths	23	8	13	6	10	8	46	22
# of live births	827	831	889	892	896	891	2612	2614
Newborn mortality rate (# deaths/1,000 live births)	28	10	15	7	11	9	18	8
odds ratio for BL-FU difference	0.34		0.46		0.80		0.47	
p-value	0.000		0.16		0.70		0.004	

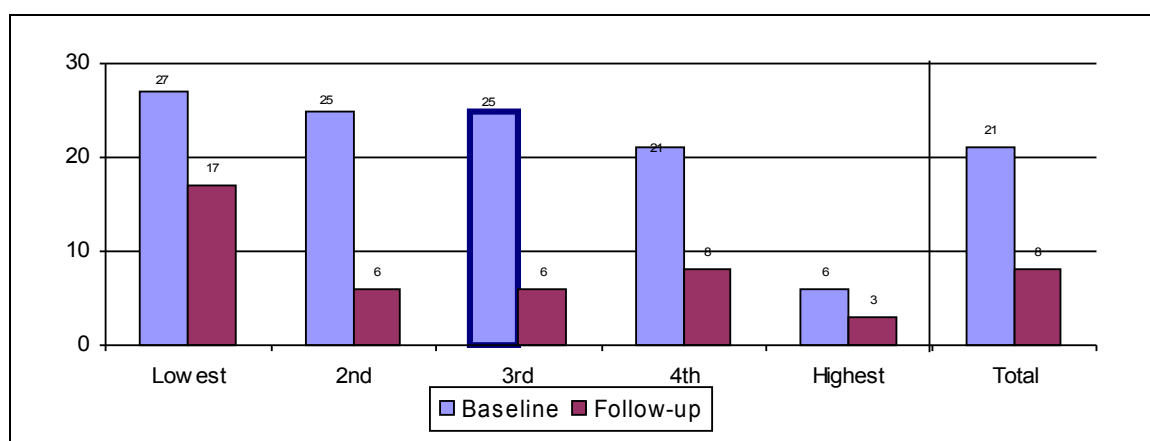
The OR of 0.34 for the reduction in mortality in Banke, representing a reduction in mortality of 66 percent, is highly significant—both statistically as well as programmatically—as is the estimate of a 53 percent reduction in newborn mortality across the three districts. The mortality rate also decreased in Jhapa and Kanchanpur although the reduction was not statistically significant within the two districts. Unlike Banke, in both of those districts, baseline neonatal mortality was already quite low, less than half the national level neonatal mortality rate documented in NDHS 2006.

Newborn mortality and equity

A key question of public health and social importance in Nepal regards the extent to which community health interventions benefit individuals of low socioeconomic (SES) status. The empirical evidence is limited regarding the extent to which FCHVs benefit poor and disadvantaged communities. Given the positive impact that CB-MNC has appeared to achieve with regards to reducing newborn mortality, the extent to which this impact has benefited groups of differing SES is an important question.

As described previously in Chapter 3, principal component analysis was used to construct a wealth index (WI) for the household of each survey respondent. The WI score was then used to place each household survey respondent into one of five wealth quintiles. The table presents the newborn mortality rate at baseline and follow-up stratified by the five wealth quintiles. Due to some differences in the follow-up questionnaires among the three districts, the analysis below is limited to data from Banke and Jhapa districts.

Figure 2: Newborn mortality rates by wealth quintile in Banke and Jhapa (pooled)



While the number of deaths in each wealth stratum is small, these findings represent convincing evidence that all socioeconomic groups in Banke and Jhapa have benefited from CB-MNC in terms of neonatal mortality reduction, though the greatest reductions are apparent in the 3 middle wealth quintiles. Further results presented below demonstrate that the distribution of program benefits across different SES strata is not limited to mortality reduction, leading to the conclusion that CB-MNC is an intervention that “levels the playing field” with regards to social equity in health benefits.

3.5.2 Maternal mortality surveillance in Banke district

The maternal mortality surveillance system that has been developed in Banke district by NFHP was described above in chapter 3. A total of 34 maternal deaths have been identified that occurred in Banke over the period from November 2005 through December 2007. This was markedly lower than the number to be expected if Banke had experienced the maternal mortality documented nationally in NDHS 2006. This suggests that there may have been significant mortality reduction in Banke but this cannot be determined with certainty, in the absence of equivalent pre-intervention data.

Twenty of the deceased women and their families had received BPP counseling and the BPP keychain from their FCHVs. Seventeen of these twenty women received MSC but only six of them took it. Future steps may include the conduct of a case-control study to establish with more certainty an association between use of MSC and prevention of PPH-related maternal death.

3.6 Other topics

The evaluation of CB-MNC has yielded important findings that fall outside of the input/process/output/outcome/impact framework that has been used to frame results presented above. This chapter concludes by presenting additional findings that include equity of benefits, an analysis of associations between exposure to messages and knowledge/behavior, a comparison of indicator estimates generated from two different data sources (monitoring system and household survey), experience with the use of FCHV pictorial pregnancy registers as both monitoring data sources as well as job aids, keychain content, CB-MNC strategy, and findings from the MINI pilot effort in Morang district.

3.6.1 Equity of benefits

Measurement of socioeconomic status

An assessment of inequality in health status and health care utilization requires a robust measure of socioeconomic status (SES). The literature on socioeconomic inequality contains several measures of SES that include social class, educational level, income, dwelling size, consumption, and ownership of household assets. Income data are difficult to gather in developing countries and are often of poor quality. Several studies suggest that a “wealth index” (WI)—a composite score constructed from several household assets by principal component analysis (PCA)—forms a robust measure and serves as a good proxy for SES^{26,27}. Wealth indices are widely used in studies of inequality in developing countries. The CB-MNC evaluation team (including support from JHU/HARP) developed a WI and then used it to stratify respondents into SES quintiles based on principal component analysis of domestic assets and household possessions and characteristics. The lowest (first) quintile indicates the poorest group while the highest quintile indicates the richest group.

Estimation of inequality

Economists have developed several summary indices to measure income and health inequality such as the Gini coefficient, the relative index of inequality (RII), the index of dissimilarities and the concentration index. The concentration index is an extension of the Gini coefficient; Wagstaff et al. suggested that the concentration index is the most appropriate measure of health inequality. The concentration index can be used to demonstrate the extent of inequality graphically by a concentration curve. This concentration curve is similar to the Lorenz curve that is widely used to assess income inequality.²⁸ Note that with this measure, lower values represent a higher degree of equity, so a reduction in the value over time (as documented below for all the indicators measured) represents an improved situation with regard to equity.

Table 34: Concentration index estimates that show a reduction in health care inequity

Health service	Concentration Index (95% CI)	
	Baseline Survey	Follow-up Survey
Received antenatal care from a trained provider	0.08 (0.07-0.10)	0.02 (0.01-0.03)
Received ANC ≥ 4 times from a trained provider	0.23 (0.19-0.26)	0.15 (0.13-0.17)
Delivery care from skilled birth attendants (SBA)	0.43 (0.37-0.48)	0.37 (0.32-0.41)
Received postpartum care from a trained provider	0.13 (0.11-0.16)	0.05 (0.04-0.06)
Received care for sick newborn from a trained provider	0.26 (0.15-0.38)	0.19 (0.08-0.30)

The largest reductions in health care inequity occurred in antenatal and postpartum care. The smallest occurred for delivery care by SBAs; utilization of this service depends particularly on access—both financial and geographical—to health facilities. A modest reduction in inequity, although not statistically significant, was observed for care for sick newborns. These results are not surprising—the two areas where equity has been reduced the least are those for which significant user charges often apply. This finding, coupled with the overall trend across the five services, suggests that the CB-MNC is a pro-poor program that reduces inequities in health care utilization and delivers benefits across all SES strata.

²⁶ Filmer, D., and L. H. Pritchett. 2001. Estimating Wealth Effects without Expenditure Data-or Tears: An Application to Educational Enrollments in States of India. *Demography*, 38(1): 115-132.

²⁷ Bollen, K. A., J. Glanville, and G. Stecklov. 2001. Socioeconomic Status and Class In Studies of Fertility And Health in Developing Countries. *Annual Review of Sociology* 27:153-85.

²⁸ Wagstaff, A, P Paci and E Van Doorslaer. 1991. On the measurement of inequalities in health, *Social Science and Medicine*, 33(5): 545-557.

3.6.2 Associations between exposure to messages, knowledge and behavior

One of the goals of the evaluation of the CB-MNC was to determine the strength of association between clients' *exposure* to messages advocated by the program and clients' *knowledge* and *practice* of the associated behaviors. Positive associations between exposure and knowledge and practice can strengthen conclusions that CB-MNC activities have directly contributed to improved outcomes. The table describes levels of exposure to message, knowledge, and practice at baseline and follow-up of two sentinel behaviors that will be explored in this analysis: 1) made four ANC visits and 2) practiced immediate breastfeeding (IBF). Data from all three CB-MNC districts are pooled for this analysis.

Table 35: Levels of exposure, knowledge and behavior of two behaviors at baseline and follow-up

Behavior / practice	Survey	Estimates (%) from follow-up HHS		
		Exposure	Knowledge	Behavior
Made 4+ ANC visits	Baseline	55	21	40
	Follow-up	88	49	61
Immediate breastfeeding	Baseline	48	35	45
	Follow-up	81	63	58

The table below describes the results of logistic regression analyses which investigated the degree of association in the follow-up survey data between exposure to BPP message (i.e., the independent variable), knowledge and behavior (i.e., the outcome variables) for these two behaviors at follow-up. The analysis controls for the cluster sample design. The results show that exposure to each of the messages is strongly and positively associated with knowledge of the message content and practice of the behavior it promotes.

Table 36: Levels of association at follow-up between exposure to messages and knowledge / practice

Behavior /	Independent variable	Outcome variable	Odds ratio (p-value)
Made 4+ ANC visits	Exposure	Knowledge	21.9 (.000)
	Exposure	Behavior	4.9 (.000)
Immediate breastfeeding	Exposure	Knowledge	4.0 (.000)
	Exposure	Behavior	3.6 (.000)

The result of another analytical approach that explores the relationship between message exposure and behavior is outlined in the next table. The practice of the behavior of interest (immediate breastfeeding) is disaggregated among survey respondents who report exposure or no exposure to the relevant message at baseline and follow-up. These results reveal that the practice of the behavior among the unexposed population is equivalent at baseline and follow-up, but that two factors have contributed to higher levels of practice at follow-up: 1) a higher level of practice among the exposed population (64 percent vs. 56 percent at baseline), perhaps due to more effective communication methods; and, 2) a higher percentage of the population has been exposed to the message (81 percent vs. 48 percent at baseline). Overall, the findings presented above suggest that promotion of messages through CB-MNC has directly led to improved knowledge and healthy practices.

Table 37: Practice levels of immediate breastfeeding, disaggregated by message exposure status

	Baseline	Follow-up
Percentage of respondents practicing IBF among exposed population	56.3 (n = 1262 exposed)	64.1 (n = 2145 exposed)
Percentage of respondents practicing IBF among non-exposed population	34.0 (n = 1378 not exposed)	33.3 (n = 495 not exposed)
Total	44.7 (n = 2640)	58.3 (n = 2640)

3.6.3 Comparison of indicator estimates from monitoring system and surveys

The comprehensive monitoring and evaluation (M&E) component of CB-MNC measured several indicators through both monitoring activities as well as household surveys. Given the high cost of conducting surveys, future CB-MNC M&E activities may need to rely more heavily on routine monitoring activities to generate data that can be used to manage the program. It is thus important to identify indicators that can be accurately estimated through routine monitoring. The table presents selected indicators that have been estimated during CB-MNC through both monitoring and household surveys. It should be noted that monitoring indicators are calculated using information from women who are registered by FCHVs—the denominator for some (but not all) of *these* indicators is # of pregnant women registered, whereas the denominator for survey-based indicators is (implicitly) # of pregnant women in the district. In order to compare the values of monitoring and survey-based indicators, some monitoring indicators are multiplied by the CB-MNC coverage (63 percent) in order to convert the estimate into a population-based figure. It should be noted that making this conversion conservatively assumes that the 37 percent of the population that were not registered did not receive the service or practice the behavior. All data presented in the table are from Banke.

The differences (in the table below) in the monitoring and survey estimates for the CB-MNC coverage indicator (# 1) and indicators # 5, 6 and 7 are most likely primarily due to an overestimate of the number of expected pregnancies; using a more accurate estimate for expected pregnancies would bring the values of these monitoring indicators very close to the equivalent survey-based indicators.

The difference between the two estimates for the indicator of FCHV PNC visits (# 2) is very large. Even for a period within *seven* days post-delivery, only 44 percent of survey respondents reported having been visited by the FCHV. This difference may be due in part to faulty recall by FCHVs and/or RDWs.

Monitoring and survey-based estimates of indicator # 4 (deworming) are not easily compared, due to differences in the denominator. A more restricted analysis of the survey data that is limited to keychain recipients reveals that 88 percent of such RDW survey respondents from Banke reported taking the deworming tablet. This estimate is constructed with the same denominator as the monitoring estimate and is somewhat closer to the monitoring estimate of 96 percent.

Overall, monitoring and survey-based estimates of most of the indicators presented above appear to be reasonably close in value with the exception of PNC visits by FCHVs (where FCHVs are asked to document their own performance). Avoiding setting up circumstances which may encourage workers to over-report their own level of service may be one way to maximize the accuracy of estimates in monitoring data collection efforts.

Table 38: Comparison of CB-MNC indicator estimates from monitoring and survey sources in Banke

Indicator	Monitoring		Survey	
	Method of calculation	%	%	Method of calculation
1. CB-MNC coverage	(# of PW registered by FCHVs) ÷ (# of estimated pregnancies)	63	77	Percentage of PW who receive the BPP keychain
Service utilization				
2. PNC visit from FCHV within 3 days of delivery	[(# RDW whom FCHVs report visiting within 3 days post-delivery) ÷ (# of PW registered by FCHVs)] x (coverage factor) $93\% \times 63\% = 59\%$	59	29	Percentage of RDW visited by an FCHV within three days of delivery
3. Birth attendance by SBA or OTHW	(# RDW who report to FCHV that their delivery was attended by SBA or OTHW) ÷ (# of PW registered by FCHVs)	32	34	Percentage of births attended by a SBA or THW
4. Deworming	(# PW who report to their FCHVs that they took deworming tablet) ÷ (# of PW registered by FCHVs)	96	81	Percentage of PW who took deworming tablets while pregnant (of all RDW respondents).
Behavior				
5. Delayed bathing	[(# RDW who report to their FCHVs that they practiced delayed bathing) ÷ (# of PW registered by FCHVs)] x (coverage factor) $93\% \times 63\% = 59\%$	59	65	Percentage of newborns not bathed during first 24 hours after birth
Misoprostol				
6. MSC coverage (distribution)	(# of PW who are registered by FCHVs as having received MSC) ÷ (# of estimated pregnancies)	62	73	Percentage of PW who received MSC prior to their deliveries.
7. MSC usage	(# of RDW who are registered by FCHVs as having taken MSC) ÷ (# of estimated pregnancies)	47	53	Percentage of women who take MSC following their deliveries
8. When MSC was taken:	(# RDW who report to FCHV that they took MSC at the specified time) ÷ (# of RDW who are registered by FCHVs as having taken MSC)			Percentage of women according to when they report having taken MSC
• Before delivery		0	0	
• Between delivery of placenta and baby		93	86	
• Immediately after delivery of placenta		7	13	
• Other		0	1	

Note: Estimates of all monitoring indicators presented in the table are an average of estimates from the 2nd through the 5th quarter of CB-MNC, a time period that most closely matches with the time period covered by the follow-up household survey.

3.6.4 Use of pictorial registers as monitoring tools and job aids

CB-MNC planners foresaw the need to collect intensive monitoring data that would allow them to monitor and adjust the program in its early stages. Much of this data needed to be recorded by female community health workers (FCHVs), many of whom are not literate. CB-MNC program and technical personnel thus designed and introduced several pictorial registers at the beginning of the program. These registers, all of which are designed to be used by FCHVs, serve both as sources of monitoring data as well as job aids for FCHVs. Copies of the registers, which are described above in Chapter 3, are included on the CD-ROM that accompanies this report.

The pictures in the registers are designed to be in sequential order so as to guide the FCHV as she carries out her tasks under CB-MNC. Many of the pictures in the registers are identical to corresponding pictures in the BPP keychain and allow even illiterate FCHVs to use the registers.

Two years of experience with the registers have resulted in a number of lessons learned, including:

1. Overall, the registers have proved to be invaluable sources of information as well as useful job aids for FCHVs. While there is clearly room for improvement, the net evaluation of these tools is positive and program personnel plan to continue their use and adaptation as CB-MNC-type approaches are expanded to new districts.
2. Early versions of the registers asked for too much information and were too “crowded”, making them difficult to fill in and maintain.
3. Some illiterate FCHVs experienced difficulty understanding i) the meaning of the pictures (some of which were reproduced much smaller in the registers than they were in the original BPP materials) and ii) how to maintain the registers.
4. Some of the pictures themselves were confusing as they consisted of many small pictures or messages within a larger picture.
5. Some FCHVs did not complete their registers in a timely manner and brought them to the monthly meeting at the health facility. They would then fill out the register with help from fellow FCHVs and other staff from the health facility or NFHP. This may have resulted in over-reporting or incorrect reporting.
6. FCHVs in Banke were asked to maintain three registers (“FCHV”, MSC and Birth Recording) resulting in substantial recording and reporting burden.
7. Overall, the substantial recording and reporting burden demanded time and effort from FCHVs and their supervisors and supporters. It was observed during monthly meetings at the health facilities that HF and NFHP staff members spent a great deal of time reviewing and correcting CB-MNC records, leaving less time for other aspects of the services. This was noted relatively early in Jhapa and Banke and was corrected to some extent for the later Kanchanpur roll-out.

Process evaluation: Using the monitoring data

Early monitoring results raised concerns regarding the quality of counseling and also indicated that program coverage was low. Members of the NFHP M&E team worked with DPHO and NFHP district-level staff to conduct field visits and observe FCHVs’ counseling and use of CB-MNC registers. This review team found that many FCHVs were confused about how to counsel using the BPP tools. This review resulted in a recommendation to conduct refresher trainings in CB-MNC districts—a recommendation that was promptly acted upon and resulted in improved program coverage and quality of FCHVs’ performance.

3.6.5 Content and use of BPP keychain

The process evaluation (PE) of CB-MNC was used to gather detailed qualitative information about clients’ and CB-MNC personnel’s impressions of the content and usefulness of the BPP keychain (KC) in Banke and Jhapa districts. The major findings from this inquiry are summarized below:

General

- The KC is shared among family members, promotes intra-household discussion, and is referred to in cases of emergencies or questions. Among PE respondents, all husbands and almost all mothers-in-law (MILs) reported having read the KC.
- The messages on the cards are well understood, especially by RDWs. Some husbands and MILs do not understand some of the messages.

Keychain content

- RDW find the most useful cards to be those that contain messages on ANC, danger signs during pregnancy and delivery, birth preparedness, newborn care, and postpartum care.
- Husbands are more focused on cards that describe danger signs and other areas where they exert decision-making control.
- CB-MNC program staff members view cards on danger signs and newborn care as the most important.
- Several respondents noted that they appreciated the card that promotes nutritious foods for pregnant and postpartum women. Although this message has been promoted for many years in Nepal, many women eat what is available due to low economic status. There was a substantial increase between the baseline and follow-up household surveys (27 percent vs. 44 percent) of RDW who reported eating more than usual while they were pregnant.

Modifying the keychain

- Respondents were asked if they felt the keychain itself (which costs approximately US\$ 0.70) was necessary or if the messages could be promoted effectively either without a KC (as was done in Kanchanpur) or with a cheaper alternative (such as a photocopied paper). Respondents stated that the KC is the preferred alternative and that the current laminated color version is preferable to a simple black-and-white photocopied version.
- The length of the KC can be substantially reduced due to numerous repetitions among cards. Content areas that are perceived to have repetitive, redundant cards (e.g., birth preparedness, ANC, FP) are not used as much by FCHVs.

3.6.6 Impressions regarding the CB-MNC strategy

Another area of inquiry in the process evaluation was CB-MNC staff members' impressions regarding the program strategy. Respondents volunteered the following opinions:

- CB-MNC has strengthened the role of FCHV in community health programs.
- Interpersonal communication (IPC) through FCHVs is an appropriate overall strategy for this kind of program.
- Future iterations of CB-MNC should focus more on strengthening health facility services; that is, there has been too much emphasis on demand creation and not enough on supply.
- CB-MNC should focus more on involvement with and orientation of private medical services.
- The effort of the program to include TBAs in the same role as FCHVs has not been effective and should be discontinued.
- The number of required contacts between FCHVs and clients should be reduced when expanding the program to hill districts.
- The messages on the BPP keychain should be reduced and consolidated.

- The various registers introduced by CB-MNC should be simplified and reduced in number.

3.6.7 MINI project

The MINI trial was designed to test an implementation model for neonatal sepsis case-finding and care delivered on an outreach basis through public sector services and FCHVs. Coverage, service quality and feasibility were the key dimensions to be assessed. The trial was not designed to definitively measure impact on neonatal mortality (although mortality in the project area has been tracked and appears to have substantially declined—a reduction of approximately two-thirds has been observed as compared to baseline). MINI has documented that FCHVs can successfully fill this function and that VHWs and MCHWs can provide gentamicin with high treatment completion rates and no evidence of significant drug resistance. Eighty percent of expected PSBI cases receive treatment through the government health system in the intervention area compared to 35 percent in the control area. Families and caretakers readily accept this service. MINI can be considered a “pro-poor” program because less privileged groups benefit from the free community-based service and coverage has been at least as high among under-privileged groups as among the privileged.

Future challenges to the MINI model include reducing delays in care-seeking, strengthening the sustainability of the intervention, and developing a streamlined intervention model for replication in other districts. The MoHP is committed to scaling up the MINI model; joint planning will determine how to best refine and streamline the MINI model to integrate it within the existing CB-IMCI program. The next phase of the MINI intervention (MINI-2), to be implemented with SNL support, will define a scalable package of training, supervision, and logistics for replication of MINI in other *terai* districts.

4 Conclusions

The results of various investigations conducted under CB-MNC give a picture of a program in which community health workers have successfully increased coverage of the services they provide while their clients have adopted new behaviors and increased their use of key health services. The overall CB-MNC strategy has been a success; a community-based approach relying primarily on demand creation and behavior promotion (but which has also addressed certain elements of service provision) has been implemented in a scaleable, replicable manner through the government health services and achieved substantial mortality reduction. Increases in *exposure* to messages promoted under CB-MNC among pregnant women in program districts, as documented by baseline and follow-up household surveys, together with documented increases in the proportion of *exposed women* who report having *adopted these practices* (and a finding of no change in adoption of these behaviors by *unexposed women*), suggest that the observed changes in behavior can be attributed to the intervention.

The CB-MNC strategy

CB-MNC has included both facility-based and community-based elements and has successfully established two important community-level *platforms* or *vehicles* through which key services can be delivered:

1. *antenatal contacts between FCHVs and pregnant women* living in their wards; and,
2. *early postnatal home visits* by FCHVs.

These vehicles for service delivery have achieved relatively high coverage and hold the potential to carry additional interventions. The services that are provided through these vehicles can be classified as 1) counseling, 2) dispensing commodities, 3) documentation, and 4) assessment and referral as needed.

CB-MNC has established FCHVs as a cadre of first contact for a significant proportion of pregnant women and their family members. Although the role of FCHVs in providing a continuum of MNH services includes only a limited range of services, this cadre has been energized through CB-MNC and has greatly increased its role in providing key MNH-related support to families living in their communities.

CB-MNC is a fairly complex program; although it has been implemented in full on a pilot basis, it may need to be simplified and streamlined for replication and scale-up.

Service utilization

Increases in service utilization by women and newborns were observed across districts and types of services including those provided in outreach clinics. FCHVs can and do provide important postnatal services although there is certainly room to improve coverage. Under CB-MNC, FCHVs have successfully promoted and distributed commodities. Increases in the use of commodities FCHVs *promote* but do not *distribute* (e.g. deworming medicine, tetanus toxoid) have also been observed. FCHVs notably increased their role in the promotion of family planning but this had no apparent effect on clients' use of contraceptives. Care-seeking for emergencies increased only marginally; adoption of this behavior may be limited by other barriers—financial, geographical, or cultural—not readily influenced by the types of interventions used under CB-MNC.

Behavior promotion

Major gains were made in the promotion of essential newborn care (ENC) behaviors in Banke district while achievements in this area were less pronounced in the other two CB-MNC districts. The reason for this discrepancy is not clear; Banke is considered to be somewhat of a “backwards” district while both Kanchanpur and Jhapa are considered to be more progressive, and thus it is counterintuitive that these behaviors would be most widely adopted in Banke. It may be that the larger observed impact was due to more intensive program effort in Banke. The particularly strong leadership from the DPHO in Banke may also have contributed to this result.

Similar results from other projects suggest that ENC behaviors may represent relatively “low-hanging fruit” where change can be achieved somewhat easily. Certain behaviors promoted through CB-MNC have proven comparatively easy to change (e.g., ENC temperature-control-related behaviors), while others have been more resistant (e.g., postpartum family planning). Other MNH behaviors that are linked by evidence to improved health outcomes should be identified and promoted (e.g. hand-washing with soap and water by those handling the baby around the time of delivery).

Skilled birth attendance

Modest gains in the use of SBAs were documented across the three districts; however achievements appeared to be limited to use of non-emergency (i.e., planned) services. These observed gains need to be interpreted not only in the context of the CB-MNC but also taking into account the launch of the government Maternity Incentive Scheme (MIS). Under the MIS, many government health workers and householders are eligible for financial incentives when births are attended by health workers from the formal sector. Because this program began implementation during the interval between CB-MNC baseline and follow-up surveys, one cannot confidently disaggregate the relative contributions of these two programs to the increased use of skilled birth attendants documented in CB-MNC districts. It is noteworthy that, in addition to use of SBAs, reported deliveries by other trained health workers (eligible for incentives under MIS, but not specifically promoted under CB-MNC) also increased significantly between baseline and follow-up surveys.

More definitive conclusions on the relationship between facility- and community-based interventions can be drawn from the CB-MNC implementation documented in Banke. From this experience it is clear that community-level safe motherhood work need not be considered *in competition with* institutional deliveries – coverage on both sides improved – what is needed is a *combined strategy* that actively and effectively promotes the use of SBAs while simultaneously implementing community-level interventions that can also contribute to driving down mortality (e.g., misoprostol to prevent PPH). Clearly both strategies should be pursued as Nepal fights to drive down the burden of avoidable maternal deaths.

BPP tools and training and monitoring materials

The BPP keychain is currently being used by many organizations and programs, including the MoHP, as a central tool in their MNH programming. The decision to make wide use of the keychain is based on limited evidence of its effectiveness and despite its substantial cost (approximately US\$0.70). While the results from CB-MNC certainly suggest that the BPP keychain is an effective tool, CB-MNC also posed the following question in Kanchanpur: “Can results achieved using the BPP keychain be replicated using the same counseling content but without distributing a keychain to every pregnant woman?” FCHVs in Kanchanpur promoted BPP messages using of the BPP flip chart and an interactive card game but did not distribute the keychain. The question of the added contribution of the

keychain to achieving results cannot be answered definitively based only on the Kanchanpur experience—Kanchanpur is a very different district than either Banke or Jhapa; the duration of CB-MNC program experience has only been one year in Kanchanpur vs. two years in Banke/Jhapa, and there have been other elements of CB-MNC-related implementation in Kanchanpur (e.g., the ACCESS-led LBW intervention, community mobilization approaches based on the MIRA experience in Makwanpur) that have supported BPP-related inputs. Overall, however, the Kanchanpur results suggest that public health officials in Nepal would do well to thoroughly explore alternative ways of promoting MNH messages that do not require the ongoing expense of providing a BPP keychain to every pregnant woman in Nepal, at least in its current, relatively expensive form.

CB-MNC training and monitoring materials have been progressively refined and improved over the course of the program but will require further revision with a view to replication and scale-up. They will also need further development if other intervention elements are added.

MINI

Although not addressed in detail in this report, the Morang Innovative Neonatal Intervention (MINI) shares many features with the CB-MNC work. Both activities built on established models from Nepal (and in the case of MINI, also from India); both relied on FCHVs as the key implementing cadre; both were implemented within the resources of the district public health system and required, for successful implementation, serious engagement with DPHO and peripheral health facility staff. Both included at least some antenatal behavior change counseling, recording of births (assisted by FCHVs) and early postnatal home visits. Both also documented substantial reductions in neonatal deaths. The active outreach effort to identify and treat cases of possible severe neonatal infection (the most important cause of neonatal death in Nepal beyond the first day of life) that forms the core of the MINI strategy was documented as successful in terms of coverage, quality of care and outcome. The Department of Health Services has been reviewing this experience and MoHP is moving towards endorsing this approach for wider-scale piloting.

Inter-district findings

Although the three CB-MNC districts all lie in Nepal's *terai*, they differ in a number of ways. Jhapa is a prosperous district with a population consisting mainly of "hill Nepalis" who have migrated south from the eastern hills. Banke is, economically, a mid-level *terai* district with a major urban center (Nepalgunj), impoverished rural areas (some of which are geographically isolated) and a relatively large Muslim minority. Similar to Jhapa, Kanchanpur has a large population of hill Nepalis, abundant wealth in its forests, and a FCHV cadre that has worked closely with international NGOs and emerged as a highly mobilized group. The content and implementation of CB-MNC also took a different form in each district—while all three districts had a basic "core" package of CB-MNC content based on BPP, Banke alone had the misoprostol intervention which invigorated post-partum visits and provided FCHVs with a valuable commodity to dispense to their clients (and which also represented the most potent CB-MNC element addressing risks to the mother). PNC visits that were guided by a job aid were emphasized in Jhapa while CB-MNC in Kanchanpur was conducted without the BPP keychain and implemented with a complementary LBW intervention implemented under ACCESS/USAID.

Kanchanpur and Jhapa rest at the extremes of low and high population per FCHV, respectively, yet program performance in the two districts was similar, suggesting that population served per FCHV may not be an important determinant of program efficacy, at

least for the program elements included in CB-MNC in these districts. A different result may have been achieved if misoprostol had been a program element in all three districts. A review of CB-MNC results suggests that many of the achievements of CB-MNC—certainly neonatal mortality reduction—were somewhat higher in Banke than in the other two districts. Although the reasons for this are not entirely clear, Banke—due to its rural poverty and “population-based” FCHVs²⁹—does appear to be well-suited for a FCHV-led community-based intervention. The relatively greater success in Banke could also be due to particularly motivated and effective leadership from the District Public Health Office. This also appears to have been a significant factor in the success documented, under MINI, in Morang district. It also appears that unlike the case for Jhapa and Kanchanpur, for which the samples in baseline and follow-up surveys were very similar, for Banke the sample in the follow-up survey was somewhat more affluent. In further analysis of the survey data, there need to be statistical adjustments made to control for these differences. This could slightly attenuate the observed changes between baseline and follow-up.

While FCHVs do have an important role to fill even in districts such as Jhapa, the population there is moving towards higher-quality facility-based services—witness the baseline level of 35 percent of births in health facilities. Furthermore, in districts such as Jhapa there appears to be a secular trend towards heavier use of private health care, and away from use of FCHVs and public sector facilities.

All of this background is intended to set the stage for an important question: “What kind of districts are likely to benefit most from a CB-MNC-like approach?” Although the sample size in the surveys done in CB-MNC districts is small and any inferences that are drawn must be based only on the experience of four districts (three CB-MNC and one MINI), the results presented above suggest that less prosperous districts with high levels of newborn mortality, a strong group of population-based FCHVs and motivated district-level government counterparts may represent the ideal setting for introducing this kind of intervention.

Next steps

CB-MNC is a highly relevant and effective program for Nepal. Plans for scaling up interventions similar to CB-MNC are already in progress. Funded by USAID, it is expected that there will be support under NFHP-II to support scale-up of such work in two or three districts (including at least one “mountain district”) over the coming two years, followed by an accelerated scale-up if results continue to show promise. USAID has also committed support through CARE and PLAN for similar activities. NFHP-II is expected to assist these and other partners in implementing such work.

Subject to approval of MoHP, it appears likely that CB-MNC-related work introduced into new districts will include two notable intervention elements included in a newly defined “core CB-MNC package”—*misoprostol* for PPH prevention and the *MINI* outreach approach for managing neonatal sepsis. Decisions regarding whether or not to use the current BPP keychain in new CB-MNC districts will need to balance the findings from Kanchanpur with the reality that the current keychain is planned to be in use in 53 of Nepal’s 75 districts by

²⁹ There are two models for assigning FCHVs in Nepal. In districts using a population-based approach, FCHVs are assigned based on the number of households in a ward, with the result that more populous wards can have several FCHVs. In districts using a ward-based approach, one FCHV is assigned to every ward in the district, regardless of the population of the ward. This can result in some FCHVs being assigned an impractically high number of households to provide services to.

mid-2008. A simplified (and less costly) tool could ultimately prove at least as effective and, at the same time, a more replicable, sustainable solution.

CB-MNC has built upon a history of innovative MNH efforts by the MoHP and its national and international partners over the past decade to develop an effective community-based model for improving maternal and neonatal health. The experience has been very encouraging. Active, committed leadership from district public health offices appears to have played a significant part in the success of the program.

None of the achievements of CB-MNC documented in this report would have been accomplished without the committed and effective efforts of FCHVs in Banke, Jhapa, and Kanchanpur. This document provides one more piece of evidence that FCHVs are saving lives of many women and children across Nepal every day.

5 Annexes

Annex 1

The theory behind the concentration index can be illustrated by presenting concentration curves, $L(p)$ in the figure below. In the graph, the cumulative share (in %) of health on the y -axis is plotted against the cumulative proportion of population ranked by income (a common measurement of economic status) on the x -axis. If there is no income related inequality in health the poor will have the same share of health outcome as the rich. As an example, if $k\%$ of the population ranked by economic status accounts for the $k\%$ of health care utilization in the whole population, the concentration curve coincides with a 45° diagonal line and suggests that there is no income related inequality. If poor people are less healthy than the rich, the concentration curve will lie below the diagonal line (slow rise at the beginning of x -axis, and rapid rise later). Conversely, if adverse health is more concentrated in among rich individuals, the concentration curve will lie above the diagonal (rapid rise at the beginning and slow rise later).

Mathematically, the concentration index (C) is defined as twice the area between the concentration curve and the diagonal:

$$C = 1 - 2 \int_0^1 L(x) dx$$

When there is no inequality, C equals zero. The value of the concentration index theoretically ranges between -1 to $+1$. A negative value suggests that the curve lies above the diagonal, and a positive value suggests the opposite.

Based on individual data, C is measured by (Kakwani et al., 1997):

$$C = \frac{2}{n \cdot \mu} \sum_{i=1}^n o_i R_i - 1$$

where o is the health or behavioral outcome, μ is the mean of o , R_i is the fractional rank of the i -th individual in the wealth asset distribution (on the continuum scale of socioeconomic status measurement).

Kakwani et. al. suggested a “convenience regression” method for estimating concentration index (CI)³⁰:

$$2\sigma^2 \left[\frac{o_i}{o} \right] = \alpha + \beta R_i + \varepsilon_i$$

where σ^2 is the variance of the fractional rank, o_i and o are the individual level and population average of the health outcome. The OLS estimator of β is equal to:

$$\hat{\beta} = \frac{2}{n \cdot \mu} \sum_{i=1}^n (o_i - o) \left(R_i - \frac{1}{2} \right)$$

and implies that β equals to the measured concentration index (C) from individual data.

The standard error (SE) for concentration index was estimated by:

³⁰ Kakwani, N. Adam Wagstaff and Eddy Van Doorslaer. 1997. Socioeconomic Inequalities in Health: Measurement, Computation and Statistical Inference. *Journal of Econometrics*, 77: 87-103.

$$\sigma(C) = \left\{ \frac{1}{n} \left[\frac{1}{n} \sum a_i^2 - (1 + C)^2 \right] \right\}^{1/2},$$

where

$$a_i = \frac{o}{\mu} (2R_i - 1 - C) + 2 - q_{i-1} - q_i$$

and

$$q_i = \frac{1}{\mu \cdot n} \sum_{\gamma=1}^i o_{\gamma}$$

is the ordinate of the concentration curve, with $q_0 = 0$.

Concentration curve: Coverage among all RDW of BP advice from FCHV

