Community-Based Management of Neonatal Infections in Nepal

Establishing a Model in One District

FINAL REPORT

Morang Innovative Neonatal Intervention Program (MINI-II)

2009

USAID FROM THE AMERICAN PEOPLE

JSI

Save the Children

NFHP · NEPAL FAMILY HEALTH PROGRAM

Community-Based Management of Neonatal Infections in Nepal

Establishing a Model in One District

Female community Health volunteers

FINAL REPORT

Morang Innovative Neonatal Intervention Program (MINI-II)

2009

Prepared by:
Dr. Gargi K.C.

USAID FROM THE AMERICAN PEOPLE

JSI

Save the Children

NFHP NEPAL FAMILY HEALTH PROGRAM

Report prepared by: Dr. Gargi K.C.

Email: kcgargi@hotmail.com

Contact person : Dr. Penny Dawson

Principal Investigator, MINI program

Email: pdawson@nfhp.org.np

Published by : The Morang Innovative Neonatal Intervention

(MINI) Program, JSI R&T (Nepal)

GPO Box: 1600

Kathmandu, Nepal

Email: mini@mini.org.np

Acronyms

AHW	Auxiliary Health Worker
ANM	Auxiliary Nurse Midwife
ARI	Acute Respiratory Infection
BCG	Bacillus Calmette Guerin
BD	Twice a day
CB	Community-Based
CB-IMCI	Community-Based Integrated Management of Childhood Illness
CHD	Child Health Division
CHWs	Community Health Workers
DoHS	Department of Health Services
DPHO	District Public Health Office
ENC	Essential Newborn Care
FB-CHWs	Facility Based-Community Health Workers
FCHV	Female Community Health Volunteer
HF	Health Facility
HI	Health Post In-charge
HP	Health Post
IEC	Information, Education and Communication
IM	Intramuscular
JSI	John Snow Inc.
LBI	Local Bacterial Infection
LBW	Low Birth Weight
LDO	Local Development Officer
M & D	Monitoring and Documentation
MCHW	Maternal and Child Health Worker
MDG	Millennium Development Goal
Mg	Miligram
MINI	Morang Innovative Neonatal Intervention
MIS	Monitoring Information System
MoHP	Ministry of Health and Population
NDHS	Nepal Demographic Health Survey
NFHP	Nepal Family Health Program
NMR	Neonatal Mortality Rate
PATH	Program for Appropriate Technology in Health
PHCC	Primary Health Care Center
PSBI	Possible Severe Bacterial Infection
RDS	Respiratory Distress Syndrome
SHP	Sub Health Post
SPSS	Statistical Package for Social Science
TWG	Technical Working Group
USA	United States of America
USAID	United States Agency for International Development
VDC	Village Development Committee
VHW	Village Health Worker
VLBW	Very Low Birth Weight
WHO	World Health Organization
WIRB	Western Institutional Review Board

Acknowledgements

It would not have been possible to complete this MINI-II final report without help and support from a wide group of people involved in various levels of this project.

Firstly we would like to thank all the people from the 65 VDCs of Morang who had trust in the MINI project and readily accepted the services provided through MINI. We would also like to thank VDC and DDC members for their continuous support to the FCHVs and the MINI project. We would also like to sincerely thank the 585 FCHVs of Morang who have worked day and night for the successful completion of this project although with so many others. We would also like to thank community health workers who willingly participated in the project and supported their FCHVs. We would also like to thank all those people whose photos are included in this report for providing oral consent to publish.

Our sincere thank goes to Public Health Administrator Mr Dinesh Kumar Chapagain, MINI focal person Mr Tek Raj Koirala, and all the other DPHO staff who were involved in the MINI project for their continuous support in implementation, monitoring and supervision of the program. Our special thanks to the District Technical Working Group in Morang for their valuable advice and support.

We would also like to thank the Central Technical Working Group/Kathmandu for their continuous support from the program development to implementation. We would also like to thank Dr Ranedra Prakash Bahadur Shrestha and Dr Prakash Sundar Shrestha for providing their expertise in evaluating verbal autopsies. We would also like to extend our thanks to government of Nepal, Child Health Division, Family Health Division, Ministry of Health and Population, and the Social Welfare Council for their ongoing support to the MINI program.

Our special thanks to Dr Robin Houston, MINI consultant for his endless support in MINI data management. We would also like to thank Dr Neena Khadka and Dr Penny Dawson, Principal Investigators of MINI for their continuous support and guidance.

Our special thanks to USAID and the Nepal Family Health Program for providing a home for MINI in the NFHP central office and proving support and funds for the expansion of MINI program to the entire district of Morang.

The successful completion of the MINI project would not have been possible without endless work and support by the MINI staff both at the central and district level. Therefore, we would like to extend our hearty thanks to all the MINI staff – past and present. We would also like to take this opportunity to thank Dr Jaganath Sharma, NFHP for his continuous support and MINI Monitoring and Documentation Officer, Mr Dinesh Neupane for analyzing and providing data required for this report. We would also like to thank all those people whose name are not mentioned here but are directly or indirectly involved with MINI project.

Lastly we would like to thank the Bill and Melinda Gates Foundation who provided the financial support for this project through the Saving Newborn Lives Initiative (SNL), implemented through Save the Children/US in Nepal.

Contents

Acronyms		**i**
Acknowledgements		**ii**
Contents		**iii**
List of Figure		**v**
List of Tables		**vi**
i.	**Executive Summary**	**1**
ii.	**Purpose**	**3**
iii.	**Background**	**3**
iv.	**Goal and Objectives**	**4**
v.	**Materials and methods**	**6**
vi.	**MINI Training**	**10**
vii.	**MINI Activities**	**13**
viii.	**MINI Monitoring and Supervision**	**14**
ix.	**DATA Collection**	**14**
x.	**Statistical analysis**	**16**
xi.	**Results**	**16**
xii.	**Trend in 21 VDCs of Morang from May 2005 to April 2009**	**17**
	1. Births, Deaths and Two-months Follow-up Status	*17*
	2. Low Birth Weight	*19*
	3. Infection among Young Infants	*20*
	4. Possible Severe Bacterial Infection (PSBI) Management	*22*
	5. Timing of Care-seeking and Management	*24*
	6. Knowledge of FCHVs and CHWs	*25*
	7. Caregiver's Knowledge and Practice	*27*
	8. Logistic Supply	*28*
xiii.	**Program Status in 65 VDCs from May 2007 to April 2009**	**29**
	1. Births, Deaths and Two-months Follow-up Status	*29*
	2. Low Birth Weight	*29*
	3. Infection among Young Infants	*30*
	4. Possible Severe Bacterial Infection Management	*31*
	5. Timing of Care-seeking and Management	*32*
	6. Knowledge of FCHVs and CHWs	*33*
	7. Caregiver's Knowledge and Practice	*34*
	8. Logistics Supply	*35*

xiv.	**Supervision Models**	**36**
	1. Impact of Supervision Model on FCHVs and CHWs Knowledge	*37*
	2. Impact of Supervision Model on Logistics Supply	*38*
	3. Impact of Supervision Model on Program Outcome	*39*
xv.	**Challenges in Hill VDCs**	**43**
	1. Births, Deaths and Two-months Follow-up Status	*43*
	2. Low Birth Weight	*44*
	3. Infection Management among Young Infants	*44*
	4. Timing of Care-seeking and Management	*45*
	5. Knowledge of FCHVs and CHWs	*46*
	6. Logistic Supply	*46*
xvi.	**Uniject Gentamicin Design Stage Study: An alternative solution**	**48**
xvii.	**Further Findings and Analyses**	**52**
	1. Seasonality of births	*52*
	2. Seasonality of deaths	*52*
	3. Age distribution of deaths	*53*
	4. Age distribution of PSBI	*53*
	5. PSBI seasonality	*54*
	6. PSBI signs distribution	*54*
	7. PSBI death pattern	*54*
	8. PSBI treated with Cotrimoxazole	*55*
	9. Verbal Autopsy	*55*
xviii.	**Sustainability**	**56**
	1. Involvement of DPHO and existing government staff	*56*
	2. Logistics supply	*56*
	3. FCHV support from the VDCs	*57*
	4. Change in care-seeking pattern	*58*
	5. Sustainability Workshop	*58*
	6. The CB-NCP Package	*59*
xix.	**Lessons Learned from Community-based Management of Neonatal Sepsis**	*60*
xx.	**Appendices**	*61*

List of Figure

Figure 1: *Nepal Map showing Morang District* 6
Figure 2: *Map of Morang District* 6
Figure 3: *Organogram of Sub Health Post* 7
Figure 4: *Female Community Health Volunteers* 7
Figure 5 : *DTWG meeting* 9
Figure 6: *Classification Card* 10
Figure 7: *Call form* 11
Figure 8: *Salter Scale* 12
Figure 9: *Dose of Gentamicin* 12
Figure 10: *Tools used in MINI* 12
Figure 11: *MINI Activities for all Babies* 13
Figure 12: *MINI Activities for Sick Babies* 13
Figure 13: *MINI Data Source* 14
Figure 14: *Flow of Information* 15
Figure 15: *Regular Data to MINI* 15
Figure 16: *FCHV learning weighing skill* 16
Figure 17: *Trend in Birth Capture Rate* 17
Figure 18: *Trend in Two-months Follow-up Status* 18
Figure 19: *Trend in Weight Taken within 3-days and Low Birth Weight* 19
Figure 20: *Trend in Percentage of Four Follow-up Visits by FCHVs to LBWs* 19
Figure 21: *Trend in LBI Prevalence by Type* 21
Figure 22: *Trend in PSBI Prevalence* 22
Figure 23: *Trend in First Place of Care-seeking* 23
Figure 24: *Trend in PSBI Treatment* 23
Figure 25: *Trend in Gentamicin Completion Rate* 24
Figure 26: *FCHVs, HF and District Supervisors after revew in Junta VDC* 26
Figure 27: *Trend in Caretaker ENC Practices* 27
Figure 28: *Senior Supervisors arrenging logistic Supplies* 28
Figure 29: *Status of Weight Taken, Low Birth Weight and Four Follow-up visits* 29
Figure 30: *PSBI Prevalence* 30
Figure 31: *First Place of Care-seeking for PSBI by Year* 31
Figure 32: *Status of care-seeking and management of PSBI* 32
Figure 33: *FCHV with her job aid* 33
Figure 34: *Caregiver's ENC Practices* 34
Figure 35: *VHW giving gentamicin injection* 35
Figure 36: *Impact of Supervision Model on Knowledge of FCHVs* 37
Figure 37: *Field Supervisors at work* 37
Figure 38: *Impact of Supervision Model on Two-month Follow-up* 39
Figure 39: *Impact of Supervision Model on PSBI Identification* 41
Figure 40: *VDC wise Distribution of Live Births and PSBI in 8 Hill VDCs* 43
Figure 41: *PSBI Treatment Status in Hill VDCs* 45
Figure 42: *Gentamicin in uniject device* 48
Figure 43: *Uniject activities for sick babies* 49
Figure 44: *FCHV giving gentamicin in uniject* 51
Figure 45: *Seasonality of births* 52
Figure 46: *Seasonality of deaths* 52
Figure 47: *Age distribution of deaths* 53
Figure 48: *Age (in days) at onset of PSBI in young infants* 53
Figure 49: *Seasonality of PSBI* 54
Figure 50: *Distribution of signs among PSBI deaths and PSBI episodes* 54
Figure 51: *Age at death among PSBI cases* 55
Figure 52: *Distribution of deaths among young infants according to VA* 55

List of Tables

Table 1: Major Findings from Baseline Survey (April 2005) 9
Table 2: MINI II Supervision Model 14
Table 3: Births, Deaths and 2-months Follow-up Status 18
Table 4: Weight Taken, Low Birth Weight and Follow-up Visits 20
Table 5: Local Bacterial Infection 21
Table 6: Infections among LBWs 22
Table 7: PSBI Management 24
Table 8: Timing of Care-seeking and PSBI Management 25
Table 9: FCHVs Knowledge on Danger signs, ENC and Correct Dose of Cotrimoxazole-P 25
Table 10: CHWs Knowledge on Danger signs, ENC and Correct Dose of Gentamicin 26
Table 11: Caretaker ENC Practices 27
Table 12: Trend in Stockout of Cotrimoxazole-P, Timer, Gentamicin and Syringes 28
Table 13: Status of Births, Deaths and Two-months follow-up 29
Table 14: Status of Local Bacterial Infections 30
Table 15: Infections among LBWs 31
Table 16: Status of PSBI Treatment 32
Table 17: Status of Knowledge on Danger signs, ENC, Correct Dose of Cotrimoxazole-P and Gentamicin 33
Table 18: Caregiver's Knowledge and Practice 34
Table 19: Status in Stockout of Cotrimoxazole-P, ARI timer, Gentamicin and Syringes 35
Table 20: MINI II Actual Supervision Model 36
Table 21: Knowledge on Danger signs, ENC, Gentamicin and Cotrimoxazole-P 38
Table 22: Impact of Supervision Model on Logistic Supply 39
Table 23: Impact of Supervision Model on Births, Follow-up and Deaths 40
Table 24: Impact of Supervision Model on Management of Low Birth Weight Babies 40
Table 25: Impact of Supervision Model on LBI Management 41
Table 26: Impact of Supervision Model on First Place of Care-seeking 42
Table 27: Impact of Supervision Model on PSBI Treatment 42
Table 28: Births, Deaths and Two-months follow-up Status in Hill VDCs 44
Table 29: Weight Taken, LBW and Four Follow-up Visits in Hill VDCs 44
Table 30: Status of Stockout in Hill VDCs 46
Table 31: Gentamicin in Uniject dosing regimen 50
Table 32: Live births, PSBI and episodes uniject gentamicin treatment 50
Table 33: Status of stock out in 65 VDCs during project period 57
Table 34: FCHV support provided by the VDCs 57

i. Executive Summary

The Morang Innovative Neonatal Intervention (MINI), a community-based project for management of neonatal infections, was implemented in Morang district of Nepal in 2 phases referred to as MINI-I and MINI-II. MINI-I was implemented from May 01, 2005 in 21 Village Development Committees (VDCs) and expanded to all 65 VDCs from January 01, 2007 as MINI-II. The objective of MINI-I was to examine whether existing community-based Female Community Health Volunteers (FCHVs) and the most peripheral government health workers could perform a set of activities that would result in improvement in the early identification and management of neonatal infection. The objectives of MINI-II were to define the most efficient model for scaling up community- based management of neonatal sepsis, to test & finalize a set of tools and materials that will be used by the Ministry of Health and Population (MoHP) for expansion of this model to additional districts and to monitor and document the challenges for the implementation of the MINI-I model in hill VDCs.

Approval was obtained from Western Institutional Review Board (WIRB), US and MoHP, Nepal to implement the project. The project was guided by two Technical Working Groups (TWG) at central and district level and provided input on the finalization of clinical algorithms, development of tools, and implementation of program, supervision and monitoring. Two separate manuals, one for FCHVs and one for other Village Health Workers (VHWs)/Maternal and Child Health Workers (MCHWs)/ Health Facility (HF) staff were developed along with a facilitator's training guide. Materials such as Information, Education & Communication (IEC) recording and reporting forms were developed in order to collect data from the community. Cascades of MINI specific- trainings were conducted for district supervisors, health facility staff and FCHVs. At the end of the training, FCHVs and Community Health Workers (CHWs) were provided with logistics (Salter scale, thermometer, cotrimoxazole-P, gentamicin, insulin syringes, gentian violet, tetracycline eye ointment, cotton, recording and reporting registers etc). All the logistics were supported by MINI and supplied through the District Public Health Office (DPHO), Morang on demand, to simulate the existing government system. Annual review meetings were conducted to reinforce FCHVs' skills and knowledge.

Oral consent was obtained before providing any services and recorded in the treatment register. The FCHVs were already in contact with mothers during early antenatal household contacts (to dispense iron/folate tablets) and counsel mothers on essential newborn care and danger signs of Possible Severe Bacterial Infections (PSBI). FCHVs were informed by the families regarding the birth. Upon notification of birth, they make an early post partum visit within 3 days to assess the baby, counsel, issue a birth record and measure weight. If they identify a newborn as very low birth weight, they immediately refer them to the nearest health facility and for low birth weight babies, they make weekly four follow-up visits. During these visits, they reassess the baby for danger signs, counsel on essential newborn care and refer when needed. If the baby is sick any time within two months, the FCHVs are notified by the families. FCHVs make a visit to the home of a sick young infant (0-59 days). They assess the young infant and classify them as having Local Bacterial Infection (LBI) or PSBI based on an algorithm using the classification card. If the young infant has LBI, they manage them by using topical antibiotics and for PSBI, they initiate treatment with oral cotrimoxazole-P and send a call form to the VHW/MCHW for gentamicin injection. The VHW/MCHW upon receiving the call form respond in a timely manner and give gentamicin injection for seven days. Then all sick young infants are followed up on the third day by the FCHVs to know their status and all the babies were followed at two-months to determine the status (dead/alive) of the baby.

MINI Field Supervisors collect the data from the field in a structured format designed specifically for this task and report to the MINI field office. All the data were entered and cleaned in the MINI MIS Software on a regular basis. The data collected by MINI Field Supervisors were checked by MINI senior supervisors to minimize the error and also 1:10 double entry data were checked by MIS software which rejects every double entry automatically. The data quality was also maintained using field verification of a random selection of records. Relevant statistical software was used for the data analysis and findings were regularly shared with the District Public Health Office for feedback.

This report includes data from May 01, 2005 to April 30, 2009. The data were analyzed to see the trend, supervisory effect, challenges of geographical location, sustainability and overall program status. During the entire project period 50,618 live births were recorded and 50,568 received two-months follow-up. Among them, 19,851 newborns were weighed within 3 days and 2,424 were identified as low birth weight and 2,061 received four follow-up visits by the FCHVs. There were 776 deaths within two months. A total of 3,614 PSBI episodes and 6,921 LBI episodes were identified. Among 3,614 PSBI episodes, 3,519 received cotrimoxazole-P tablets and 3,132 were given gentamicin injection. Among 3,132 who initiated treatment with gentamicin injection, 2,927 completed the full 7 doses of gentamicin. During the final year of the program in all 65 VDCs from May 01, 2008 to April 30, 2009, there was a 74% birth capture rate and 100% of them were followed up at the two months by the FCHVs. Forty-nine percent of them were weighed within 3 days and among them 11% were identified as low birth weight. Eighty percent of low birth weights received four follow-up visits. There was 7% PSBI prevalence and 14% LBI prevalence. Among PSBI episodes, 98% received cotrimoxazole-P tablets and 86% of them were given gentamicin injection. Upon initiation of gentamicin injection, 94% of them completed the full seven doses of gentamicin. There was 96% third day follow-up among all PSBI cases which were first seen by FCHVs. The overall knowledge of FCHVs and CHWs on program activities was good and 98% of FCHVs knew the correct dose of cotrimoxazole-P and 97% of CHWs knew the correct dose of gentamicin. There was less than 5% of stockout of any essential program commodities during the final year of the program.

The main objectives of MINI-I and MINI-II were met. FCHVs can follow an algorithm for classification of sick neonates, initiate treatment, and facilitate referral. MINI has also shown that VHW/MCHWs can provide gentamicin, with high treatment completion rates. This has resulted in increased rates of appropriate treatment, and likely contributed to reduction in neonatal deaths. The involvement of the DPHO and the community from the beginning of the program helped to facilitate early acceptance at the community-level and also helped to ensure future sustainability. The initial intensive program with extensive monitoring and supervision and then tapering of external supports as the program matured also helped in preparing for sustainability of the program within the existing government system. Reduced supervision had less impact on program indicators than expected and the trend in overall program performance appears to be stable. Community-based management of neonatal infections utilizing this implementation model is feasible in flat land settings like Morang district. Difficult geographical terrain in the hills and mountains needs a different strategy to bring care closer to the family. One of the alternative solutions could be using Gentamicin in Uniject.

ii. Purpose

The Morang Innovative Neonatal Intervention (MINI), JSI's community based project for the management of neonatal infections is designed to examine the practical feasibility of managing neonatal infections by improving the capacity of community-based workers to recognize and treat sick neonates. The project capitalizes on ongoing research projects currently testing the sensitivity and specificity of clinical algorithms, as well as the impact on neonatal mortality of implementing these algorithms. This project fills a gap by piloting an approach that can be replicated by the government, and subsequently scaled up as part of their evolving neonatal strategy.

iii. Background

According to the World Health Organization (WHO), nearly 4 million neonatal deaths occur each year around the world. Ninety-eight percent of these neonatal deaths occur in developing countries and a large proportion of these neonates die within the home without receiving medical care. As reported in the State of the World's Children, 2009, deaths of newborn account for over half of all deaths in infancy in many developing countries. Globally, the three main causes of newborn deaths are: severe infection, asphyxia and the consequences of low birth weight and prematurity. Newborns require rapid identification and immediate treatment after the onset of infections. However, most neonatal deaths due to infection occur at home without notification, making it difficult to identify and prevent these deaths. There is an urgent need for community-based management of newborn care to prevent these deaths in order to meet Millennium Development Goal (MDG) 4 by 2015.

According to the 2006 Nepal Demographic Health Survey (NDHS), the Neonatal Mortality Rate (NMR) in Nepal between 2001- 2005 was 33 deaths per 1000 live births. Among all infant deaths in Nepal, 69% occur during the first month of life. Thus one out of every 21 children in Nepal dies before reaching their first birthday, while one out of every 16 children does not survive to their fifth birthday. Data from the 2006 NDHS revealed that infant mortality has declined by 41 percent over the 15-year period preceding the survey, from 82 to 48 deaths per thousand live births. Under-five mortality has been reduced by 48%, from 117 deaths per 1000 live births to 61 per thousand live births. The corresponding declines in neonatal and post-neonatal mortality over the 15-year period were 33% and 55%, respectively, thus these rates remain high when compared to infant and under-five mortality rates. Neonatal deaths account for over 50% of under-five deaths in Nepal. Immediate action focused on newborn care is required to meet MDG 4 and reduce the under-five mortality rate by 2/3 by 2015. In response to this need, the Ministry of Health and Population (MoHP) of Nepal developed a National Neonatal Health Strategy in 2004 which encourages the testing of innovative programs to bring the treatment of neonatal sepsis to the household level. The MoHP has demonstrated their willingness to adopt and expand an efficient and tested model to other districts of Nepal.

Neonatal infection being one of the major causes of neonatal mortality, along with recently developed National Neonatal Health Strategy, MINI project was developed to address the persistent high neonatal mortality in Nepal and implemented in 2005. MINI was the first community-based programs to work entirely within the government health system and focus on community-based management of neonatal sepsis. MINI was implemented in 2 phases referred to here as MINI-I and MINI-II.

The MINI-I project was designed to demonstrate that Community Health Workers (CHWs) have the capacity to successfully assess sick young infants from their communities, using a simple algorithm. It was designed to address the young infants (0-59 days old) because, the Community–Based Integrated Management of Childhood Illness (CB-IMCI) program was already addressing infants from 2 months old to under-five years old children. There was a gap of 0-59 days old young infants and MINI tried to fulfill this gap. The intervention was carried out in 21 VDCs in the Morang district, revealed that 14% of young infants and 11% of neonates in rural Morang experienced an episode of Possible Severe Bacterial Infection (PSBI) and 23% of young infants (0-59 days) had a Local Bacterial Infection (LBI).If any sign of PSBI is present, Female Community Health Volunteers (FCHVs) initiate treatment with oral antibiotic (Cotrimoxazole-P tablet) and facilitate referral to higher level health workers (Village Health Worker(VHW)/Maternal and Child Health Worker(MCHW)/Health Facility Incharge(HI)) for gentamicin injection. Of the episodes of PSBI for which treatment with gentamicin was initiated, 91% received a full course of treatment. Based on the experiences of MINI-I, the MINI-II project was initiated in January 2007 to work within the currently permissive government policy on infection management of newborns, and to provide the MoHP with an efficient and tested model ready for expansion throughout the country.

iv. Goal and Objectives

Goal

To address the persistent high neonatal mortality in Nepal.

Objectives

MINI-I

- To examine whether existing community-based Female Community Health Volunteers and the most peripheral Community Health Workers (Village Health Worker, Maternal and Child Health Worker, and Health Facility In-charge) of the MoHP could perform a set of activities that would result in improvement in the early identification and management of neonatal infection.

MINI-II

- To define the most efficient model for scaling up community- based management of neonatal sepsis and determine the effect on community health worker performance and program coverage with decreased external supervision and support such as documenting the effect on quality of care, motivation, provision of essential supplies, reporting and recording, and coverage rates.
- To test and finalize a set of tools and materials that will be used by the MoHP for expansion of this model to additional districts.
- To provide technical expertise and catalyze the integration of community-based treatment of neonatal sepsis into the CB-IMCI program of the MoHP and provide support for replication of the modified MINI model in 1-2 new districts (utilizing other donor funds).
- To monitor and document the challenges for implementation of the MINI-1 model in hill VDCs, where transportation by bicycle or vehicle is either limited or non-existent, and to define viable alternatives for appropriate management of neonatal infections at the community-level in this setting.

The first phase of the project (MINI-I) was designed to determine whether Female Community Health Volunteers (FCHVs) could assist with the education of families in recognizing sick neonates, and whether FCHVs can follow a simple clinical algorithm, provide initial treatment and facilitate ongoing treatment by health facility-based community health workers (MCHWs, VHWs, AHWs, ANMs) who are trained to give injections. The project monitored activities closely to determine if the interventions resulted in an improvement in the proportion of expected neonatal infections that receive adequate treatment. MINI used the existing government infrastructure and followed the guidelines of National Neonatal Health Strategy to implement the project.

The second phase of the project (MINI-II) was designed to address several research questions.

Primary Research Question

- What is the minimum, effective supervisory support required to maintain the quality of community-based management of neonatal sepsis, the performance of community health workers and program coverage?

Secondary Research Questions

- What is the effect of limiting external supervisory support to the MINI-I model to that which can be provided through regular MoHP programs, such as the Community-Based Integrated Management of Childhood Illnesses (CB-IMCI)?
- What tools and materials must be incorporated into the existing CB-IMCI program to allow effective CB management of neonatal sepsis?
- What are the limitations and challenges of replicating the MINI-I model in the hill and mountain districts of Nepal? Which model is most likely to work best in these settings?

V. Materials and methods

Program setting

Nepal is a low income country of 28 million people, 78% of whom live on less than 2 US dollars a day and 86% of whom live in rural, and often remote, areas. Nepal is divided into 5 regions with 75 districts. The MINI project began in the Morang, a large district in the Terai (Flatland) region situated in south-eastern Nepal in 2005.

Nepal Map

Figure 1: *Nepal Map showing Morang District*

Morang is a large district (1,855 sq. kms), and is the second most populous district in Nepal after Kathmandu, the capital city. Morang district is divided into 65 Village Development Committees (VDCs) and one municipality. VDCs are administrative and political units which are further divided into 9 subunits called wards. The estimated total population of Morang in 2008 was 999,346, with an average household size of 6, and 80% of the population resides in rural areas. The per capita income in Morang is USD 297, and the overall literacy rate is 66%. Morang has two hospitals, seven primary health care centers, 10 health posts, and 49 sub-health posts under the government health care delivery system.

Figure 2: *Map of Morang District*

Morang Profile

Total Population	999346
Under 5 year population	107594
Under 1 year population	25660
MWRA population	209941
Expected pregnancy	30003
Total Health Facility	68
Hospital	2
PHCC	7
HP	10
SHP	49
Health Facility Based Staff	144
VHW/MCHW	155

Source: District Public Health Office Morang, 2008

The sub-health post is staffed by Village Health Worker (VHW), Maternal and Child Health Worker (MCHW) and Health Post Incharge (HI), who are the most peripheral paid government employees. Similarly, Health Post is staffed by Health Assistant /Sr AHW, AHW and ANM.

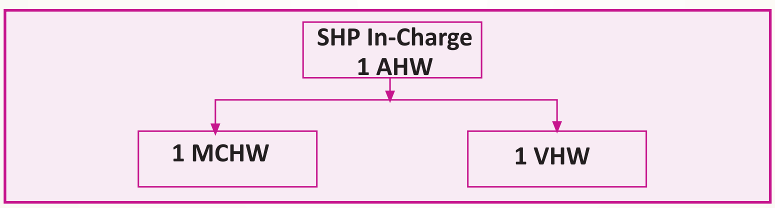


Figure 3: *Organogram of Sub Health Post*

Figure 4 : *Female Community Health Volunteers*

The minimum education required for AHWs and ANMs is grade 10. AHWs receive 15 months training and Sr AHWs receive additional 6 months in-service training. Similarly, ANMs receive 18 months trainings and are mostly responsible for maternal and child health program. The VHWs and MCHWs have minimum education of grade 8 and they receive three months in-service training which includes injection skills, routine management of out-reach clinics, family planning, immunization and other health promotional activities. In addition, there are 585 FCHVs (1 FCHV per ward) who are volunteers and worked as an extension of the government health system. FCHVs are local, married women, with limited educational background. They initially receive 18 days of basic health training, followed by periodic refresher and program specific training. These FCHVs were trained through the CB-IMCI program to diagnose and treat pneumonia amongst children between 2 months to 5 years of age. Under this program, they were trained to assess sick children, measure the respiratory rate using an ARI timer, record fever, and diagnose and treat pneumonia cases with oral antibiotics (cotrimoxazole-P tablet). FCHVs referred severely ill children and newborns less than 2 months of age to the nearest health facility. Prior to MINI, FCHVs had been established as a health promoters and service providers within the community. However, a gap existed in their service, which MINI tried to fill in this through training and service provision to prevent young infant (0-2 months) infections.

Method

MINI was designed as a pilot project to be implemented initially in 21 VDCs of Morang district. After 18 months of implementation in 21 VDCs, the intervention was expanded to cover all 65 VDCs of Morang as a result of great demand from the DPHO and the community. During the initial phase of the program, 21 VDCs were designated as intervention areas and the other 36 VDCs (excluding 8 hill VDCs) were designated non-intervention areas. In the second phase of the intervention, the FCHVs training was completed in December 2006 and implementation was expanded to all 65 VDCS of the Morang district.

The MINI project was conducted in full accordance with ethical principles. The MoHP of Nepal approved the intervention, and ethical approval to conduct this project was obtained from the Western Institutional Review Board (WIRB) in the U.S.A. Renewal of WIRB was obtained on a yearly basis. Informed, oral consent was obtained from the parents or the legal guardian of the young infant before any services were provided under the MINI project.

The overall MINI project was guided by the two Technical Working Groups (TWG). (see appendix A). The central TWG at Kathmandu and District TWG at Biratnagar, the district center of Morang, provided input on the finalization of the clinical algorithm to be used by FCHVs to diagnose Possible Severe Bacterial Infection (PSBI). The TWG also supported the development of the MINI materials and tools. Periodic meetings were conducted amongst TWGs, both at the central and district level, to share project progress and discuss any changes or modifications. These TWG meetings provided an opportunity to share ideas and receive expert advice in order to further improve the MINI project.

A baseline survey was conducted prior to program implementation on April 2005. The 20x30 cluster household survey was conducted using a structured questionnaire in both intervention and non- intervention VDCs. The survey was conducted in order to document current knowledge, attitudes, and practices related to birth preparedness, delivery, and newborn care. Health facility registers were also reviewed to highlight information related to newborn case management, patient load, and recorded results. Health workers were interviewed to document current knowledge of risk factors and danger signs for newborns as well as the appropriate management of newborn infections. The data from the baseline survey was already reported in Baseline Survey Report on Neonatal Health in Morang District Nepal.

Table 1 : Major findings from Baseline Survey (April 2005)

	Intervention	Non-intervention
General Findings		
Neonatal Mortality Rate	24	37
% of sick young infants coming to HF	*5 %	6 %
Knowledge of Community Health Workers		
% of CHWs who knew correct dose of cotrimoxazole	1%(N=220)	3%(N=372)
% of CHWs who knew all 5 ENC messages	0%(N=220)	0%(N=372)
Practice of Caretaker		
% applying nothing to cord at last delivery	47%(N=624)	38%(N=619)
% breastfeeding within 1 hour at last delivery	29%(N=624)	25%(N=619)
% of mothers with infant <1 year knowing at least 2 neonatal danger signs	77%(N=619)	80%(N=619)

** Source: Health Facility Record Review*

Figure 5 : *DTWG meeting*

vi. MINI Training

Training materials were developed with support from the TWG, Nepal Family Health Program (NFHP), and other expert in the field of child health. Two sets of training manuals were developed for use in MINI-specific training. The earlier CB-IMCI training manuals were referred to while developing MINI training manuals. Two separate manuals, one for FCHVs and one for other VHW/MCHW/ HF staff, were developed, along with a facilitator's training guide. These have been printed separately in English and Nepali for dissemination. Materials, such as Information, Education & Communication (IEC), recording and reporting forms, were developed in order to collect data from the community. A classification card was developed as a job aid to facilitate the FCHV's assessment of the sick young infant and diagnoses of PSBI.

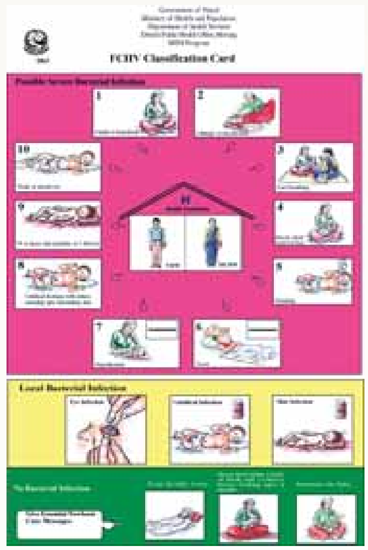


Figure 6 : *Classification Card*

After completion of the training, FCHVs were provided with a classification card. The classification card is a pictorial form that takes into account the educational level of FCHVs, contains the ten danger signs of PSBI, signs of LBI, ENC messages, and instruction on how to provide treatment. FCHVs were trained to always use classification card while assessing and treating sick young infants.

The CB-IMCI training video for breastfeeding and a MINI training video were both utilized for MINI training. Annual review meetings were conducted to reinforce FCHVs' skills and knowledge, and a series of MINI- specific trainings were conducted. FCHVs received a 5 -day training, while other health workers (VHW/MCHW/HF staff) received a 4-day training. Initially, training was conducted only in 21 VDCs, and the project was implemented from May 2005. At the request of the DPHO, with the support from USAID (United States Agency for International Development) through NFHP, subsequent training began in the other 44 VDCs, and was completed in December 2006.

Since January 2007, the MINI project has been implemented in all 65 VDCs of Morang. MINI staff, with support from the DPHO, conducted training for district, health facility, and community health workers, as well as FCHVs. As many FCHVs were illiterate or semi- literate (30%), the pictorial training manual was used in their training. FCHVs had already been trained in counting respiratory rates using an ARI timer, and other basic assessments of sick children through the ARI program and CB-IMCI program, thus in the MINI training, they were trained in measuring temperature using a thermometer. A flat mercury thermometer was used for this purpose, and was marked with two red bars to differentiate between fever and hypothermia. FCHVs were also trained in weighing newborns using the Salter scale-which was also color coded for easy assessment. Green, yellow and red colors indicated normal, low birth weight and very low birth weight, respectively on the Salter scale. FCHVs were trained to make four follow-up visits to newborns identified as low birth weight, and were instructed to immediately refer very low birth weight newborns to the nearest health facility.

Prior to MINI, FCHVs were providing cotrimoxazole pediatric tablets to children older than 2 months. MINI training provided FCHVs with the necessary skills to administer cotrimoxazole-P tablets to sick young infants according to the age of the baby. They were trained to administer ½ tablets BD for 5 days to newborns less than one month old, and 1 tablet BD for newborns between 1 and 2 months of age. FCHVs were also trained to fill out a call form, referring sick young infants to the local VHW/MCHW in order to receive a gentamicin injection. The call form, also a pictorial form, utilized by FCHVs, is an important link between FCHVs and the facility-based health workers.

Figure 7: *Call Form*

When FCHVs identify a case of PSBI, they initiate treatment with oral cotrimoxazole-P and complete a call form, by circling the signs present in the sick young infant. Upon receiving call form, the facility-based health workers respond in a timely fashion and initiate treatment with gentamicin injection. FCHVs were trained to identify and treat Local Bacterial Infections (eye, cord, and skin) with tetracycline ointment for eye infection and gentian violet for cord and skin infection. They were instructed to conduct a follow-up visit on the third day to all sick young infants in order to assess their condition and refer immediately if the condition had worsened. They were also asked to record all the births in the community and follow-up at two months to record their status (dead/alive).

VHWs, MCHWs, and HF Incharges received 4 days of training. This group of health workers had already been trained in injection skills. MINI training further enhanced their skills by providing instructions in the administration of gentamicin injections. The doses of the gentamicin injection was determined by the weight of the sick young infant. Young infants weighing more than 2.5 kg received 15 mg IM once daily for 7 days and those weighing less than 2.5 kg received 10 mg IM once daily for 7 days. Health workers were trained in reading and responding to

FCHV call form, and instructed to respond in a timely manner, and supervise FCHVs when and where needed. Health workers were also asked to record all the services they provided in a register and to assess and manage cases presented directly to them sans FCHV referral.

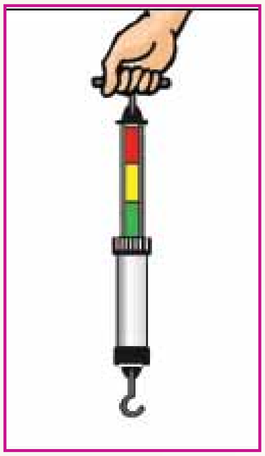


Figure 8 : *Salter Scale*

Dose of gentamicin

Which drug?	**Gentamicin (2 ml in 80 mg)**
How much Upto 2.5 kg Above 2.5 kg	 10 miligram or 10 units of Insulin syringe 15 miligram or 15 units of Insulin syringe
How many in a day	1 Time
How much days	7 days
Where	Upper outer quadriant of anterior thigh

Insulin syringe has 1 unit equal to 1 miligram Gentamicin. 10 mg means 10 units and 15 mg means 15 units.

Figure 9 : *Dose of Gentamicin*

After completing training, FCHVs were provided with logistic supplies (Salter scale, ARI timer, thermometer, cotrimoxazole-P tablets, gentian violet, cotton, tetracycline eye ointment, birth record form, treatment register form, call form, etc.). Similarly, HF staff were also provided with basic supplies. All the logistic supplies were supported by MINI, and supplied through the DPHO, on demand to simulate the existing government system.

Figure 10 : *Tools used in MINI*

vii. MINI Activities

MINI Activities: for all babies

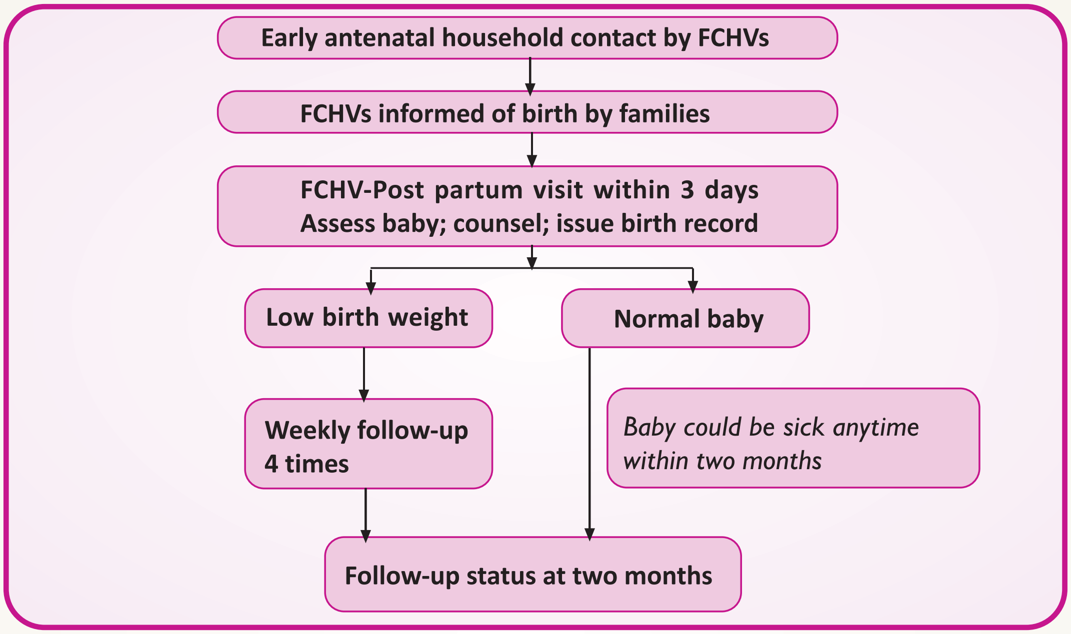


Figure 11 : *MINI Activities for all Babies*

MINI Activities: for sick babies

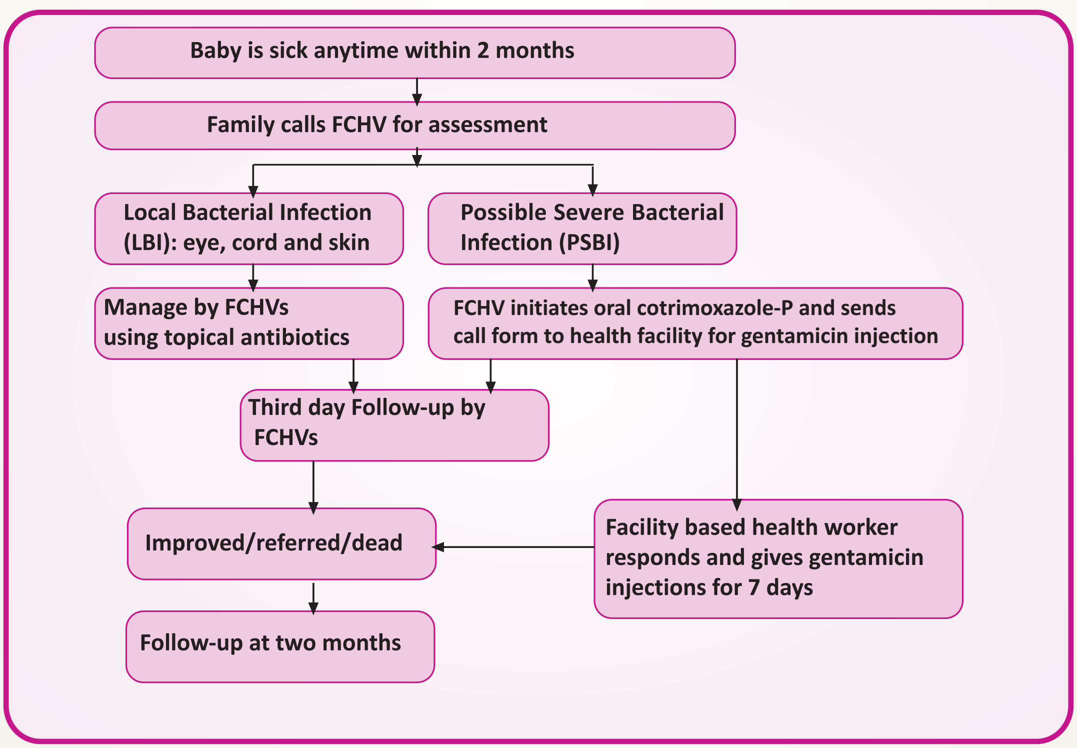


Figure 12 : *MINI Activities for Sick Babies*

viii. MINI Monitoring and Supervision

Extensive supervision and monitoring was provided by MINI Field Supervisors, and regular supervision was also conducted by DPHO staff, as per their schedule. The MINI field staff and DPHO staff supervised the community-based health workers to reinforce their skills, and solve any problems if detected, as well as to collect data. Initially, extensive supervision was conducted by MINI in 21 VDCs by 5 supervisors. After full project implementation in the 65 VDCs of Morang, supervision was decreased. In MINI II, decreasing supervision models were examined to determine the effects of supervision as the program matured, as well as to provide a model to the government of Nepal, for the future implementation of a similar program in other districts.

Table 2 : MINI II Supervision Model

	Model 1 (Oct 07-Jun 08)	Model 2 (Jul 08-Feb 09)	Model 3 (Mar 09-Apr 09)
21 VDCs	5 (1 FS: 38 FCHVs)	2 (1 FS: 95 FCHVs)	2 (1 FS: 293 FCHVs)
36 VDCs	2 (1 FS: 162 FCHVs)	2 (1 FS: 162 FCHVs)	
8 VDCs (Hills)	1 (1 FS: 72 FCHVs)	1 (1 FS: 72 FCHVs)	

ix. DATA Collection

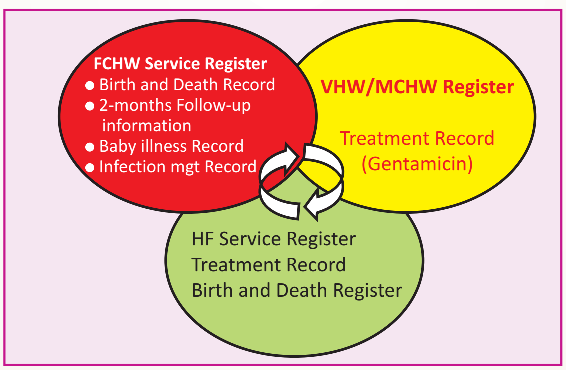


Figure 13 : *MINI Data Source*

MINI Data Sources

MINI has a strong data collection process. MINI Field Supervisors collect data from the field, and report to the MINI Monitoring and Documentation Officer in the Biratnagar field office. All data was entered, cleaned and analyzed at MINI office, Biratnagar. Regular feedback was provided to the DPHO through monthly meetings. Regular data sources consists of FCHV registers, VHW/MCHW registers, and the Health Facility registers. In addition to these registers, other specific forms such as Form A, B, D, and E were used to compile the information collected, as well as to collect other in-depth information such as ethnicity, place of treatment etc. In addition, MINI has also designed other forms, such as a community events recording form, a Health Facility staff interview form, a community health worker (FCHV, VHW, MCHW) interview form, a caretaker interview form, a MINI field supervision and technical support visit checklist etc. Information from these forms were also collected by MINI Field Supervisors and reported to the MINI MIS on a regular basis.

MINI Data Flow

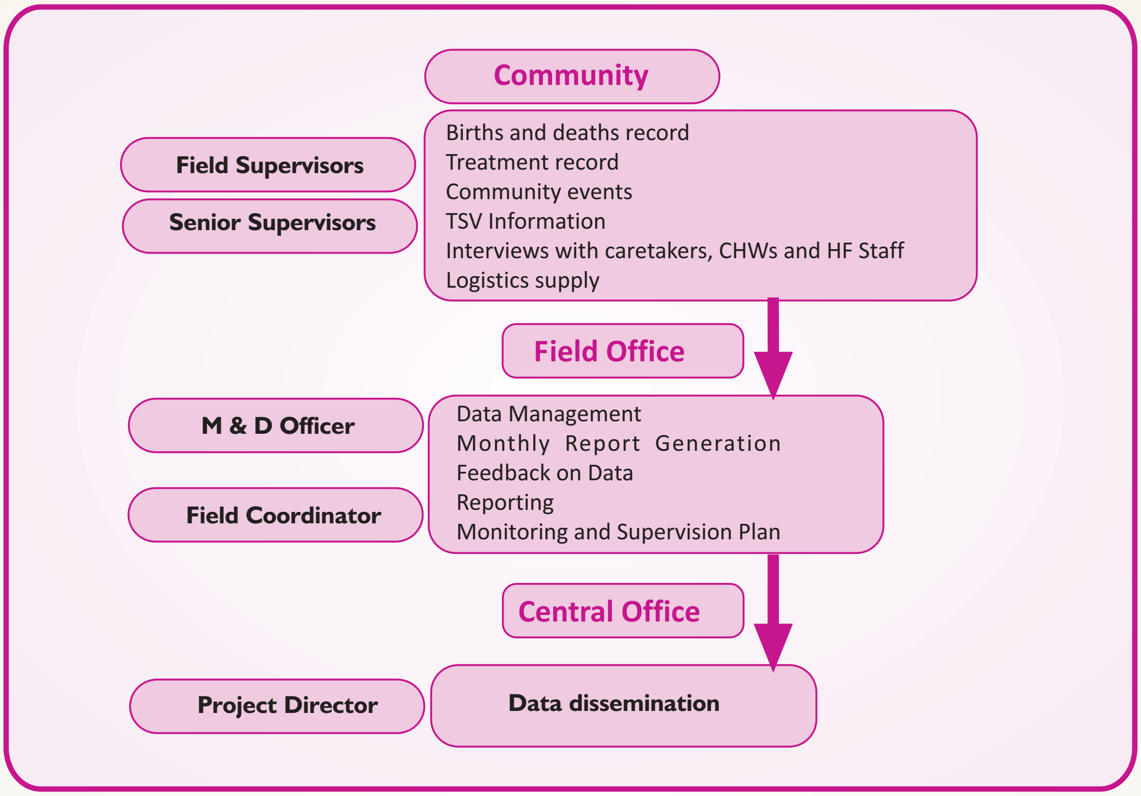


Figure 14 : *Flow of Information*

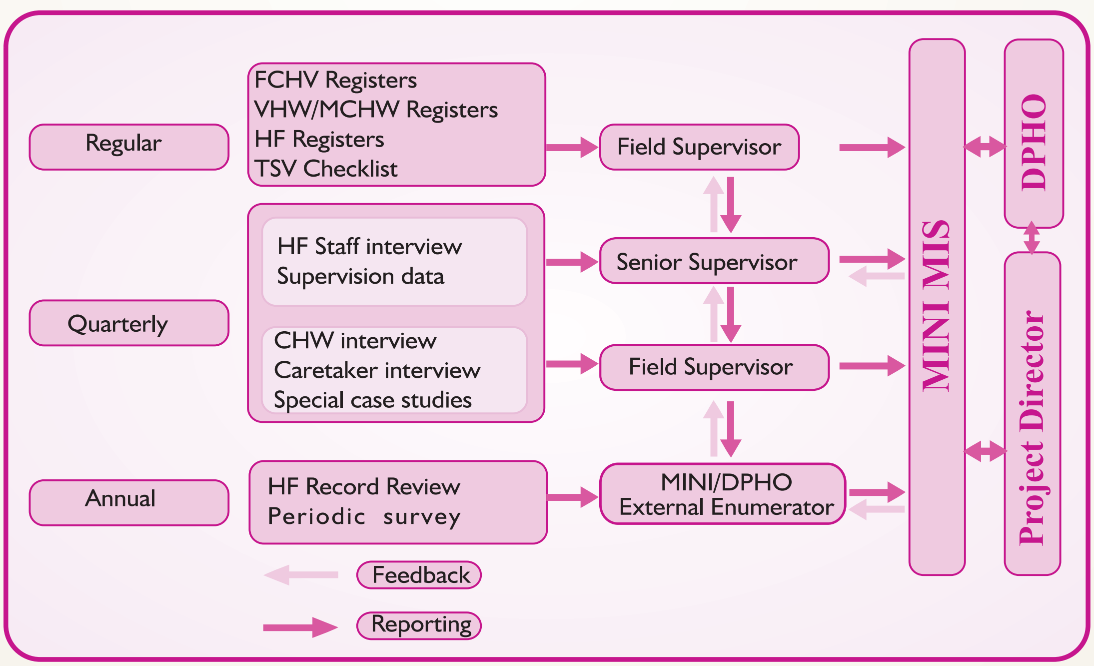


Figure 15 : *Regular Data to MINI*

x. Statistical Analysis

MINI has a robust monitoring database system. FCHVs and Facility- based-Community Health Workers (FB-CHWs) used registers specifically developed to record all data related to the MINI intervention. Specific forms were designed to collect the information from the FCHV and CHW registers, and this data was consolidated by MINI supervisors. The forms were reviewed, and data was entered into the MINI database and cleaned. Data quality was maintained using field verification of a random selection of records and a 1:10 double entry data check. Data analysis was done using SPSS 15.0 for Windows, as well as other relevant statistical software.

xi. Results

MINI was initially designed to be implemented in 21 VDCs of Morang district. However, due to the successful outcome as well as demand of the local DPHO/Government and the community, MINI was expanded to include all 65 VDCs of the district- including 8 hill VDCs. Hill VDCs are difficult to reach, as well as different in every aspect- such as physical access to health care services as compared to flat land VDCs. MINI-I began in May 2005 and MINI- II was initiated in January 2007. Therefore, the initial 21 VDCs were considered intervention and other 36 VDCs as non-intervention areas for the first 20 months only. The 8 hill VDCs were not initially included due to political instability in those areas, and municipalities were also excluded due to the program's focused nature on community-based interventions in more rural communities where access to care is difficult. The initial results from the MINI intervention and non-intervention areas were reported in the MINI–I final report.

Since MINI had different phases, the results will also be produced in various ways. The initial 21 VDCs have the longest mature data set, therefore the data from only those 21 VDCs will be analyzed to determine the maturation and trend of the program and its effects. Data will also be analyzed to see the effects of various supervision models, geographical locations and program effects, and overall program results in 65 VDCs of Morang. This report includes data from May 1, 2005 to April 30, 2009.

Figure 16 : *FCHV learning weighing skill*

xii. Trend in 21 VDCs of Morang from May 2005 to April 2009

1. Births, Deaths and Two-months Follow-up Status

Figure 17 shows the trend of birth capture rate. The birth capture rate by FCHVs remained constant, except in the third year. In first two years there was almost 75% birth capture rate, which decreased to 69% in the third year, and subsequently increased to 73% in the final year. This slight reduction in the birth capture rate during third year of the project could be due to the political conflict targeted to the flat land areas (Terai) of the country. This Terai movement has resulted in closing of health facilities and even hinders the FCHVs movement within the communities. During that period, even MINI field supervisors could not move to the communities and also supervise FCHVs and other CHWs.

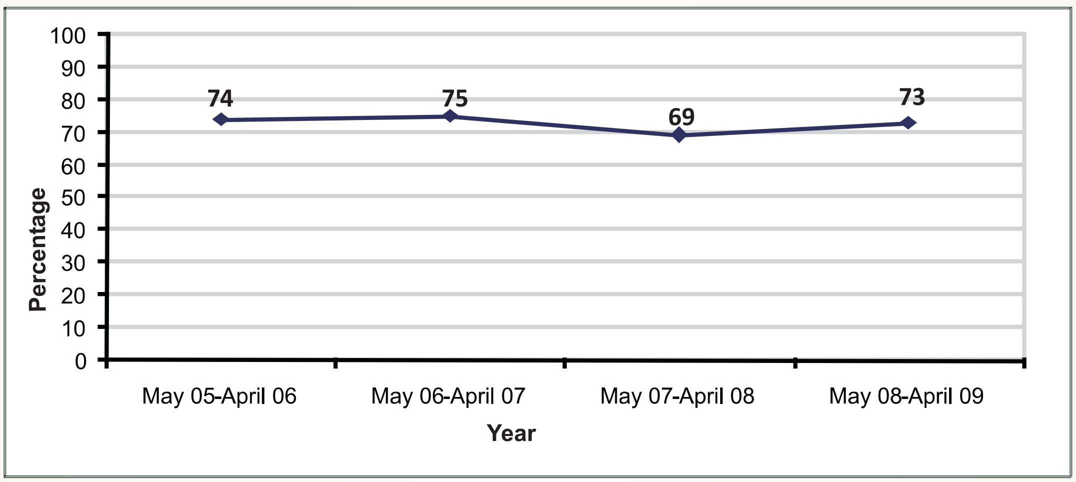


Figure 17 : *Trend in Birth Capture Rate*

Calculation of Birth Capture Rate

The estimated birth capture rate projected by government figures were based on last census (2001) and likely overestimated. Therefore, the BCG data collection was done to find a more accurate way to determine the birth coverage rate and ruled out the missing birth. According to NDHS 2006, the BCG coverage in eastern Terai region was 95%. By applying this five percent correction factor, MINI calculated 77% birth capture rate for one fiscal year. Therefore this correction factor (0.763) has been applied for each year to adjust the projected estimation.

Suppose,

Estimated Live Births: Y numbers (Given by government)
Correction Factor: 0.763 (By MINI BCG data collection and NDHS survey)
Adjusted Live Births: 0.763 x Y numbers
Actual Birth Captured by MINI: Z

$$\textbf{Adjusted Birth Capture rate: } \frac{\text{Actual Birth Captured (Z)}}{\text{Adjusted Live Births (0.763x Y)}} \times 100\ \%$$

Table 3 : Births, Deaths and 2-months Follow-up Status

	May 05-April 06		May 06-April 07		May 07- April 08		May 08- April 09	
	Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*
Total expected births	8036		6787		7338		6807	
Total live births	5947	74	5090	75	5063	69	4969	73
2 months follow up	5947	100	5089	100	5062	100	4931	99
Total deaths	124		63		68		70	
Deaths within 7days	93		39		45		43	
Deaths within 28 days	114		53		58		65	
Estimated NMR	19		10		11		13	

Table 3 demonstrates that the Neonatal Mortality Rate (NMR) during the first year of the program was 19 per 1000 live births among the MINI cohort of births and decreased to 10 per 1000 live births in the second year. The third and fourth years showed some fluctuation. MINI's focus on sepsis management could be one of the major contributing factors for improvement in NMR. However, other various factors, such as an improvement in ENC practices, or the similar nature of the program from Safer Motherhood and other agencies, and sepsis management as a MINI's focus could be the contributing factors for the reduction of deaths from first year to following years. This figure also demonstrates that a large percentage of deaths occurred within the first week of life, followed by the percentage of deaths which occurred within 28 days.

At the end of two months, all young infants within the MINI program area were followed up to record their status. There was 100% follow-up at the end of two months during the first three years, and 99% follow-up in the final year.

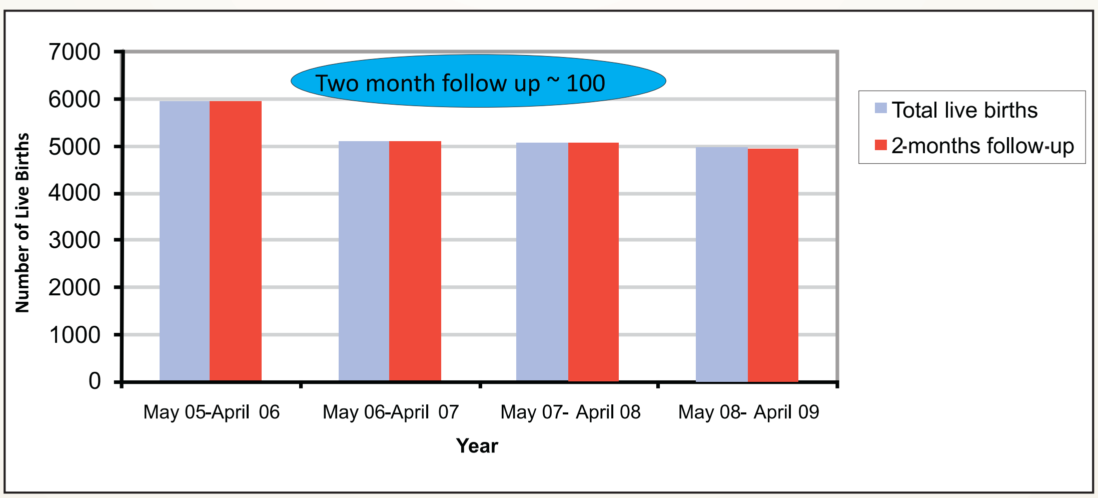


Figure 18 : *Trend in Two-months Follow-up Status*

2. Low Birth Weight

According to the program model, it was intended for FCHVs to visit the home of a newborn upon notification of the birth, in order to assess and weigh the baby, as well as well as issue the birth record. Most of the young infants were weighed, and approximately 50% were weighed within 3 days of birth. The trend of weighing within 3 days was nearly constant reaching 54% in the first year, and 51%, 50% and 48% in the following years, respectively. These results are substantial, given the program's passive case detection nature, as well as the FCHVs' volunteer status. During these visits, FCHVs identified babies with Low Birth Weights (LBW). Sixteen percent of births were LBWs in the first year of the project, and the label was reduced to 12 % in the second and third year, and further reduced to 10% in the final year.

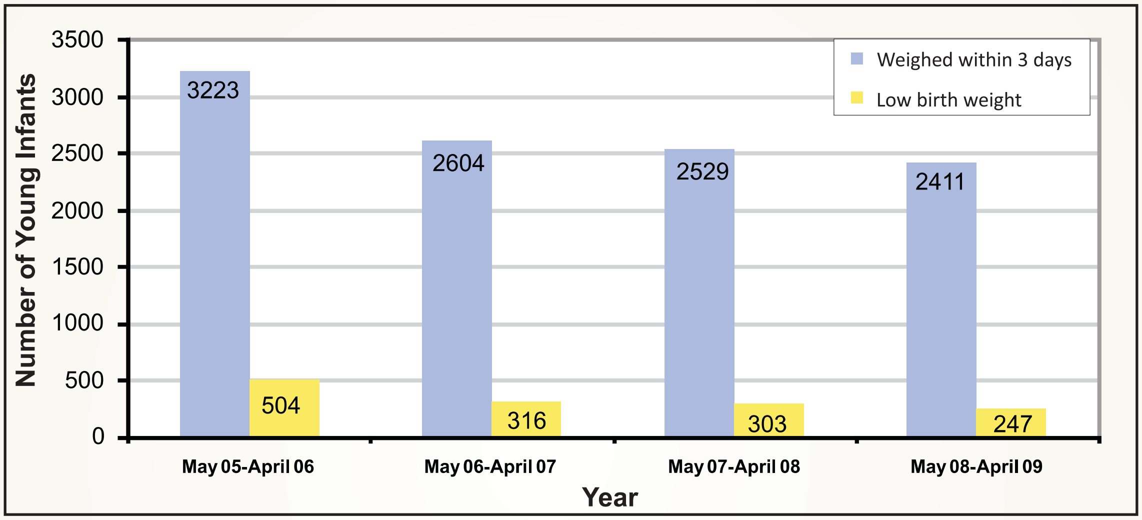


Figure 19: *Trend in Weight Taken within 3-days and Low Birth Weight*

Once the FCHVs identify babies with Very Low Birth Weight (VLBW), they immediately refer them to the nearest health facility and for LBWs they make four follow-up visits within one month to support the parents in the management of their LBW newborn. During these visits, they reassess the baby for 10 danger signs, counsel on essential newborn care messages-frequent and exclusive breast feeding, keeping baby warm etc. and refer LBWs when needed. After identifying LBW, 80-90% of the babies received four follow-up visits in all four years.

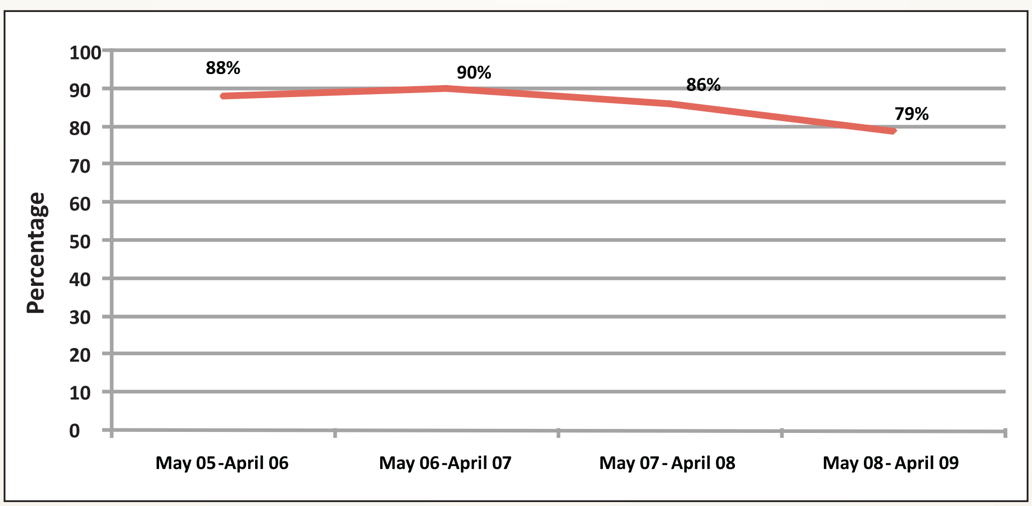


Figure 20 : *Trend in Percentage of Four Follow-up Visits by FHCVs to LBWs*

Deaths among LBWs were greater than the deaths among non-LBWs babies. Deaths among LBWs were 8% in the first 2 years, and reduced to 6% and 4% in the following years whereas the deaths among all babies were 2% in the first year and reduced to 1% in the following years. This mortality reduction amongst LBWs, could be due to the four follow-up visits provided by the FCHVs. Normally, the FCHVs provide support, counseling on ENC and danger signs during these visits and refer the cases when needed. These follow-up visits could be an opportunity for rapid identification of infections among LBWs and immediate treatment and referral.

Table 4 : Weigh Taken, Low Birth Weight and Follow-up Visits

	May 05-April 06		May 06-April 07		May 07- April 08		May 08- April 09	
	Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*
Total weight taken	5930		5075		5036		4919	
Weighed within 3 days	3223	54	2604	51	2529	50	2411	49
4 follow-up visits	444	88	283	90	260	86	196	79
1-3 visits	18		8		3		5	
0 visit	42	8	21	7	24	8	37	15
Refer			4		16		9	
Deaths	43	8	25	8	18	6	10	4

3. Infection among Young Infant

The community-based management of sepsis was the main focus of the MINI project. The FCHVs, upon notification by the family regarding the sick young infant, make home visits, and assess and identify sick young infants. The sick young infants were classified as LBI and PSBI, according to signs presented. Community health workers also identified and managed both LBI and PSBI if they were directly presented with them.

i- Local Bacterial Infection (LBI)

Eye infection, cord infection limited to the umbilical cord and not spreading towards skin, and the skin infection with pustules less than 10 indicate LBI. There was a constant reduction of LBI from 23% in the first year to 14% in the final year. Among the types of LBI, the cord infection was constantly the most common throughout the four year period. Despite awareness, changes in ENC practices and improvement in the practice of applying nothing to the cord, cord infection remained constant. However, the practices of using old cloths to wrap the baby, unhygienic condition and even when these wrapping cloths were washed, water is polluted and dried in the contaminated surfaces could be indirect contributing factors for this infection than direct cause of applying something to the cord.

Table 5: Local Bacterial Infection

	May 05-April 06		May 06-April 07		May 07- April 08		May 08- April 09	
	Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*
Total episodes of LBI	1394	23	963	19	890	18	700	14
Eye infection of all LBI	519	37	343	36	372	42	282	40
Cord Infection of all LBI	859	62	672	70	548	62	475	68
Skin Infection of all LBI	217	16	110	11	106	12	76	11

Among all LBI, cord infection had the highest prevalence rate, followed by eye infection. Figure 21 shows a decreasing trend of cord and eye infection. However, the trend of skin infection decreased in first year, and then remained constant in the following years.

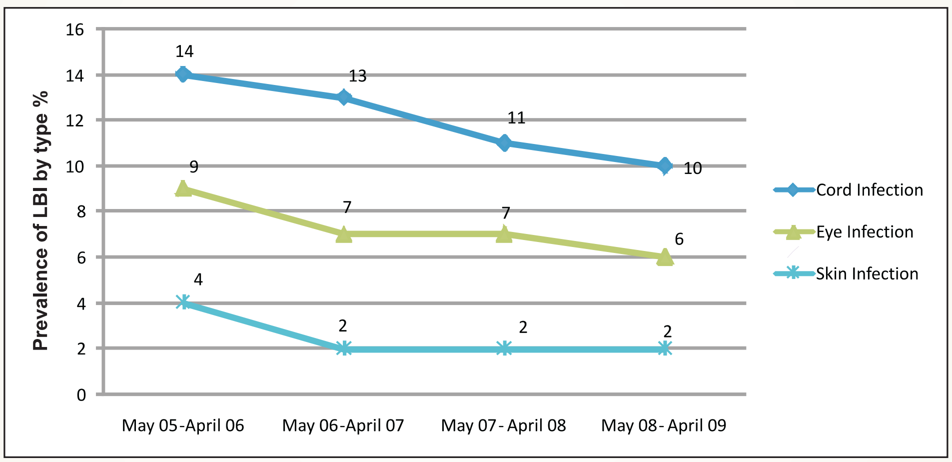


Figure 21: *Trend in LBI Prevalence by Type*

ii- Possible Severe Bacterial Infection (PSBI)

The FCHVs in MINI project used an algorithm to identify the cases of Possible Severe Bacterial Infection (PSBI). The algorithm consisted of 10 danger signs: unable to feed, unconscious or lethargic, respiratory rate more than 60 per minutes, chest indrawing, grunting, fever- axillary temperature of more than 37.5$^{\mathrm{O}}$ C, hypothermia-axillary temperature of less than 35.5$^{\mathrm{O}}$ C, redness around umbilicus, more than 10 skin pustules or one big abscess, and weak cry. A young infant was considered to have PSBI if one or more of the above mentioned danger signs were present. FCHVs utilized the MINI classification card, which depicted these signs pictorially to assess and identify PSBI cases. A reduction was observed in the prevalence of PSBI episodes over the 4 year period, from 16% in the first year to 9% in the final year. There was a gradual annual reduction in PSBI, from 16% (n=932) to 12% (n=596), 11% (n=545) and 9% (n=465, respectively. There are a number of possible explanations for this. The higher prevalence of PSBI during the first year could be due to the newness of the program and intensive supervision and monitoring, as well as over enthusiastic service providers. In the field, MINI also supported activation of regular Mothers' Group Meetings and the promotion of essential new born care messages through FCHVs, both of which could be contributing factors for the rapid reduction of PSBI cases from first year to second year.

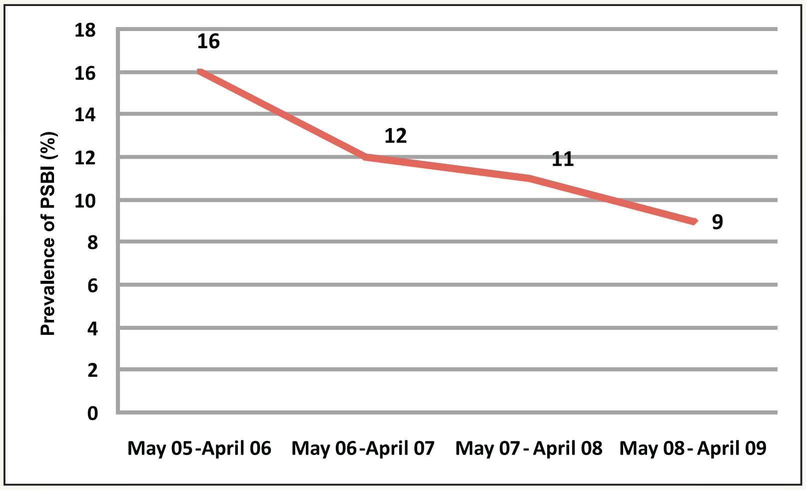


Figure 22: *Trend in PSBI Prevalence*

iii- Infection among LBWs

Infections were common among LBWs. Overall, the PSBI rate among newborns was 16% compared to 18% among LBWs, in the first year. Similarly, the PSBI rate was consistently higher amongst LBWs than amongst newborns in subsequent years. There was a decreasing trend of LBI among all newborns, but LBI among LBWs remained constant except in the final year (see Table 6). The mortality rate of 8% among LBWs with PSBI in the first year was reduced to 7% in the final year. The mortality rate among LBWs with LBI was 3% in the first year, and was reduced to 0% in the final year. The reductions of deaths among LBWs could be due to the four follow-up visits conducted by the FCHVs, which may have provided the opportunity for early identification and management of infections among LBWs.

Table 6: Infections among LBWs

	May 05 - April 06		May 06 - April 07		May 07- April 08		May 08- April 09	
	Number	%	Number	%	Number	%	Number	%
PSBI+LBW	91	18	53	17	44	14	29	12
LBI+LBW	109	22	69	22	68	22	39	16
LBW+PSBI+death	7	8	2	4	1	2	2	7
LBW+LBI+ death	3	3	2	3	0	0	0	0

4. Possible Severe Bacterial Infection (PSBI) Management

i. First Place of Care-seeking

During the first year of the MINI project, the level of initial care-seeking for PSBI from FCHVs was greater than for care-seeking directly from the health facility. Over the course of 4 years, there was a changing trend in the pattern of care-seeking, and more cases began seeking care from health facilities. In the first year, 70% of the PSBI cases were first seen by FCHVs compared to 30% by the VHWs/MCHWs/HI. This trend of seeking care from the FCHVs was reduced to 49% in the final year, and the cases seen in the health facilities increased from 30% in the first year to the 51 % in the final year. This positive trend of care-seeking from home to health facility is one of the major achievements of the MINI program, and this shift required motivation and behavior change of the caregivers. This has also helped to increase utilization of government health facilities, when awareness and trust are built up between the community and the health facility staff. However, it should be noted that nearly 50% of caregivers first sought care and advice from the FCHVs in the final year.

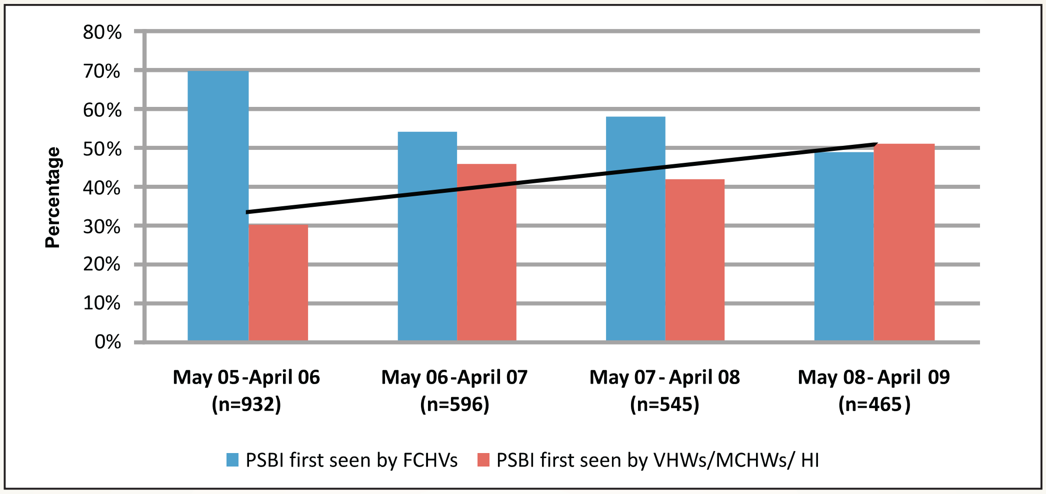


Figure 23: *Trend in First Place of Care-seeking*

ii. PSBI Treatment

In the MINI project, FCHVs were trained to manage cases of PSBI by providing cotrimoxazole-P, initiating referral by writing a call form, and making third day follow-up visits to check the status of the young infant and provide a referral if the case had not improved. Figure 24 shows that, once identified as PSBI cases, more than 97% of young infants received cotrimoxazole-P, and almost 90% received gentamicin in all four years. MINI defined quality service as the completion of the full seven doses of gentamicin, and a third day follow-up conducted by the FCHVs for sick young infants. Therefore quality service was provided by the FCHVs and CHWs to sick young infants.

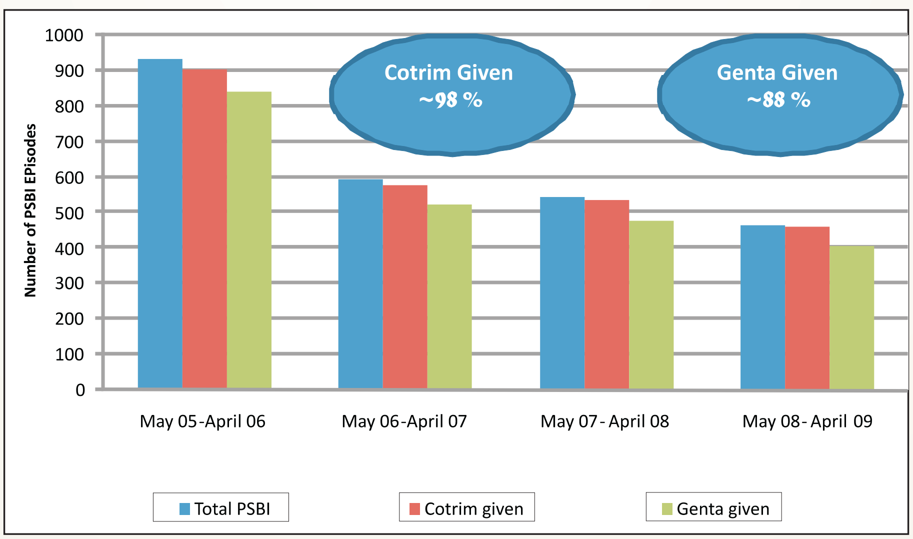


Figure 24: *Trend in PSBI Treatment*

There was a high completion rate of gentamicin following initiation. Figure 25 shows the increasing trend of gentamicin completion rate. Overall, more than 90% had completed the full 7 doses of gentamicin, which was again improved to 97% in the final year.

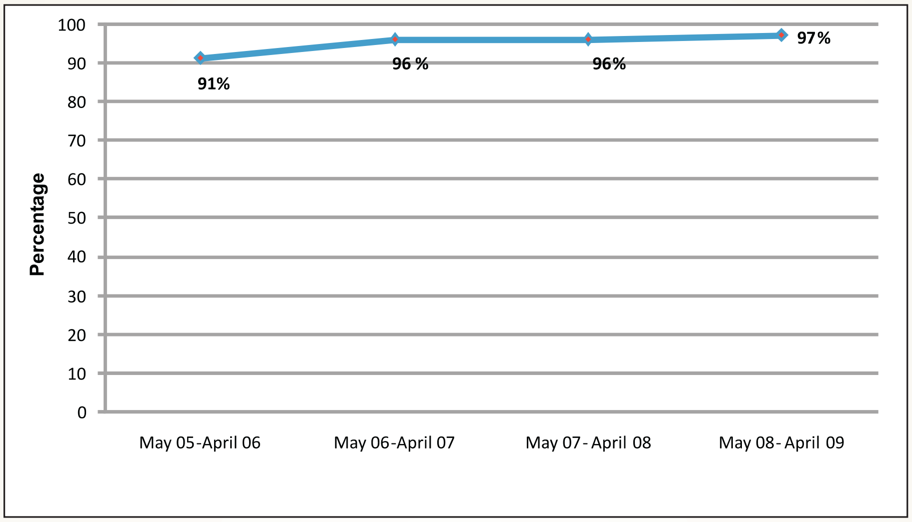


Figure 25: *Trend in Gentamicin Completion Rate*

Table 7 shows that more than 95% of PSBI cases received third day follow-up visits, among those cases which presented first to the FCHVs. Overall the quality of care provided by the FCHVs as well as CHWs was good and always around 90% or more.

Table7 : PSBI Management

	May 05-April 06		May 06-April 07		May 07- April 08		May 08- April 09	
	Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*
Cotrimoxazole-P given	903	97%	577	97%	535	98%	459	99%
Gentamicin given	840	90%	523	88%	478	88%	406	87%
Complete 7 dose gentamicin	765	91%	503	96%	460	96%	394	97%
PSBI 3rd day follow-up by FCHV*	630/648	97%	311/322	97%	312/316	99%	215/226	95%

* PSBI cases first seen by FCHVs

5. Timing of Care-seeking and Management

While analyzing how rapidly PSBI cases were seeking care and the timing of PSBI management, there was increasing trend of seeking care within 2 days after the onset of illness. Table 8 shows that only 56% of cases received gentamicin within 2 days of onset of illness in the first year, yet this level increased to 69% by the final year. However, once in contact with the FCHVs or VHWs/MCHWs/HI, a high percentage of cases received gentamicin within 2 days of the contact. Ninety-eight percent of PSBI cases received gentamicin within 2 days of the contact in the first three years, yet a slight reduction was seen in the final year to 95%. There was an increasing trend in rapid care-seeking from caregivers and in timely response from the CHWs in providing gentamicin over the course of the project.

Table 8: Timing of Care-seeking and PSBI Management

	May 05 - April 06		May 06 - April 07		May 07 - April 08		May 08 - April 09	
	Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*
Onset of illness to first gentamicin within 2 days	473	56	330	63	343	72	282	69
First contact with CHWs to first gentamicin within 2 days	820	98	513	98	469	98	387	95

6. Knowledge of FCHVs and CHWs

FCHVs' knowledge of 10/10 danger signs, 5 ENC messages, and correct dose of cotrimoxazole-P increased annually during the first three years of the project, and then decreased slightly in the final year. It is worth mentioning that the number of interviews conducted in the final year was decreased, as the external MINI supervisors were gradually reduced in number. This is shown in Table 9.

This slight reduction of knowledge in the final year could be due to the lack of intensive supervision. As a result of having fewer supervisors, the time between supervisory contacts was extended during the final year, and may have hampered FCHVs' knowledge to some extent. However, FCHVs were allowed to use the classification card while providing care, thus this slight reduction in knowledge may not have any effect on program outcome.

Table 9: FCHVs Knowledge on Danger signs, ENC and Correct Dose of Cotrimoxazole-P

	May 05 - April 06 (n=559)		May 06 - April 07 (n=543)		May 07 - April 08 (n=313)		May 08 - April 09 (n=88)	
	Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*
FCHVs knowledge of 10/10 danger signs	525	94%	516	95%	290	93%	79	90%
FCHVs knowledge of 5 ENC messages	507	91%	529	97%	298	95%	82	93%
FCHVs knowledge of correct dose of cotrimoxazole-P	548	98%	541	100%	312	100%	87	99%

Similarly, CHWs' knowledge of danger signs, ENC messages, and correct dose of gentamicin remained more or less constant in all four years. Table 10 shows the increasing trend of knowledge regarding 10/10 danger signs in the second year, the slight reduction in third year, and the subsequent increase to 100% in the final year. The knowledge of 5 ENC messages also reduced in third year and increased to 100% in fourth year. The knowledge of correct dose of gentamicin increased to 100% in second year and remained constant for the final 3 years.

Table 10: CHWs Knowledge on Danger signs, ENC and Correct Dose of Gentamicin

	May 05 - April 06		May 06 - April 07		May 07 - April 08		May 08 - April 09	
	Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*
CHWs knowledge of 10/10 danger signs	82 (n=88)	93%	85 (n=85)	100%	48 (n=50)	96%	12 (n=12)	100%
CHWs knowledge of 5 ENC messages	78 (n=88)	89%	84 (n=85)	99%	47 (n=50)	94%	12 (n=12)	100%
CHWs knowledge of correct dose of gentamicin	78 (n=88)	98%	84 (n=85)	100%	47 (n=50)	100%	12 (n=12)	100%

The overall knowledge of both FCHVs and CHWs regarding program activities was high and remained constant for all four years. The appropriate training materials, program-specific training, and intensive supervision and monitoring during the early phase of the program, as well as periodic review and refresher training, could be the factors associated with higher levels of knowledge on danger signs, ENC messages, and correct treatment doses which continuously improved during the program.

Figure 26: *FCHVs, HF and District Supervisors after review meeting in Jante VDC.*

7. Caregiver's Knowledge and Practice

Caregivers were interviewed by Field Supervisors during the MINI project to determine actual ENC practices during their last child birth. As a result of a reduction in the number of Field Supervisors, it was not possible to interview caregivers in the final year. Therefore, this report analyzed caregivers' interviews for the first 3 years only. The percentage of caregivers who practiced all 5 ENC increased from 6% in the first year to 16% in the third year.

Table 11 : Caretaker ENC Practices

	May 05 - April 06 (n=770)		May 06 - April 07 (n=602)		May 07 - April 08 (n=193)	
	Number	*%*	*Number*	*%*	*Number*	*%*
% of caregivers practicing all 5 ENC	43	6%	57	9%	30	16%
Practice of drying baby	294	38%	300	50%	83	43%
Practice of wrapping baby	721	94%	500	83%	166	86%
Practice of delaying bathing	188	24%	223	37%	92	48%
Practice of applying nothing to the cord	643	84%	567	94%	182	94%
Practice of breastfeeding within 1 hour	430	56%	400	66%	121	63%

Individual practices, such as drying the baby, wrapping the baby, applying nothing to the cord, and breastfeeding within one hour, remained constant in all three years. However, the practice of delayed bathing increased from 24% in the first year to 48% in the third year. Overall practice of ENC was improved during the course of the project.

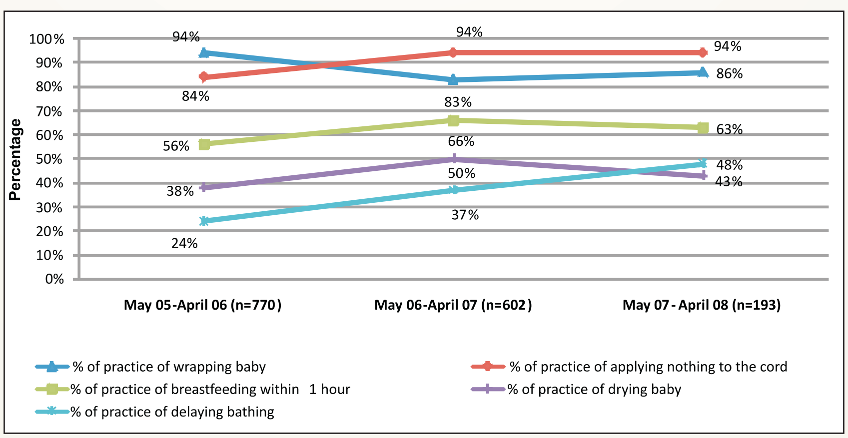


Figure 27: *Trend in Caretaker ENC Practices*

8. Logistic Supply

There was no major stockout of any key commodity during all four years of the program. Logistics support was a priority for all MINI activities, and special attention was paid in order to maintain a regular supply of supplies. MINI utilized the regular DPHO demand and supply mechanism to ensure the maintenance of supplies in order to minimize the chance of stockouts among FCHVs and CHWs. In all four years, less than five percent of FCHVs and CHWs reported some stockout of logistics such as cotrimoxazole-P, ARI timer, gentamicin, or syringes. However, in the final year, there was a slightly higher percentage of CHWs reporting stockout of gentamicin. This could be due to fewer Field Supervisors, either because they were unable to conduct interviews during final year of the project or because their absence may have allowed some deviation from the regular supply mechanism.

Table 12 : Trend in Stockout of Cotrimoxazole-P, Timer, Gentamicin and Syringes

	May 05 - April 06		May 06 - April 07		May 07 - April 08		May 08 - April 09	
	Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*
% of FCHVs reportingstock out of cotrimoxazole	4 (n=559)	1	3 (n=543)	1	2 (n=313)	1	0 (n=88)	0
% of FCHVs reporting stock out of Timer	3 (n=559)	1	0 (n=543)	0	1 (n=313)	0	3 (n=88)	3
% of CHWs reporting stock out of Gentamicin	4 (n=88)	5	0 (n=85)	0	0 (n=50)	0	2 (n=12)	17
% of CHWs reporting stock out of Syringes	3 (n=88)	3	0 (n=85)	0	0 (n=50)	0	0 (n=12)	0

Figure 28: *Senior Supervisors arranging logistic Supplies*

xiii. Program Status in 65 VDCs from May 2007 to April 2009

As described earlier, MINI was implemented in 65 VDCs from January 2007 due to demand from the DPHO and the community. Though full program implementation was initiated in January 2007, this report will analyze two complete years of data from May 2007 through April 2009 to present the program status in 65 VDCs.

1. Births, Deaths and Two-months Follow-up Status

The FCHVs in all 65 VDCs captured 75% of expected births in the first year and 74% in the second year. At the end of two months all young infants within the MINI cohort were followed up to record their status. There was 98% follow-up at the end of two-months in the first year and this increased to 100% in the final year. During the first year, the NMR was estimated at 14 per 1000 live births, and was reduced to 13 per 1000 live births in the second year. The highest percentage of deaths occurred within the first week of life, followed by deaths occurring within 28 days of birth. The overall findings in 65 VDCs were similar to the trend shown in 21 VDCs.

Table 13 : Status of Births, Deaths and Two-months follow-up

	May 07- April 08		May 08- April 09	
	Number	%	Number	%
Total expected births	16695		16749	
Total live births recorded	12931	75%	12421	74%
2-months follow-up	12627	98	12379	100
Total deaths	199		192	
Deaths within 7days	129		102	
Deaths within 28 days	174		165	
Estimated NMR	14		13	

2. Low Birth Weight

Similar to the findings from 21 VDCs, the program status in 65 VDCs showed that around 52% (n=6471/12544) of young infants were weighed within 3 days of birth in the first year, and 49% (n=6008/12421) in the second year. There were 12% (n=782/6471) LBWs in the first year, which decreased very slightly to 11% (n=636/6008) in the second year. After identifying LBWs, 85% (n=663) of the LBWs received four follow-up visits in the first year and 80% (n=507) received four follow-up visits in the second year. The reduction of the four follow-up visits by the FCHVs in the second year could be due to the decreased external supervision by MINI Field Supervisors, resulting in slightly less motivation. There were 5% deaths among LBWs in both years.

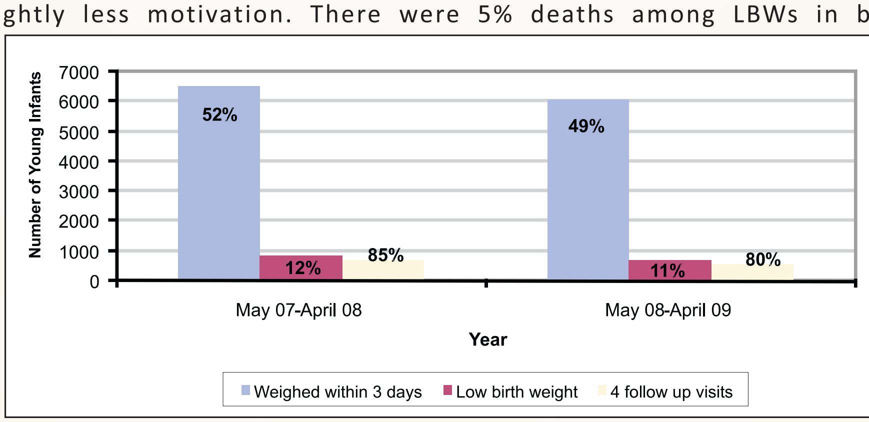


Figure 29 : *Status of Weight Taken, Low Birth Weight and Four Follow-up visits*

3. Infection among Young Infants

i- Local Bacterial Infection (LBI)

The rate of local bacterial infections of eye, cord, and skin (LBI) showed a similar decreasing trend as in the 21 VDCs. Table 14 shows that LBI rate of 16% in the first year was reduced to 14% in the second year. Among the types of LBI, cord infection was the most common, and the rate of cord infection increased from 59% in the first year to the 65% in the second year. The rate of eye infection remained constant in both years to 41%. Slight reduction has been observed in the rate of skin infection from 14% to 12%.

Table 14 : Status of Local Bacterial Infections

	May 07- April 08		May 08- April 09	
	Number	%	Number	%
Total episodes of LBI	2080	16	1775	14
Eye infection of all LBI	861	41	728	41
Cord Infection of all LBI	1224	59	1160	65
Skin Infection of all LBI	294	14	219	12

ii- Possible Severe Bacterial Infection (PSBI)

The overall PSBI prevalence rate (7%) in 65 VDCs was slightly lower than that of 21 VDCs (9%). The slight reduction of PSBI prevalence in the final year of the program could be due to decreased supervision. This does not mean that the actual PSBI prevalence has declined, but instead that the lack of Field Supervisors to collect and verify data from the health facilities, in particular, may have resulted in fewer episodes being entered into the MINI data base. Some VDCs of Morang had shown lower prevalence of PSBI compared to others.

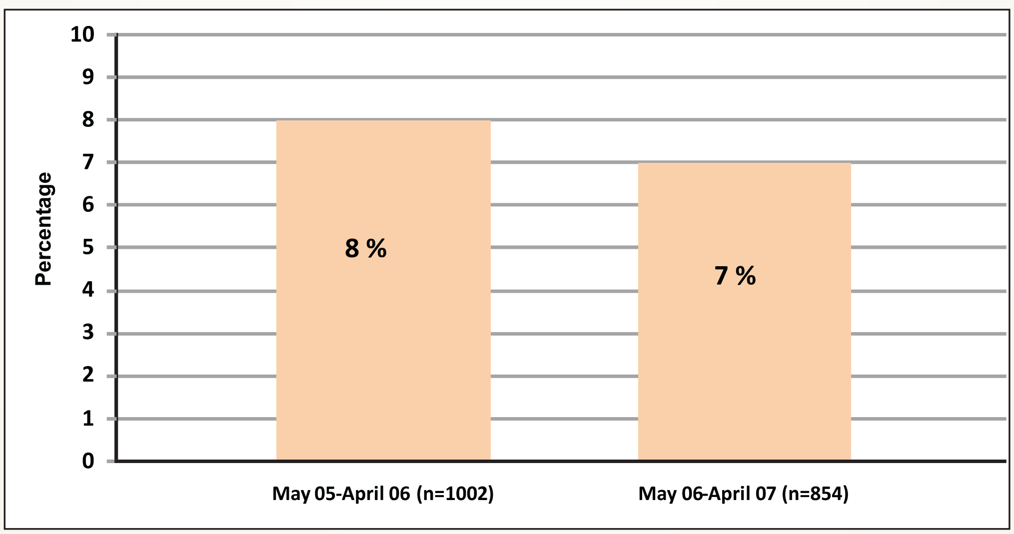


Figure 30 : *PSBI Prevalence*

iii- Infection among LBWs

Table 15 shows that, overall, the PSBI rate among LBWs was higher compared to the prevalence rate amongst all newborns. There was 17% PSBI prevalence among LBWs as compared to 8% PSBI prevalence among all newborns in the first year. Similarly, there was 20% PSBI prevalence among low birth weight compared to 7% among all newborns in the second year. Similar pattern was also seen among LBWs with LBI. In both years, the percentages of LBWs with LBIs were higher. The deaths among LBWs with PSBI were 2% in the first year and increased to 5% in the final year. The deaths among LBWs with LBI remained constant at 1% in both years.

Table 15: Infections among LBWs

	May 07- April 08		May 08- April 09	
	Number	%	Number	%
PSBI+LBW	133	17	126	20
LBI+LBW	254	32	178	28
LBW+PSBI+death	3	2	7	5
LBW+LBI+ death	3	1	2	1

4. Possible Severe Bacterial Infection Management

i. First Place of Care-seeking

As previously mentioned, during the early years of the program, a greater number of cases of PSBI were seeking care from the FCHVs. In the first year, 54% (n=541/ 1002) of PSBI cases sought care from the FCHVs, and only 46% (n=391/854) did in the second year. Additionally, there was a changing trend in the pattern of care-seeking, with more cases were seeking care directly from health facilities in the second year, similar to the pattern seen with the 21 VDCs. In the first year 46% (n=461/1002) of the PSBI cases were first seen by VHWs/MCHWs/HI, and increasing to 54% (n=463/854) in the final year. There was a positive trend of care-seeking from home to health facility.

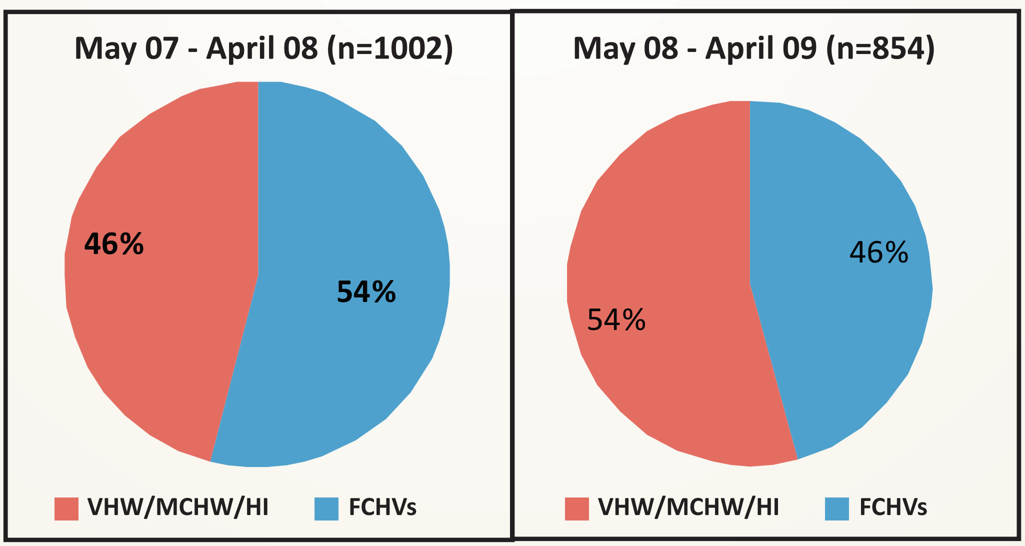


Figure 31: *First Place of Care-seeking for PSBI by Year*

ii. PSBI Treatment

The overall treatment pattern of PSBI in 65 VDCs was similar to that observed in the 21 VDCs, and remained high. Table 16 indicates that in both years 98% of PSBI cases received cotrimoxazole-P, and in the first year 87% and in the second year 86% received gentamicin.

Table 16: Status of PSBI Treatment

	May 07- April 08		May 08- April 09	
	Number	%	Number	%
Cotrimoxazole-P given	979	98	841	98
Gentamicin given	874	87	737	86
Complete 7 dose gentamicin	825	94	694	94
PSBI 3rd day follow-up by FCHV	418/541	77	377/391	96

There was a high completion rate of gentamicin upon initiation. In both years, 94% of those who initiated treatment completed the full 7 doses of gentamicin. There was 77% third day follow-up of PSBI cases seen by FCHVs in the first year, which improved to 96% in the final year.

5. Timing of Care-seeking and Management

Figure 32 shows the status of care-seeking within 2 days of onset of illness, and indicates a similar pattern to that observed in the 21 VDCs. Seventy-three percent (n=641/1002) of PSBI cases sought care within 2 days of illness in first year, and 72% (n=528/854) in second year. However, the percentage of cases receiving gentamicin injection after first contact with CHWs was consistently higher. Ninety-eight percent (n=859/1002) of the PSBI cases received gentamicin within 2 days of the contact with FCHVs/CHWs in the first year, compared with 84% (n=720/854) in the second year.

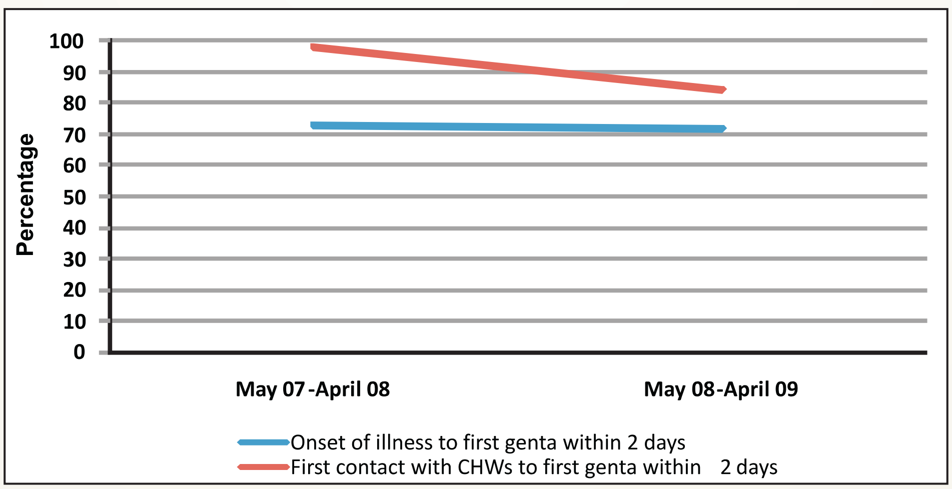


Figure 32: *Status of Care-seeking and Management of PSBI*

6. Knowledge of FCHVs and CHWs

An analysis of FCHVs' knowledge of 10/10 danger signs revealed a slight reduction from 86% in the first year to 71% in the second year. Similarly, knowledge of the 5 ENC messages also decreased from 86% in the first year to 79% in the final year. Knowledge of the correct dose of cotrimoxazole-P remained high, at 99% and 98%, respectively, the first and second year. Overall, the slight reduction of knowledge in the second year could be due to decreased external supervision. The knowledge of CHWs remained more or less constant in both years. Eighty-nine percent and 87% of CHWs in years 1 and 2, respectively, knew 10/10 danger signs. Knowledge of the correct dose of gentamicin amongst CHWs also decreased, from 100% the first year to 97% the second year. Knowledge of ENC messages remained constant in both years. The overall knowledge level of both FCHVs and CHWs regarding program activities was good.

Table 17 : Status of Knowledge on Danger signs, ENC, Correct Dose of Cotrimoxazole-P and Gentamicin

	May 07- April 08		May 08- April 09	
	Number	%	Number	%
FCHVs' knowledge of 10/10 danger signs	487 (n=568)	86	242 (n=339)	71
FCHVs' knowledge of 5 ENC messages	487 (n=568)	86	269 (n=339)	79
FCHVs' knowledge of correct dose of cotrimoxazole-P	565 (n=568)	99	331 (n=339)	98
CHWs' knowledge of 10/10 danger signs	150 (n=168)	89	108 (n=124)	87
CHWs' knowledge of 5 ENC messages	144 (n=168)	86	103 (n=124)	83
CHWs' knowledge of correct dose of gentamicin	168 (n=168)	100	120 (n=124)	97

Figure 33: *FCHV with her job aid.*

7. Caregiver's Knowledge and Practice

As part of the MINI project, caregivers were interviewed to determine actual practices of the 5 ENC activities. Few caregivers were interviewed during the final year, due to decrease in the number of Field Supervisors after the program decreased external supervision. Therefore, fewer interviews were compared to first year, and the results may not be comparable. However, the percentage of caregivers interviewed who stated they had conducted 5 ENC practices remained constant in both years, with the exception of the practice of delaying bathing to 24 hours after birth.

Table 18 : Caregiver's Knowledge and Practice

	May 07- April 08 (n=330)		May 08- April 09 (n=102)	
	Number	%	Number	%
Practice of drying baby	120	36	35	34
Practice of wrapping baby	299	91	94	92
Practice of delaying bathing	114	34	1	1
Practice of applying nothing to the cord	314	95	98	96
Practice of breastfeeding within 1 hour	214	65	64	63

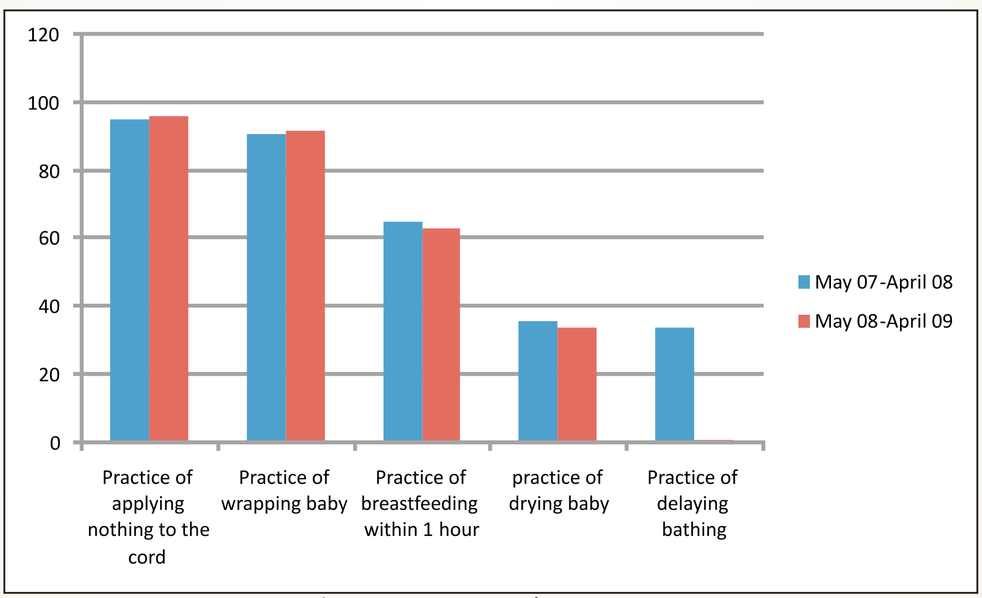


Figure 34 : *Caregiver's ENC Practices*

8. Logistics Supply

The overall logistics supply during the program years was efficient, and less than 6% of FCHVs and CHWs reported any stockout. There were fewer stockouts during the last year of the program. About 6% of FCHVs reported a stockout of cotrimoxazole-P and ARI timer in the first year, which was reduced to 2% and 1% respectively in the following year. The stockout of gentamicin among CHWs remained constant at 4% in both years, reflecting an efficient logistics supply. This efficient logistics supply through the DPHO system has helped maintain the continuity of the program, and ensure that logistics supply did not have any adverse effect on the program outcome.

Table 19 : Status in Stockout of Cotrimoxazole-P, ARI timer, Gentamicin and Syringes

	May 07- April 08		May 08- April 09	
	Number*	%	Number	%
% of FCHVs reporting stockout of cotrimoxazole	34 (n=568)	6	8 (n=339)	2
% of FCHVs reporting stockout of ARI timer	33 (n=568)	6	4 (n=339)	1
% of CHWs reporting stockout of Gentamicin	7 (n=168)	4	5 (n=124)	4
% of CHWs reporting stockout of Syringes	7 (n=168)	4	1 (n=124)	1

**interviews with FCHVS and CHWs*

Figure 35: *VHW giving gentamicin injection.*

xiv. Supervision Models

The main objective of MINI-II was to define the most efficient model for scaling up community-based management of neonatal sepsis, and determine the effect on community health worker performance and program coverage with decreased external supervision and support, such as documenting the effect on quality of care, motivation, provision of essential supplies, reporting and recording, and coverage rates. Therefore, this section of the report will analyze the CHW's knowledge, problems with logistics supply, impact of supervision and monitoring, and coverage rates after decreasing the number of Field Supervisors through various supervision models. However, the supervision model most similar to the model which might be implemented within the regular government system, Model 3 (Table 20), was not implemented for sufficient enough length of time to fully assess it's impact. The Model 3 was only in place for 2 months, and did not yield sufficient data for the comparison with Models 1 and 2. Therefore, the data from last 2-months are not presented here.

Additionally, the exact model of government supervision could not be replicated, as MINI staff were still present and working in the field for the final data collection, FCHV dropouts training, conducting review meetings and other similar purpose. Therefore, the impact of MINI supervision remained until the last moment of this report and could not show the exact government model of supervision. This may require another whole one year to see the impact of decreased supervision, on program performance, without external support.

Table 20: MINI II Actual Supervision Model

# VDCs	Model 1 (Oct 07 - Jan 08)	Model 2 (Jul 08 - Feb 09)	Model 3 (Mar 09 - Apr 09)
21VDCs	5 (1 FS: 38 FCHVs)	2 (1 FS: 95 FCHVs)	2 (1 FS: 293 FCHVs)
36 VDCs	2 (1 FS: 162 FCHVs)	2 (1 FS: 162 FCHVs)	
8 VDCs (Hills)	1 (1 FS: 72 FCHVs)	1 (1 FS: 72 FCHVs)	

After full project implementation in 65 VDCs, the supervision model was modified to determine the program effect. Initially in Model 1, there was a total of 8 Field Supervisor, with 5 Field Supervisors working in the initial 21 VDCs, 2 in the 36 flat land VDCs, and one in the 8 hill VDCs. In Model 2, there were only 5 Supervisors; 1 working in the 8 hill VDCs, and 2 each in the 21 VDCs and the 36 VDCs. In Model 3, there were only 2 supervisors working in all 65 VDCs. Even though the Model 3 was implemented for 4 months, data was collected for only two months because MINI data collection activities were closed on April 30th and babies born up to April 30th with 2-months follow-up to June 30th was included in MINI data set.

1. Impact of Supervision Model on FCHVs and CHWs Knowledge

FCHVs' knowledge of 10/10 danger signs remained constant in 21 VDCs in both models, but was reduced in 36 VDCs in Model 2. Similarly there was reduction of knowledge of the 5 ENC messages amongst FCHVs in 36 VDCs in the Model 2. Knowledge remained constant in 21 VDCs in both models, and was reduced in 36 VDCs. This may be due to intensive monitoring and supervision in early program implementation in the 21 VDCs, resulting in program maturation and lessened the effect of decreased supervision. However, there was less supervision from the initial periods of the program in 36 VDCs and this may have affected in overall knowledge of FCHVs belonging to the 36 VDCs compared to the 21 VDCs. Comparing their knowledge regarding correct dose of cotrimoxazole-P, it remained constant in both models.

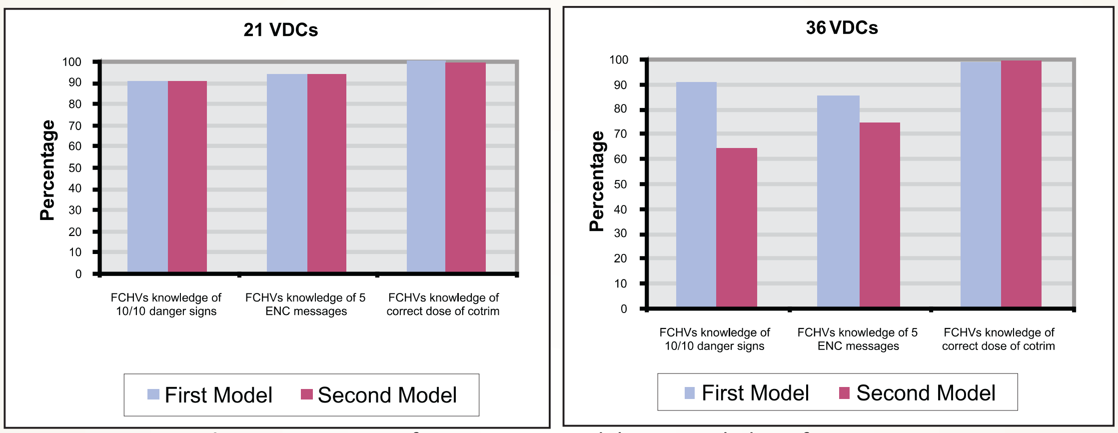


Figure 36: *Impact of Supervision Model on Knowledge of FCHVs*

In comparison to the patterns observed for FCHVs, CHWs' the knowledge of danger signs was lower in Model 2 than in Model1. Amongst CHWs in the 21 VDCs, in Model 1 there was 100% knowledge of ENC messages, compared to 94% in Model 2. Amongst CHWs in the 36 VDCs, in Model 1, 82% of CHWs knew the ENC messages, compared with 86% in Model 2. Except for a slight reduction in the 36 VDCs in Model 2, the knowledge of correct dose of gentamicin remained constant at 100%. There was no obvious impact of the decreased supervision model in the 21 VDCs, which could be due to intensive program support and reinforcement of training messages during the initial stage, tapering to fewer Field Supervisors as the program matured. In the 36 VDCs, there were fewer Field Supervisors from the beginning and there was less supervision and monitoring compared to the 21 VDCs.

Figure 37: *Field Supervisors at work*

Table 21: Knowledge on Danger signs, ENC, Gentamicin and Cotrimoxazole-P

	Oct 07-June 08 Model 1				July 08 - Feb 09 Model 2			
	21 VDCs		36 VDCs		21 VDCs		36 VDCs	
	No	%	No	%	No	%	No	%
FCHVs' knowledge of 10/10 danger signs	149/166	90	45/60	90	79/88	90	111/174	64
FCHVs' knowledge of 5 ENC messages	154/166	93	51/60	85	82/88	93	129/174	74
FCHVs' knowledge of correct dose of cotrimoxazole-P	166/166	100	59/60	98	87/88	99	172/174	99
CHWs' knowledge of 10/10 danger signs	31/32	97	61/73	84	12/12	100	85/97	88
CHWs' knowledge of 5 ENC messages	30/32	94	60/73	82	12/12	100	83/97	86
CHWs' knowledge of correct dose of gentamicin	32/32	100	73/73	100	12/12	100	96/97	99

The MINI supervision model suggests that it is advisable to have an intensive program which begins with extensive supervision and monitoring. As the program matures, decreasing external supervision but maintaining the regular logistics supply will be adequate to sustain a program. The data from the 21 VDCs indicates that the knowledge of CHWs remained constant, even after decreasing supervision. However, a slight change was seen in the 36 VDCs which explains the importance of intensive supervision during the beginning of the program.

2. Impact of Supervision Model on Logistics Supply

The regular logistics supply and supervision is a key component of regular project activities. A lack of project commodities and less supervision might hamper in program continuity. However, even after decreasing supervision, no major difficulties were encountered regarding logistics supply. In Model 1, only 1% of the FCHVs in the 21 VDCs reported stockout of cotrimoxazole-P. In the 36 VDCs in both Models, supply of ARI timer was constant. However, 0.6% of FCHVs in the 21 VDCs of Model 1 and 3% of FCHVs in the 21 VDCs of Model 2 reported stockout. For both VDCs in Model 1, supply of gentamicin was constant. However, in Model 2, 17% of CHWs in the 21 VDCs and 1% of CHWs in the 36 VDCs reported stockout of gentamicin. Overall, the logistic supply remained constant and the supply system was maintained even after decreasing supervision. Due to MINI's regularization of FCHVs monthly meetings, and the program's utilization of the existing government logistics supply system, decreased external supervision had no impact on logistics supply. Thus, even after MINI project closed, the regular demand and supply system remained intact. FCHVs, during their monthly meeting at the health facility, continue to request their logistic requirements, and the HF/DPHO resupply them through their regular channel.

Table 22: Impact of Supervision Model on Logistic Supply

	Oct 07-June 08 Model 1				July 08 - Feb 09 Model 2			
	21 VDCs		36 VDCs		21 VDCs		36 VDCs	
	No	%	No	%	No	%	No	%
% of FCHVs reporting stockout of cotrimoxazole-P	2/166	1	0/60	0	0/88	0	0/199	0
% of FCHVs reporting stockout of ARI timer	1/166	0.6	0/60	0	3/88	3	0/199	0
% of CHWs reporting stockout of Gentamicin	0/73	0	0/32	0	2/12	17	1/97	1
% of CHWs reporting stockout of Syringes	0/73	0	0/32	0	0/12	0	0/97	0

3. Impact of Supervision Model on Program Outcome

The decreasing supervision model did not have a dramatic effect on the overall program. However, slight changes have been observed in 36 VDCs. The knowledge of FCHVs and CHWs remained more or less constant, even after decreasing external supervision. There were no stockout problems during either supervision models. This may have resulted in continuity of the program, and did not hamper in program outcome.

i. Births, Deaths and Two-months follow-up Status

Though there was a slight reduction in knowledge of program activities, the overall coverage remained the same in both models in both the 21 as well as 36 VDCs. There was a 69% birth capture rate in both 21 and 36 VDCs in the Model 1, which increased to 73% in Model 2. The overall two-months follow-up status in both models was higher than 90 %.

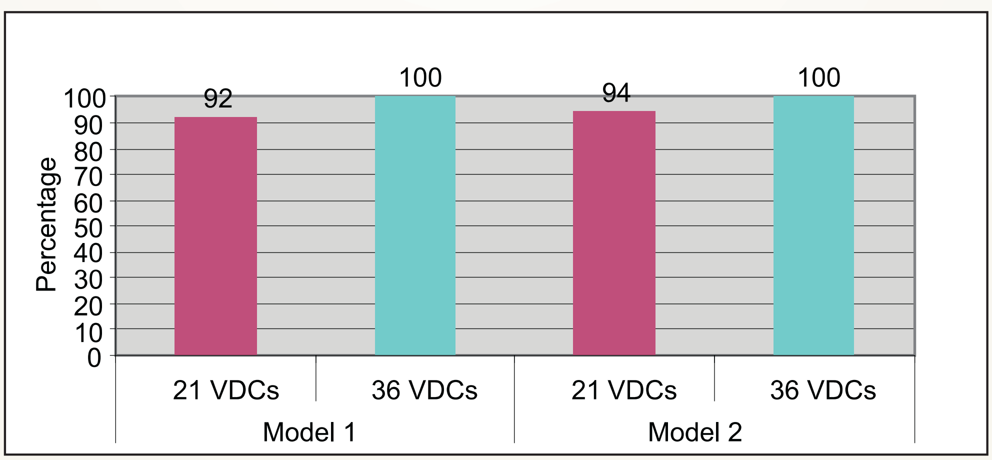


Figure 38: *Impact of Supervision Model on Two-month Follow-up*

The estimated NMR in the 21 VDCs in both models remained constant at 15 deaths per 1000 live births. The NMR in the 36 VDCs increased from 15 per 1000 live births in the Model 1 to 17 per 1000 live births in the Model 2. Overall, there was no obvious programmatic impact of decreasing supervision in either 21 or the 36 VDCs.

Table 23: Impact of Supervision Model on Births, Follow-up and Deaths

	Oct 07-June 08 Model 1				July 08 - Feb 09 Model 2			
	21 VDCs		36 VDCs		21 VDCs		36 VDCs	
	No	%	No	%	No	%	No	%
Total expected births	5393		7128		5345		6838	
Total Live births recorded	3721	69	4918	69	3902	73	4992	73
2-months follow-up	3420	92	4917	100	3660	94	4989	100
Total deaths	51		76		55		85	
Estimated NMR	15		15		15		17	

ii. Low Birth Weight

In the both models, more than 90% of young infants were weighed by the FCHVs. Among those weighed, approximately 50% of weights were taken within 3 days of birth. In Model 1, there was 12% low birth weight in the 21 VDCs, which was reduced to 10% in Model 2. The LBWs in the 36 VDCs remained constant at 11% in both models. After identification as a LBW, approximately 80% of young infants received four follow-up visits by an FCHV. However, there was a slight reduction in the percentage of LBWs who received four follow-up visits in Model 2 compared with in Model 1. This could be an effect of decreasing supervision, as the presence of Field Supervisors might have motivated the FCHVs to provide regular MINI follow-up activities in the communities.

Table 24: Impact of Supervision Model on Management of Low Birth Weight Babies

	Oct 07-June 08 Model 1				July 08 - Feb 09 Model 2			
	21 VDCs		36 VDCs		21 VDCs		36 VDCs	
	No	%	No	%	No	%	No	%
Total weight taken	3395	91	4871	99	3662	94	4884	98
Weighed within 3 days	1718	50	2601	53	1797	49	2441	49
Low birth weight	211	12	274	11	184	10	277	11
4 follow-up visits	174	82	233	85	148	80	214	77

iii. Local Bacterial Infection (LBI)

The total episodes of LBI remained constant in both models. Fourteen percent of young infants had an episode of LBI in the 21 VDCs in Model 1, and 13% had an episode in Model 2. Similarly, 13% of young infants had an episode of LBI in the 36 VDCs in Model 1, and 14% had an episode in Model 2. Therefore, the supervision model had no impact on the rates of detection and management of LBI episodes. Cord infections accounted for the largest proportion of LBI infections. However, there was a decline in the proportion of cord infection in the 36 VDCs during Model 2. The other types of infections remained constant for both sets of VDCs throughout both models.

Table 25: Impact of Supervision Model on LBI Management

	Oct 07-June 08 Model 1				July 08 - Feb 09 Model 2			
	21 VDCs		36 VDCs		21 VDCs		36 VDCs	
	No	%	No	%	No	%	No	%
Total episodes of LBI	532	14	619	13	510	13	700	14
Eye infection	218	41	225	36	203	40	255	36
Cord Infection	342	64	382	62	342	67	246	35
Skin Infection	49	9	77	12	62	12	100	14

iv. Possible Severe Bacterial Infection (PSBI)

There was a slight increase in PSBI prevalence in the 21 VDCs in Model 2, from 7% (n=271) to 9% (n=342). The PSBI prevalence in the 36 VDCs remained constant at 5 % in both models. The overall PSBI prevalence remained more or less constant in both models, and did not show any impact of decreasing supervision.

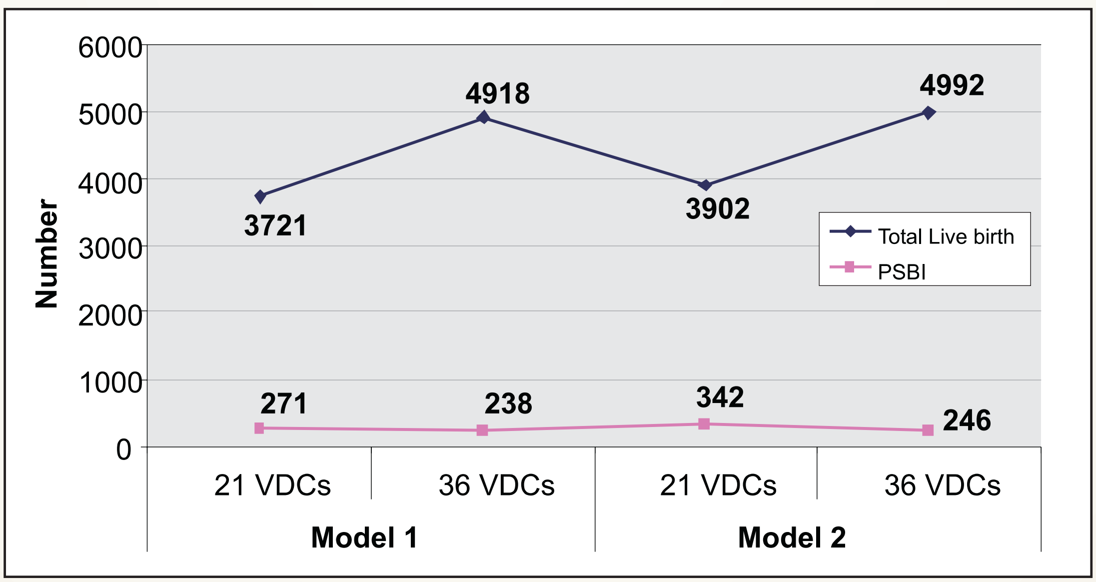


Figure 39: *Impact of Supervision Model on PSBI Identification*

v. Possible Severe Bacterial Infection (PSBI) Management

a. First Place of Care-seeking

The supervision model did not have any impact on first place of treatment. Initially, in Model l, larger numbers of cases were first seeking care from FCHVs. However, in Model 2, more cases were going directly to the CHWs. This is consistent with the changes seen in the 21 VDCs, as the program matured; more families went directly

Table 26: Impact of Supervision Model on First Place of Care-seeking

	Oct 07-June 08 Model 1				July 08 - Feb 09 Model 2			
	21 VDCs		36 VDCs		21 VDCs		36 VDCs	
	No	%	No	%	No	%	No	%
PSBI first seen by FCHVs	141	52	114	48	153	45	98	40
PSBI first seen by CHWs	130	48	124	52	189	55	148	60

b. PSBI Treatment

There was no major impact of supervision model on PSBI treatment. There was high coverage of PSBI cases receiving cotrimoxazole-P in both models and this remained constant. Similarly, there was high coverage of gentamicin injection, as well as high completion rate. Even the third day follow-up conducted by FCHVs among cases first presented to them remained constant in both models. Therefore, no supervisory effect was observed on PSBI treatment.

Table 27: Impact of Supervision Model on PSBI Treatment

	Oct 07-June 08 First Model				July 08 - Feb 09 Second Model			
	21 VDCs		36 VDCs		21 VDCs		36 VDCs	
	No	%	No	%	No	%	No	%
Cotrimoxazole-P given	264	99	230	97	337	99	240	98
Gentamicin given	240	90	212	89	292	85	220	89
Complete 7 dose gentamicin	228	95	199	94	282	97	197	90
PSBI 3rd day follow-up by FCHV	139	98	113	99	143	93	97	99

xv. Challenges in Hill VDCs

Morang is a typical flatland district-excluding the 8 hill VDCs, which are difficult to reach. The difficult geographical terrain and limited access to health care services different these VDCs from the district's 57 flat VDCs. One of MINI-II' objectives was to monitor and document the challenges of implementation of the MINI-I model in hill VDCs, where transportation by bicycle or vehicle is either limited or non-existent. MINI-II also aimed to define viable alternatives for the appropriate management of neonatal infections at the community-level in this setting. Therefore, data from these 8 hill VDCs will be analyzed separately to show the challenges of implementing a community-based program such as MINI in the hilly areas of Nepal.

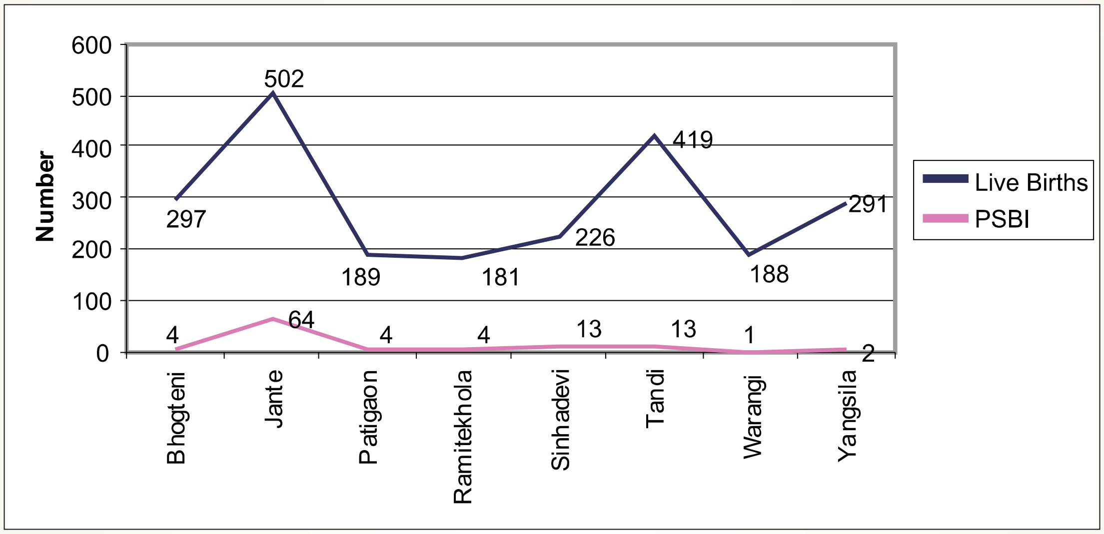


***Figure 40:** VDC wise Distribution of Live Births and PSBI in 8 Hill VDCs (May 01, 2005 to April 30, 2009)*

Figure 40 indicates that there was variation in program coverage amongst the hill VDCs. Some VDCs had much better coverage than others. FCHVs from Jante and Tandi VDCs captured a greater number of births than other hill VDCs. Similarly, wide variation had been observed in the rate of PSBI among these VDCs. This discrepancy among hill VDCs could be due to difficult geographical terrain. Jante and Tandi VDCs are more accessible than other hill VDCs. Data from hill VDCs suggest that, due to difficult geography, there could be missed births and sick young infants who could not be easily reached by the FCHVs and Health Facility staff.

MINI's favorable results form the 8 hill VDCs were largely influenced by findings from two VDCs (Jante and Tandi), which resulted in overall findings suggesting that hill VDCs are comparable to other flat land VDCs. This was contrary to the results expected. Therefore, an in-depth analysis of VDC-wise data is needed to determine the actual program impact.

1. Births, Deaths and Two-months Follow-up Status

The overall birth capture rate of nearly 70% in both years was the same in both the hill VDCs and other 57 VDCs of Morang district. The two-months follow-up status in the hill VDCs in both years was also high, at 99% and 100% respectively. The estimated Neonatal Mortality Rate in the birth cohort decreased from 15 per 1000 live births in the first year to 13 per 1000 live births in the second year. Overall, the results from the hill VDCs were much better than expected. As mentioned earlier, only some VDCs were actively involved in the program, which may have resulted in favorable outcomes.

Table 28: Births, Deaths and Two-months follow-up Status in Hill VDCs

	May 07- April 08		May 08- April 09	
	Number	%	Number	%
Total live births	673	69	686	73
2- months follow-up	669	99	685	100
Total deaths within 2 months	13		16	
Estimated NMR	15		13	

2. Low Birth Weight

Similar to our findings in the 65 VDCs, 51% of young infants in the hill VDCs were weighed within 3 days of birth in the first year and 45% were in the second year. Twelve percent of babies were deemed LBW in the first year and 10% in the second year. However, the fewer LBWs received the four follow-up visits by the FCHVs in the first year in the hill VDCs than in the 65 VDCs. Eighty-five percent of LBWs received four follow-up visits in the 65 VDCs, compared with 73% of LBWs in the hills. However, the follow-up visits for LBWs increased in the second year in the hill VDCs, and 88% were completed, compared to 80% complete follow-up in all VDCs. Therefore, the births captured by FCHVs were more easily accessible, and therefore, easily followed up. Deaths among LBWs were higher compared to deaths in all 65 VDCs in the first year. There were 12% (n=5) deaths among LBWs in the first year and 3% (n=1) in the second year.

Table 29: Weight Taken, LBW and Four Follow-up Visits in Hill VDCs

	May 07- April 08		May 08- April 09	
	Number	%	Number	%
Total weight taken	666	99	675	98
Weighed within 3 days	343	51	308	45
Low birth weight	41	12	32	10
4 follow-up visits	30	73	28	88

3. Infection Management among Young Infants

i. Local Bacterial Infection (LBI)

LBI in hill VDCs were as common as in all VDCs. There was 25% (166/673) prevalence of LBI in the first year and 19% (130/686) in the second year. The eye infections in hill VDCs were more common than cord infections in all VDCs. Eye infection accounted for 55% (n=92/166) of LBI episodes in the first year, increasing to 62% (n=81/130) in the second year. Cord infections accounted for 46% (n=77/166, 61/130) of LBI cases in both years, while skin infections accounted for 19% (n=31/166) of cases in the first year, yet only 9% (n=12/130) of cases in the second year.

ii. Possible Severe Bacterial Infection (PSBI)

PSBI in the hill VDCs were similar to that of the all VDCs. In the hill VDCs, there was a PSBI prevalence of 7% (n=49) in the first year, which increased slightly to 8% (n=56) in the second year. However, there was a large discrepancy in the distribution of PSBI prevalence among hill VDCs, ranging from 1% to 13%.

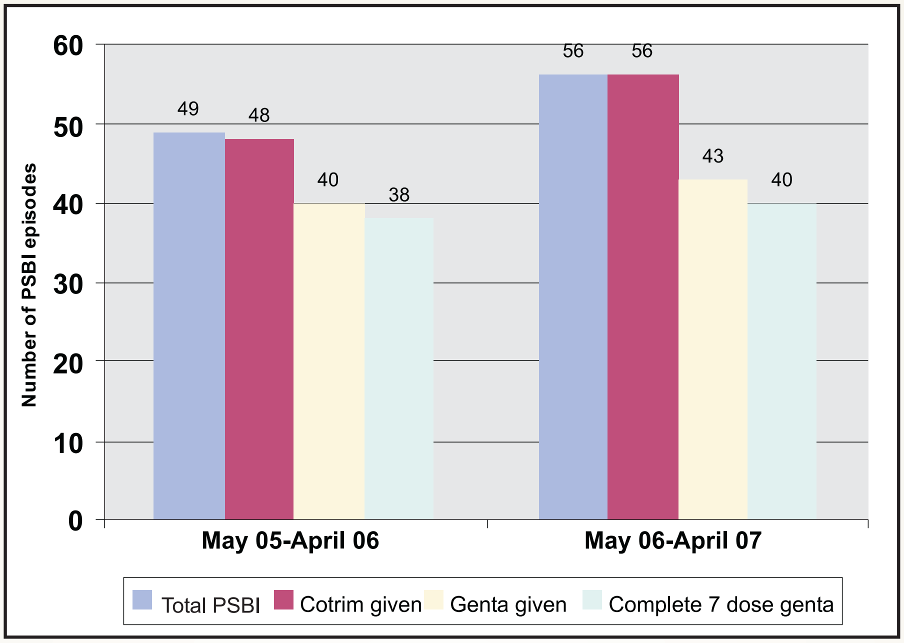


***Figure 41:** PSBI Treatment Status in Hill VDCs*

iii. Possible Severe Bacterial Infection Management

Ninety-eight percent (n=48) of PSBI episodes in the first year and 100% (n=56) in the second year were treated with cotrimoxazole-P. However, the initiation of gentamicin in the hill VDCs was slightly lower than in the all VDCs each year. In the first year, gentamicin treatment was initiated for 82% (n=40) of PSBI cases in the hill VDCs, compared to 87% (n=874) in the all VDCs. Similarly, in the second year, gentamicin treatment was initiated for 77% (n=43) of PSBI cases in the hill VDCs, compared to 86% (n=737) in the all VDCs. However, the gentamicin completion rate in the hill VDCs was high in both years, with 95% (n=38) completion in the first year and 93% (n=40) completion in the second year. The third day follow-up conducted by the FCHVs for the cases first seen by them was 100% (n= 21) in both years.

4. Timing of Care-seeking and Management

Eighty-two percent (n=33) of PSBI cases in the first year received gentamicin within 2 days of the onset of illness, compared with 86% (n=37) in the second year. However, after contact with CHWs, 100% (n=40, 43) of cases received gentamicin within 2 days of their first contact. The distances between the home of the sick young infants and the FCHVs, CHWs and the health facility could be contributing factors in the delay of early care-seeking. There was wide variation regarding the distance to first place of treatment. A separate survey was conducted among 91 PSBI cases in the hill VDCs treated by the MINI program in order to determine the average time required to reach the FCHVs or the nearest health facility. On average, it took sick young infants 26 minutes to reach the FCHV's home, yet the time needed ranged from 0 to 120 minutes. Similarly, the average time required to reach the CHW's home was 56 minutes-yet the time needed ranged from 10 minutes to 240 minutes. The farthest distance required for any sick young infants to reach the nearest health facility was 200 minutes. Therefore, we assumed that the sick young infants who visited FCHVs/CHWs were those close by or within easy access.

5. Knowledge of FCHVs and CHWs

Knowledge levels of both FCHVs and CHWs in the hill VDCs was good in the first year, and a slight reduction was reported in the second year. This reduction could be due to the decreased supervision. In the MINI project, there was always only one Field Supervisor supervising the 8 hill VDCs. Though responsible for only 8 VDCs, difficult geographical terrain made timely and quality supervision a challenge. During the final year of the project, there were only 2 supervisors for the entire district, and the hill VDCs Field Supervisor was given the additional responsibility for other flat VDCs. These factors may be reflected in the decreased knowledge of both the FCHVs and CHWs in the final year. In the first year 100% (n=14) of FCHVs knew 10/10 danger signs, yet only 43% (n=18) knew them in the second year. Similarly, 100% (n=14) FCHVs knew the correct dose of cotrimoxazole-P in the first year, yet only 88% (n=37) did in the second year. Only 79% (n=11) of FCHVs knew the 5 ENC messages in the first year, and this was further reduced to 69% (n=29) in the second year. Similarly, the knowledge of 10/10 danger signs among CHWs in the first year was 100% (n=20), yet was reduced to 73% (n=11) in the second year. Likewise, the ENC knowledge was also reduced from 86% in the first year to 53% (n=8) in the second year. The percentage of CHWs who knew the correct dose of gentamicin was 100% (n=21) in the first year, yet reduced to 80% in the second year.This reduction of knowledge for both CHWs and FCHVs in the second year could be due to decreased supervision as well as the frequent transfer of CHWs and drop out of FCHVs in the hill VDCs. Regular supervision by any other DPHO staff for other programs is also reduced in the hill VDCs. In some of the health facilities in this geographic area it was reported that prior to MINI, there had not been any supervisory visits for any programs for many years.

6. Logistic Supply

There was no stockout reported by the FCHVs and CHWs in the first year. However, 17% of the FCHVs in the second year reported not having cotrimoxazole-P. Similarly, 13% of CHWs reported stockout of Gentamicin. This could be due to decreased supervision and difficult geographical terrain for the regular supply of logistics in hill VDCs.

Table 30: Status of Stockout in Hill VDCs

	May 07- April 08		May 08- April 09	
	Number	%	Number	%
% of FCHVs reporting stockout of cotrimoxazole-P	0 (n=14)	0	8 (n=46)	17
% of FCHVs reporting stockout of ARI timer	0 (n=14)	0	1 (n=46)	2
% of CHWs reporting stockout of Gentamicin	0 (n=21)	0	2 (n=15)	13
% of CHWs reporting stockout of Syringes	0 (n=21)	0	1 (n=15)	7

The overall results from the 8 hill VDCs were good and did not show much impact even after decreasing supervision. However, mentioned earlier the discrepancy among hill VDCs might have affected in this. A slight reduction has been observed regarding the knowledge of FCHVs and CHWs in hill VDCs as well as there were some challenges faced regarding logistics supply after decreasing supervision. Therefore, a different strategy should be adopted while implementing such community-based program in hilly areas. Considering this, a small pilot study has been conducted within the MINI Program to see the feasibility and acceptability of Uniject Gentamicin.

The MINI project proved that FCHVs can play a significant role in the community based management of newborn infections. While the program for treating PSBI appears to be effective in a Terai district (flat land), where accessibility is reasonably good, it was difficult to implement in the hills. Therefore, there was an interest in exploring the feasibility of using gentamicin in Uniject in areas that are less accessible. Therefore, 5 VDCs of Morang were selected as the most suitable site for this early design-stage trial due to existing MINI program and research infrastructure. So, Gentatamicin in uniject design stage trail was built on the already ongoing MINI interventions.

This design stage trial was implemented under the leadership of Child Health Division, Ministry of Health and Population, Nepal. The program was a partnership among MoHP, Nepal Family Health Program (NFHP-II/USAID), PATH USA and MINI program.

xvi. Uniject Gentamicin Design Stage Study: An alternative solution

Uniject® prefill, single-dose injection devices combine medication, syringe, and needle in a small, sterile package. The Uniject device was specifically designed to make injections safe and easy to administer. Uniject devices are an ideal delivery mechanism, not only within a health facility but also for minimally trained workers to administer injections at locations outside the health facility. Health workers with no previous experience using syringes have been able to easily learn to use the Uniject device correctly.

The Uniject devices were pre-filled with a single gentamicin dose so that they may be easily transported and used in a home or primary health facility when the signs of a neonatal infection are first detected. Thus, gentamicin in Uniject if used safely, properly, and efficiently for infants with severe bacterial infections, may make significant contributions in reducing neonatal mortality in countries with difficult geographical terrain.

Figure 42: *Gentamicin in uniject device*

Research questions

Primary Research Question

Is gentamicin in Uniject, in combination with oral cotrimoxazole and an appropriate scale, a feasible option for the treatment of neonatal sepsis when administered at home by FCHVs?

Secondary Research Questions

- Are the FCHVs motivated and able to continue to use this treatment modality in a program setting as it will require a larger time commitment than their current responsibilities?
- Is the administration of gentamicin in Uniject by FCHVs as a treatment for neonatal sepsis acceptable to community members?

Research Objectives

1. To evaluate health worker comprehension of training materials about the use of the gentamicin in Uniject device in combination with an appropriate scale including choosing the correct dose and dosing schedule, and adhering to a correct dosing schedule; and
2. To assess performance of gentamicin in Uniject characteristics such as ease-of-use, dose accuracy, safety, and ease-of-disposal among health workers; and
3. To assess acceptability of using gentamicin in Uniject by health workers and the community.

Study Design

The five VDCs of Morang district with high PSBI prevalence were selected for this study: Govindapur, Dainiya, Sorabhag, Hattimuda and Madhumalla. FCHVs were given new skill of injecting gentamicin in uniject in addition to skills provided in MINI program. The FCHVs were once certified at the end of the training and again certified by their immediate supervisor (VHW/MCHW/HI) at the completion of first case. Community health workers (CHW) in those VDCs were also trained regarding the injection skill of gentamicin in uniject. Orientation was also given to members of health facility management committees as well as to the local community leaders before the implementation of the study.

A total of 45 FCHVs from five VDCs were enrolled in the study and provided supervision by 15 VHWs and MCHWs.The DPHO and district supervisors had a supervisory role in the intervention VDCs. In addition, 45 caretakers of infants who were treated with gentamicin-Uniject were interviewed during the intervention period from February to June 2009.

Research approval were obtained from Ministry of Health and Population, Nepal, Nepal Health Research Council and Research Ethics Committee, PATH, USA

Program activities

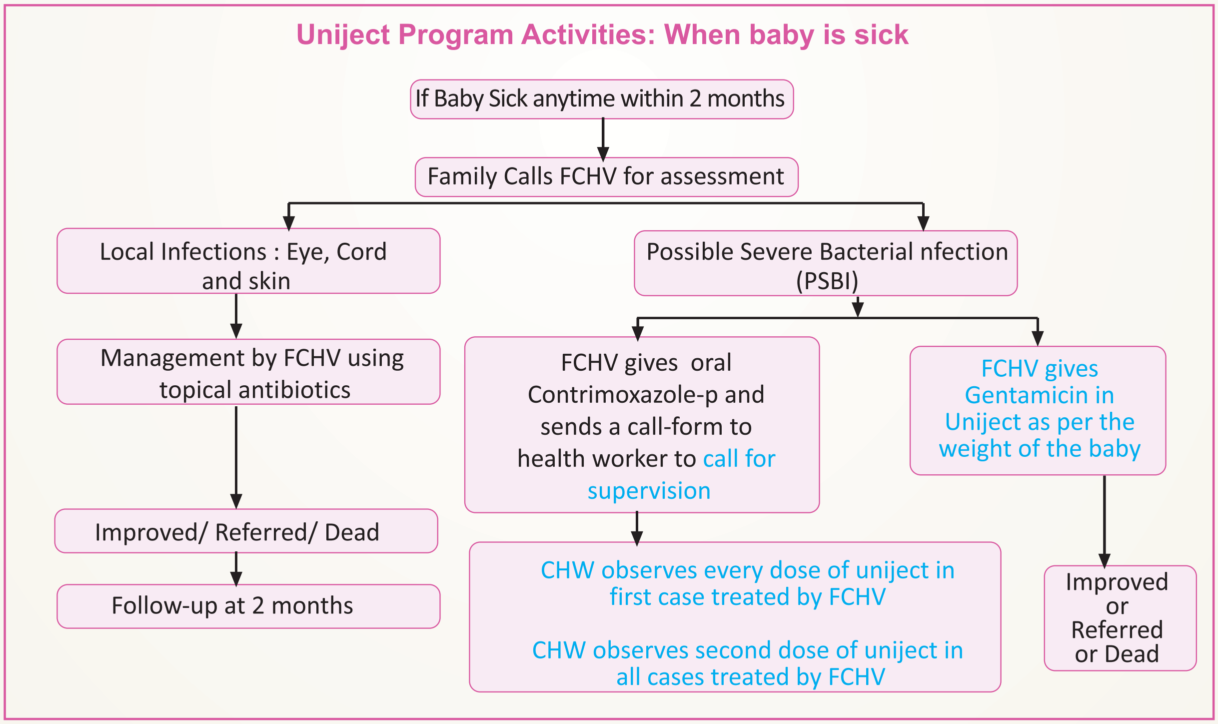


Figure 43: *uniject activities for sick babies*

Treatment Regimen

Gentamicin in Uniject was paired with cotrimoxazole-P for treatment of neonatal sepsis in newborns as opposed to regular gentamicin in MINI program. Table 30 shows dose of Gentamicin in Uniject according to weight of the young infants which is slightly different than in MINI program. This is because the Gentamicin in Uniject is pre-filled.

Table 31: Gentamicin in Uniject dosing regimen

Weight	Dose	Duration	Total # of Doses
< 2000 grams	10 mg every 48 hours	9 days	5
2000 - 2499 grams	10 mg every 24 hours	7 days	7
2500 -3500 grams	13.5 mg every 24 hours	7 days	7

Data Collection

The existing MINI registers were used for recording births and two month status. Slight modifications were done for treatment registers used in Morang Uniject Genta Program (GENTAMICIN IN UNIJECT DESIGN STAGE study). One field coordinator, from the MINI project, regularly visited the FCHVs and CHWs to collect the data. The field coordinator provided technical support to the CHWs and FCHVs and also interviewed the caretaker who benefited from the program.

The Gentamicin in Uniject intervention was implemented for a period of four months. At the end of the study, focus group discussions with FCHVs in each VDC, key informant interviews with two community leaders in each VDC, in-depth interview with CHWs, post implementation competency certification with FCHVs, and post implementation knowledge assessment with CHWs and FCHVs were conducted.

Results

During the study period, 33 FCHVs treated at least one PSBI case and 12 did not treat. Study results are currently being analyzed. The final report of GENTAMICIN IN UNIJECT DESIGN STAGE study will be published separately and disseminated. Some of the major findings available now from the regular monitoring data from the MINI project are as follows:

Table 32: Live births, PSBI episodes and uniject gentamicin treatment.

	Number	Percentage
Total Live birth recorded	367	
Total PSBI episodes identified	82	22%
Total PSBI first seen by FCHVs	73	89%
Total PSBI treated by FCHV by using uniject gentamicin	60*	73

** 13 were not treated because they were more than 3500 grams and referred to health facility*

All the episodes of PSBI (73) improved with cotrimoxazole and Gentamicin in Uniject. In all the PSBI episodes, the used Uniject device was disposed properly in the safe disposal box. None of the PSBI cases developed local adverse reaction like redness or abscess at the injection site and none died. None of the health workers had needle stick injury with the Uniject device.

In the in-depth interviews with caretakers (n=45), 95% of themhad either good or very good impression about the FCHVs giving Uniject injection and the most common reason was that the device was easy and not frightening. These results demonstrate the acceptability of using Gentamicin in Uniject by both health workers and the community.

Recommendations

Based on the preliminary findings, it seems that Gentamicin in Uniject could be an option to bring the treatment of newborn infection closer to home. FCHVs are well accepted by the community as having a primary role in giving Gentamicin in Uniject. FCHVs themselves are very well motivated to carry out this new role in the community. Therefore, Gentamicin in Uniject might be an alternative solution for the challenges faced in the hill VDCs for the community-based management of neonatal sepsis.

Figure 44: *FCHV giving gentamicin in uniject*

xvii. Further Findings and Analyses

During the MINI data collection period, various other data were collected apart from MINI's regular data and further analyses have been done to determine the significance of those data. Some of them are important to understand the status of newborn health in community settings. Therefore, few important analyses are included in this report.

1. Seasonality of births

The seasonality of births has been observed over the course of the project and more births were generally seen in the last quarter of the year. During May-June the least births were observed. This seasonality of births could be due to the cultural practices of certain fixed marriage months in the country and peaks in births occurring 9 – 10 months after these seasons. December/January is a popular wedding season.

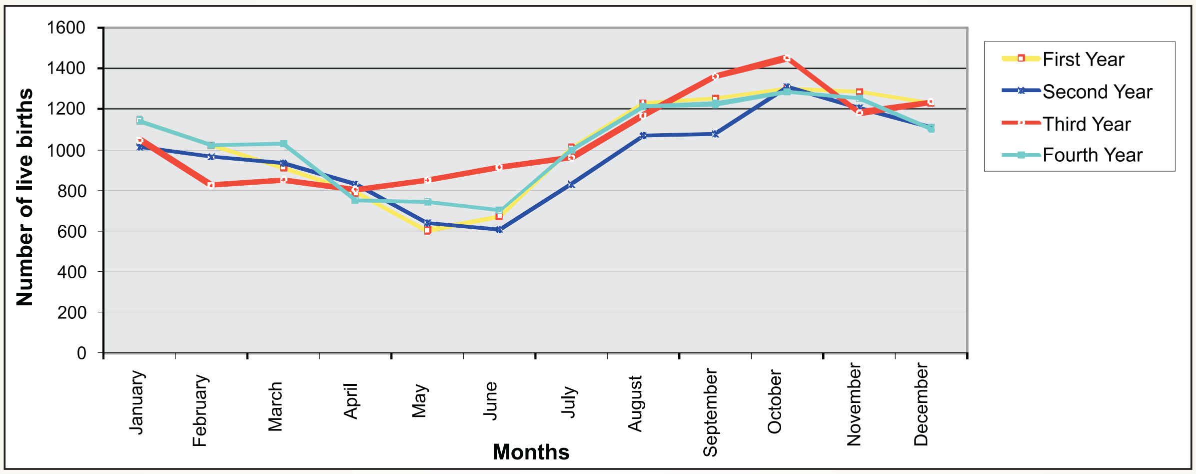


Figure 45: *Seasonality of births*

2. Seasonality of deaths

The total 776 deaths among young infants were analyzed to see the seasonality of deaths. More deaths occurred during the last quarter of the year corresponding, as expected, to the quarter with the most births. However, there is some fluctuation in the seasonality pattern of deaths. In all 4 years the most births occurred in the month of October. but the number of deaths was not always highest in October. In the first two years, more deaths occurred during the month of August and the following two years most deaths occurred in the month of September.

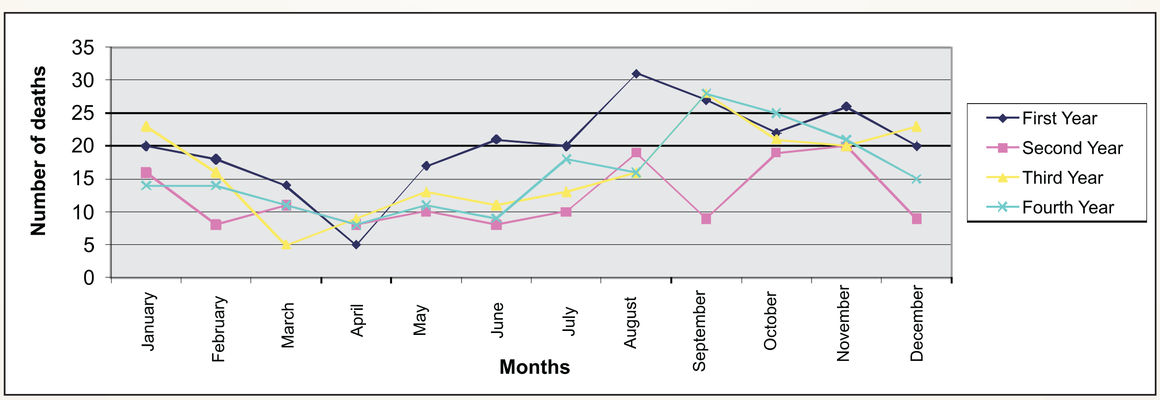


Figure 46: *Seasonality of deaths*

3. Age distribution of deaths

Out of 776 recorded deaths during the entire project period, most of the deaths occurred during the first week of life. However, a slight peak was also observed during the third week of life and deaths continued throughout the two-month period. It would be expected that two-thirds of neonatal mortality would occur in the first week of life, but this was not fully reflected in the MINI data perhaps due to the neonatal sepsis management in the community.

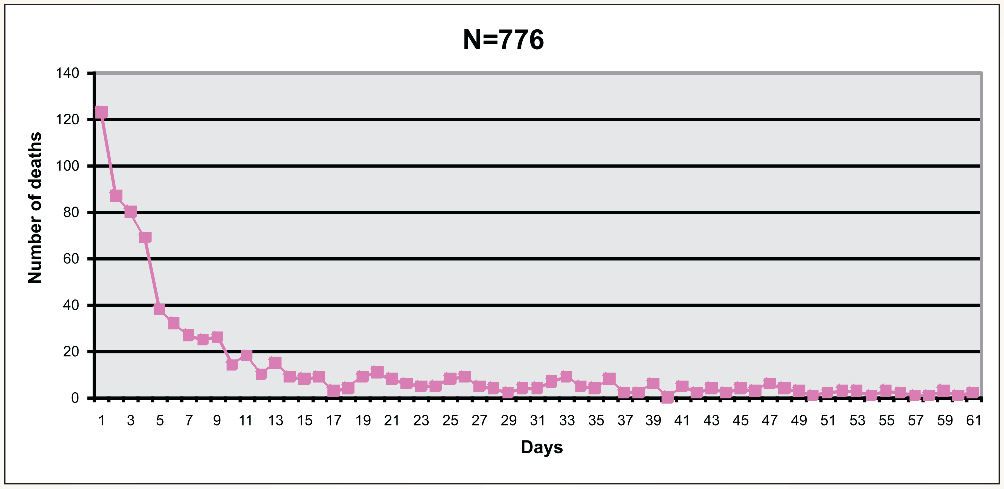


Figure 47: *Age distribution of deaths*

4. Age distribution of PSBI

More PSBI deaths were seen during first and second week of life. However, PSBI episodes continued to occur throughout the two-month period. Rapid identification and early management are essential to prevent deaths due to PSBI in young infants in the community setting.

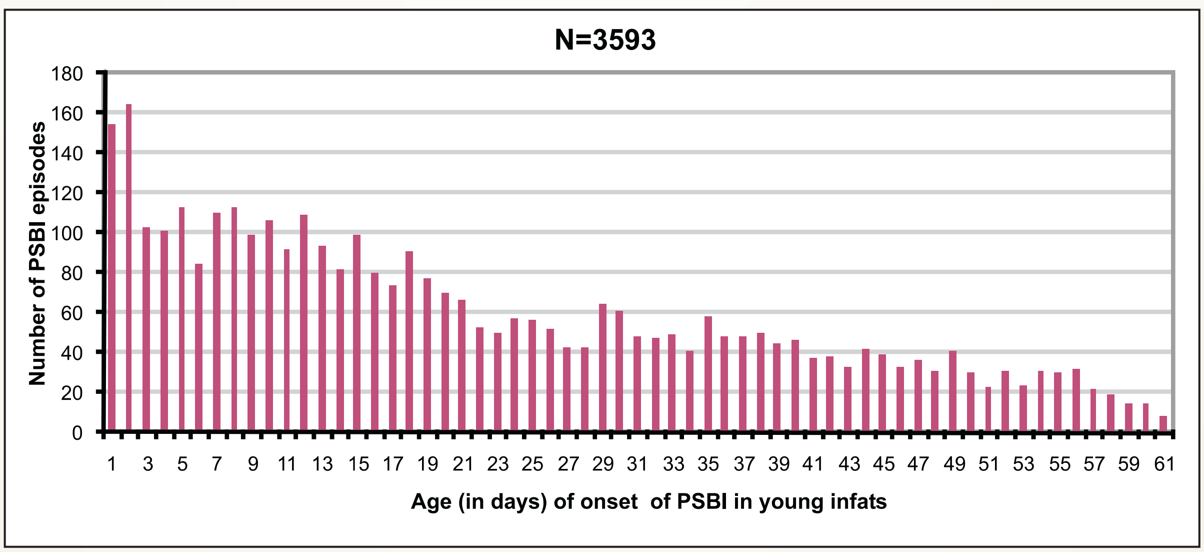


Figure 48: *Age (in days) at onset of PSBI in young infants*

5. PSBI seasonality

There was a similar pattern of seasonality of births and PSBI. More PSBI episodes occurred in the last quarter of the year and the highest number were found in September. This could be due to more births during the same period of time. In addition, there might be higher risk of PSBI during the early winter season.

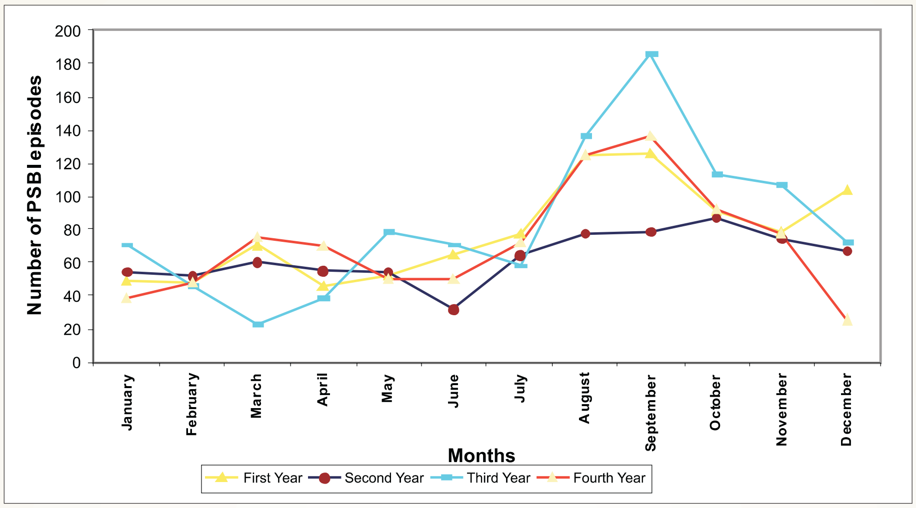


Figure 49: *Seasonality of PSBI*

6. PSBI signs distribution

A similar pattern of distribution of PSBI signs was observed among those young infants who died due to PSBI and those who survived. The most common signs in both categories were “unable to feed”, “fast breathing” and “fever”. The graphs show that there was a similar trend of sign distribution among PSBI-related deaths and PSBI episodes that did not result in death. However, the signs “unable to feed” and “weak cry” had an increased association with the likelihood of dying and the presence of “skin pustules” was not associated with an increased likelihood of dying.

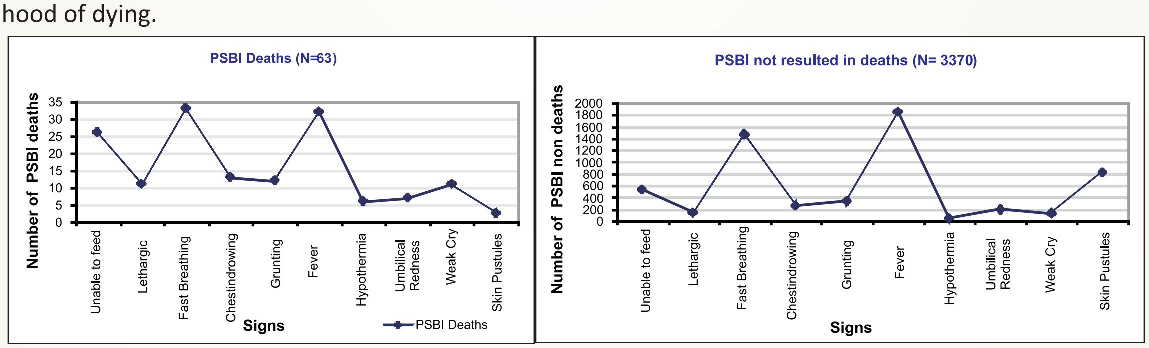


Figure 50: *Distribution of signs among PSBI deaths and PSBI episodes that did not results in deaths*

7. PSBI death pattern

Among young infants who were diagnosed, within the MINI program, as having PSBI who died, 44% of total deaths occurred in the first week of life. Deaths due to PSBI were also high in the second week of life. Of all PSBI deaths, 62% occurred during the first two weeks of life and 82% during the neonatal period. However, the PSBI deaths continued even during the second month of life.

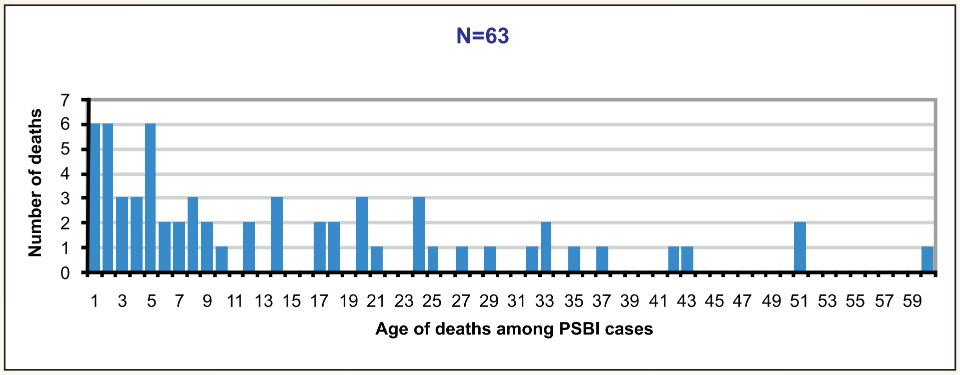


Figure 51: *Age at death among PSBI cases*

8. PSBI treated with Cotrimoxazole-P

According to MINI activities, upon identification of PSBI episodes by the FCHVs they initiate treatment with cotrimoxazole-P and refer the cases to the VHW/MCHW for gentamicin injection. However, at times families do not or cannot comply with this referral advice and therefore the sick young infant receives only cotrimoxazole-P and not gentamicin injections. This could be due to problems with physical access to the health facility, family problems and other socio-cultural factors. Therefore, a separate form was developed and used by MINI to collect information regarding those PSBI cases who were treated only with cotrimoxazole-P.

There were a total of 111 PSBI episodes who received cotrimoxazole-P and did not receive any gentamicin injection through the VHW/MCHW/HF. Out of 111 cases, 32 sought care from other facilities (nursing home, private hospital, pharmacy, clinic etc) and MINI does not have further information about them. However, 79 PSBI cases (episodes or cases) who were treated only with cotrimoxazole-P were analyzed to find out the outcome of "cotrim-P only" treatment. Out of 79 PSBI episodes who were treated only with cotrimoxazole-P, 96% (n=76) completed the full five days course of treatment and 94% (n=74) were improved at the completion of treatment. Among other, 1% (n=1) got worse, 2% (n=2) were died and 2% (n=2) were unknown.

9. Verbal Autopsy

Separate verbal autopsy data were collected to understand the causes of young infant deaths in the communities. Experienced MINI field supervisors were assigned to collect the verbal autopsy data using a specially-designed form. The completed forms were reviewed by two senior pediatricians to assign the cause of death. A total of 450 verbal autopsy data were collected and analyzed. The following graph shows the distribution of cause of deaths among young infants. However, 399 deaths occurred without getting treatment through the MINI program. Only 51 came into contact with MINI and among them only 31 did receive treatment and died. This shows that if a baby receives treatment, there is less likelihood of dying from sepsis. Therefore, it is essential to implement a community-based program like MINI to prevent deaths among young infants.

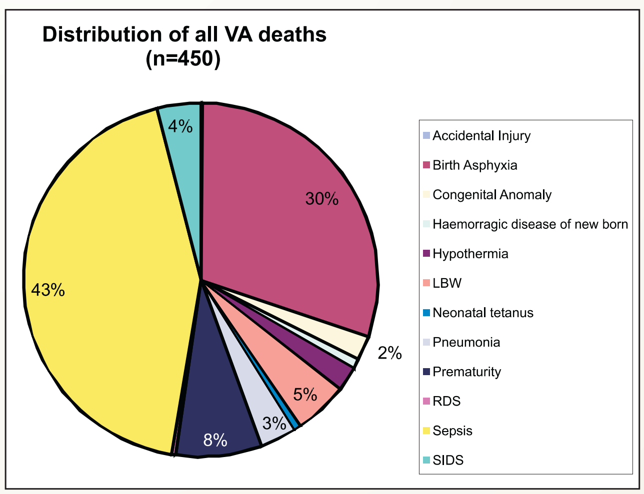


Figure 52 : Distribution of deaths among young infants according to VA-assisgned cause of death

xviii. Sustainability

The sustainability of the MINI program was always a concern and special attention has been given to this issue since the initiation of the proram. Various strategies were used to give consideration to how to sustain the program even after completion of the project.

Approaches for sustainability

1. Involvement of DPHO and existing government staff

From the beginning of the program, the DPHO was involved with the MINI project. While developing the DTWG, the DPHO was also requested to be a member of the team. In addition, one senior officer from the DPHO with experience of the CB-IMCI program, was requested to be the MINI focal person and also involved in the DTWG. Therefore, both the DPHO and MINI focal person participated from the planning, designing to the implementation of the program. Their involvement made it easy to liase and work with the government health staff and facilitated entry into the communities. Similarly MINI used the existing government volunteers and staff (FCHVs/CHWs) to implement the program in the communities. The FCHVs in the government system were already trained in the ARI and CB-IMCI program. Therefore, utilizing their previously established experience and building new skills was an easy approach for MINI. Similarly CHWs in the government system were already trained with injection skills, and MINI further enhanced their skill by introducing gentamicin injection.

This approach of involving the DPHO and utilizing already existing health workers helped in ensuring the sustainability of the project right from the beginning The MINI project in Morang has already ended on April 30th 2009, however, there is continuity of the program activities in the district with the support from the DPHO, VDC and local communities. There are no more MINI Field Supervisors in the field, but the program has been sustained with the help of existing peripheral government staff and committed DPHO staff. The data which is regularly collected from the DPHO Morang after April 30, 2009, is evidence for the sustainability of the program.

2. Logistics supply

MINI also used another strategy from the beginning of the program for its future sustainability. After the training of FCHVs and CHWs, essential logistics were supplied. The DPHO and health facilities were asked to continue their usual demand and supply mechanism as in the government system for any logistics requirement. MINI supplied all logistics requirements (medicines, registers, supplies, etc) to the DPHO and these were made available to the peripheral staff through their existing supply mechanism. The FCHVs request the supplies that they require from the (sub) Health post Incharge on a monthly basis and the HP Incharge will resupply them from their health facility stock. Then the health facility sends their own demand to the DPHO. On receiving the request, the DPHO will supply logistics to the HP for their own use and for resupply to the FCHVs. Therefore, MINI did not have to face any major difficulty regarding stockouts during the entire project period. However, there were some stockouts which were less than 3% and overall the system was considered to be an efficient supply mechanism. Even after completion of the project, the mechanism of supply remained the same and continued without any hindrance. Most of logistics used by the MINI project were already available in government health facilities such as cotrimoxazole-P, gentian violet. The major additional commodity was gentamicin injection with insulin syringes. By the end of the project, the government of Nepal had considered gentamicin as an essential drug and will make it available up to the Sub Health Post level. This has also helped in sustainability of the program.

Table 33 : Status of stock out in 65 VDCs during project period

	May 01 2005 to April 30, 2009	
	Number	%
% of FCHVs reporting stockout of cotrimoxazole-P	49 (N=2368)	2
% of FCHVs reporting stockout of ARI timer	40 (N=2368)	2
% of CHWs reporting stockout of Gentamicin	16 (N=526)	3
% of CHWs reporting stockout of Syringes	11 (n=526)	2

Source: MINI CHW Interview

3. FCHV support from the VDCs

FCHVs under the government health system are volunteers. MINI always made a special effort to keep their motivation high. For the regular program and data collection, the monthly meetings were important. Therefore, MINI started supporting these monthly meetings by providing refreshment worth Rs 300 (total) for 9 FCHVs to encourage them to attend these meetings. These meetings were utilized to collect data and reinforce their skills. By the end of the program the VDC members were convinced regarding the importance of these meetings for health-related activities and some VDCs started supporting the FCHVs. by providing their own funds for the conduct of these meetings. MINI already stopped supporting them from June, 2009. In many of the VDCs in Morang the local VDC committee has also given bicycles to the FCHVs in appreciation of their work in MINI program and for other programs as well. For the MINI-related activities, the FCHVs had to go out of their own homes and make visits to the homes of newborns, often far from their own residence. They did this willingly to try to save newborn lives whether it be day or night. Therefore, to make their commute easier, they were supported by VDCs with these bicycles. Similarly, even though these FCHVs were volunteers, many VDCs started giving them a monthly stipend in recognition for the important role that they play in the health of the community. Through all these activities MINI played an active role with VDC members to advocate to maintain motivation of FCHVs by providing small supports. The FCHVs in most of the VDCs were also given Sarees(local dress) which has not only enhanced their motivation but also made it easy for the community to recognize them. The motivation of the FCHVs was essential to sustain the program and these efforts made by MINI and the VDCs played a major role in sustainability of the program.

Table 34 : FCHV support provided by the VDCs

Support Activities	Number of VDCs
Saree distribution	47 (72%)
Cycle distribution	26 (40%)
Monthly Allowance	61 (94%) [Rs 100 to Rs 500 per month]

Source : FCHV review Meeting, 2009

4. Change in care-seeking pattern

During the early years of the MINI program, more caretakers were seeking care from the FCHVs at home and not going to the health facility. There were several cultural factors associated with this. Many people believe in evil spirits and would be reluctant to bring their newborn out of their home, even when treatment was necessary, for fear of encounters with these spirits. Some people prefer not take their baby out of their house until the naming ceremony is over and this occurs at different times in different sectors of society. For example, in some groups, the baby is not named until 11 days after birth. In other situations there were practical considerations, if the distances were far or if the mother of the young infant was weak or unwell herself during the post partum period. Therefore, MINI had to play a major role in this behavior change in the communities. Before this change, the CHWs had to go to the home of a sick young infant to give injections. This trend has changed over the period of the program Now, more cases are seeking care directly from the HF staff and also going regularly to the health facility for gentamicn injections and there is still a high compliance rate. This had also played a big role in the sustainability of the program because there is less burden for both FCHVs as well as CHWs for going to the home of the sick young infants in order to provide treatment. There is also an increased utilization of health facilities in Morang and a suggestion of improved uptake for other public health services provided through these facilities.

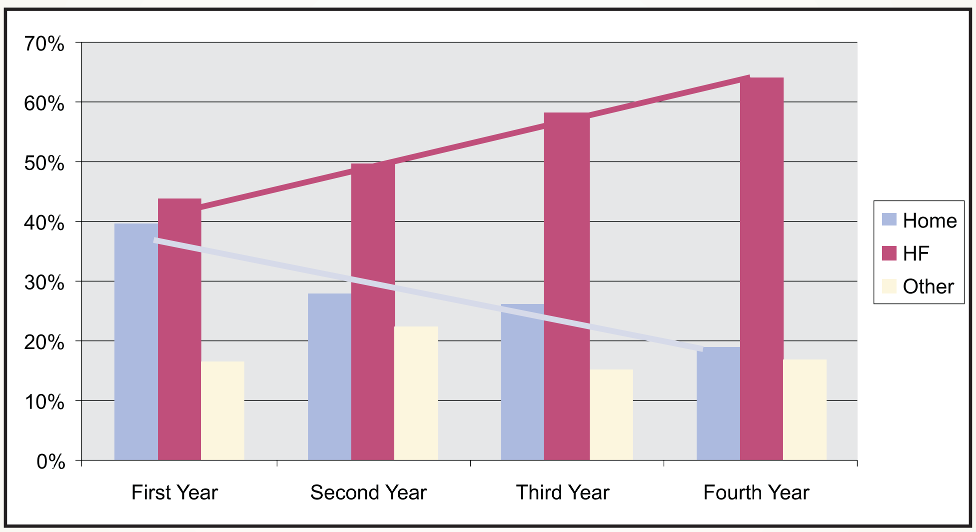


Figure 53: *Trend in First Place of Gentamicin*

5. Sustainability Workshop

A sustainability workshop was conducted in May 2009 with the help of the Social Welfare Council. The consultant who was an expert for sustaining programs in the communities was hired to conduct the workshop. The various stakeholders and partners were invited to participate in this workshop. The VDC members, LDO, DPHO, were also represented at the workshop. There was a strong representation of the DPHO staff. The other partners who were working in similar fields such as PLAN Nepal, SAVE the Children and UNICEF were also presented at the workshop. By the end of the workshop, there was a strong commitment from the DPHO, VDC and other partners to sustain the MINI activities in the communities. The DPHO was strongly committed to run the regular MINI activities with the help of DPHO staff. The VDC members were committed to support FCHVs to maintain their motivation. The other partners were also committed to support in the logistics to DPHO and regular review and refresher meetings.

Figure 54: *MINI Sustainability workshop*

6. The CB-NCP Package

The government of Nepal's Ministry of Health and Population is already piloting a neonatal package to 8 districts of Nepal and is currently conducting training activities. This package consists of many components including sepsis management as a core component and the MINI experience and materials and staff were utilized in planning for the design of this package. The government has decided to consider Morang as one of the CB-NCP districts. Therefore, this decision of the government will help to further sustain the MINI activities in Morang district. After the CB-NCP package, the government has declared gentamicin as one of the essential drugs and it will now be made available through sub health post level. Therefore, the DPHO will have easy access to this important commodity and this will help them to sustain the program in the communities. In addition, the MoHP has recently decided to also add the management of neonatal infections into the CB-IMCI curriculum in two districts in fiscal year 2009/2010 and based on that experience will scale it up quickly to other CB-IMCI districts in subsequent years.

xix. Lessons Learned from Community-based Management of Neonatal Sepsis

Feasibility

- MINI has demonstrated that community-based management of neonatal sepsis is feasible and effective.
- MINI has demonstrated that FCHVs can follow an algorithm for classification of sick neonates, initiate treatment, and facilitate referral.
- MINI has also shown that VHW/MCHWs can provide Gentamicin, with high treatment completion rates. This has resulted in increased rates of appropriate treatment, and likely contributed to reduction in neonatal deaths.

Acceptability

- Caregivers will actively seek care if they know where to go and whom to consult.
- Awareness of availability of gentamicin injections with Community Health Workers shifted the place of first care seeking gradually as the program matured and trust was reinforced.
- Low birth weight and early post natal contact with the FCHVs were contributing factors for early care seeking.

Sustainability

- MINI demonstrated that strong community orientation and inclusion from the beginning helps to build support for both the intervention itself and for the FCHVs and the CHWs delivering the services.
- The involvement of the DPHO from the beginning of the program helps to facilitate entry into the community as well as ensuring future sustainability.
- Newborn sepsis management is a sustainable intervention within MOHP system

Scale up

- MINI has affected national policy as CB management of neonatal infections is now incorporated in the Community-Based Neonatal Care Package and CB-IMCI.

- Reduced supervision had less impact on program indicators than expected. Trend in overall program performance appear to be stable. This likely reflects that high quality initial training and early-program supports (logistics, monitoring/supervision and review meetings) prepared the CHWs to work well with less external supports later in the program.

Alternative Model for Hill VDCs

- Performance in hill VDCs was better than expected although there was high variability in some indicators across VDCs. Some more remote VDCs still had limited contact with the health system for sick young infants and a different service delivery strategy is needed in more remote areas. Eg. UNIJECT gentamicin with FCHVs is a proven, viable approach.

xx. Appendices

Appendix- A

Central Technical Working Group

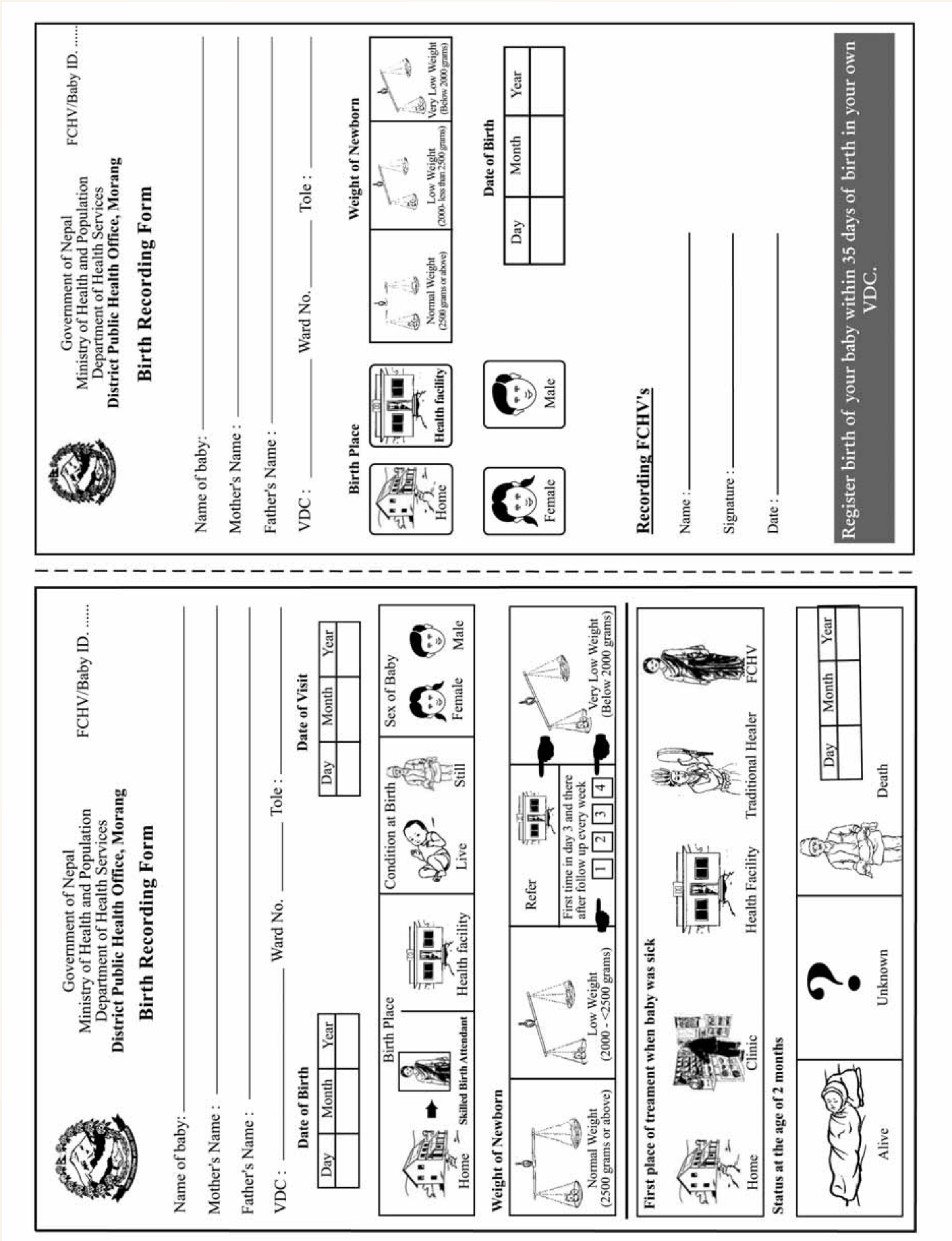
1. Dr. B. D. Chataut
2. Dr. Neena Khadka
3. Dr. Robin Houston
4. Dr. Penny Dawson
5. Dr. Tekendra Karki
6. Dr. D. S. Manandhar
7. Dr. Steve Hodgins
8. Representative from Save the Children, Kathmandu
9. MINI Project Director

District Technical Working Group

1. Dinesh Kumar Chapagain, PHA, DPHO Morang
2. Planning Officer, DDC Morang
3. Dr Prakash Rana, Pediatrician, Koshi Zonal Hospital
4. Tek Raj Koirala, Focal Person MINI, DPHO Morang
5. Representative Women Development Office, Morang
6. Representative from NFHP, Biratnagar
7. Representative from Save the Children, Biratnagar
8. Representative from Unicef, Biratnagar
9. Representative from Nursing Campus, Biratnagar
10. Representative from Plan Nepal, Biratnagar
11. Field Coordinator, MINI Program
12. MIINI Project Director

Appendix -B

Birth Recording Form



Government of Nepal
Ministry of Health and Population
Department of Health Services
District Public Health Office, Morang

FCHV/Baby ID. ......

Birth Recording Form

Name of baby: ____________

Mother's Name : ____________

Father's Name : ____________

VDC : ________ Ward No. ________ Tole : ________

Date of Birth

Day	Month	Year

Date of Visit

Day	Month	Year

Birth Place: Home — Skilled Birth Attendant — Health facility

Condition at Birth: Live — Still

Sex of Baby: Female — Male

Weight of Newborn

Normal Weight (2500 grams or above) — Low Weight (2000 - <2500 grams) — Very Low Weight (Below 2000 grams)

Refer

First time in day 3 and there after follow up every week 1 2 3 4

First place of treament when baby was sick

Home — Clinic — Health Facility — Traditional Healer — FCHV

Status at the age of 2 months

Alive — Unknown — Death

Day	Month	Year

Government of Nepal
Ministry of Health and Population
Department of Health Services
District Public Health Office, Morang

FCHV/Baby ID. ......

Birth Recording Form

Name of baby: ____________

Mother's Name : ____________

Father's Name : ____________

VDC : ________ Ward No. ________ Tole : ________

Birth Place

Home — Health facility

Female — Male

Weight of Newborn

Normal Weight (2500 grams or above) — Low Weight (2000- less than 2500 grams) — Very Low Weight (Below 2000 grams)

Date of Birth

Day	Month	Year

Recording FCHV's

Name : ____________

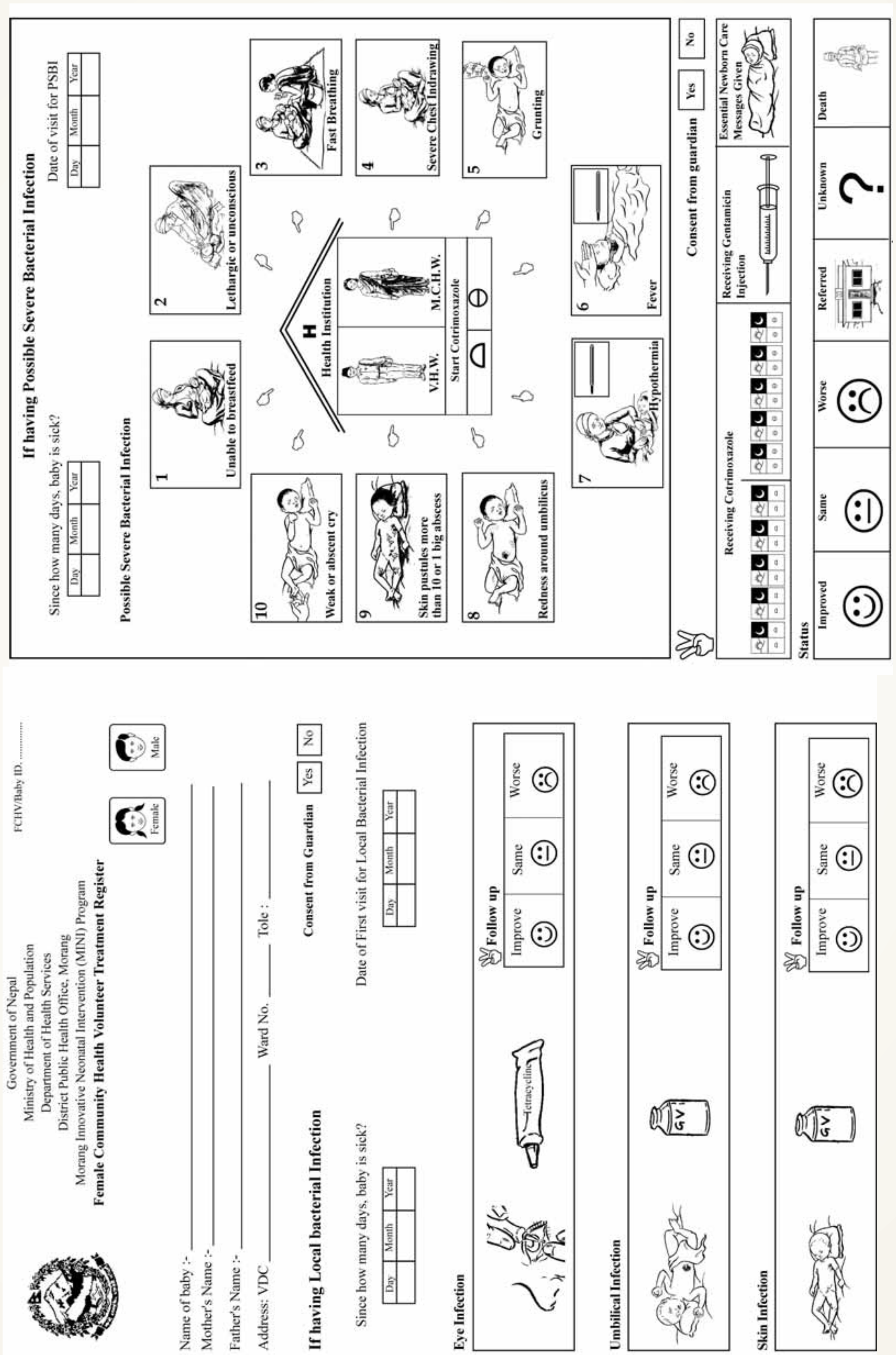
Signature : ____________

Date : ____________

Register birth of your baby within 35 days of birth in your own VDC.

Appendix -C

FCHV Treatment Register



Appendix -D

Call form

Government of Nepal
Ministry of Health and Population
Department of Health Services
District Public Health Office, Morang
Morang Innovative Neonatal Intervention (MINI) Program

FCHV/Baby ID. ....

VHW/MCHW Call Form

Baby's Father's/mother's Name: ....

Address: VDC .... Ward No.............. Tole ....

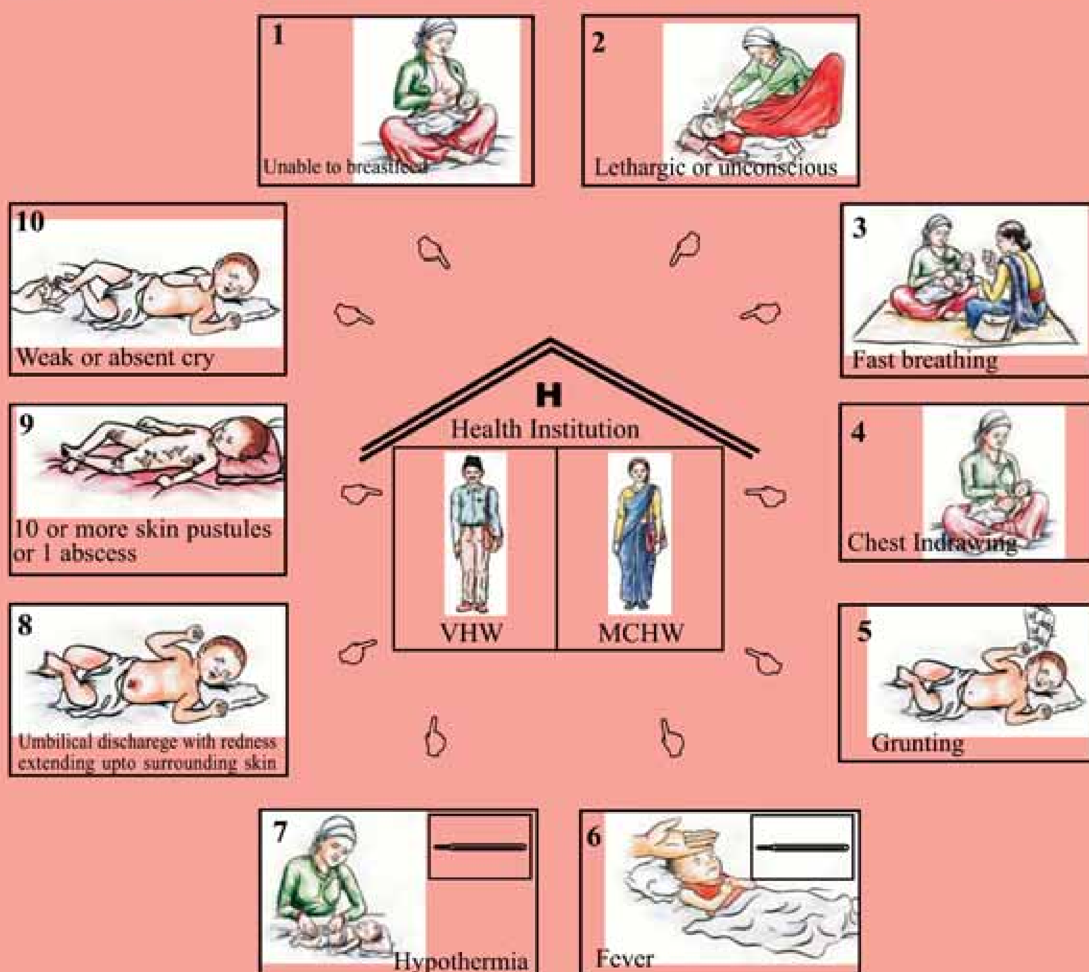
Date of birth: Day .... Month .... Year ....

Date of visit: Day .... Month .... Year ....

Resident of another ward:	
Yes	No

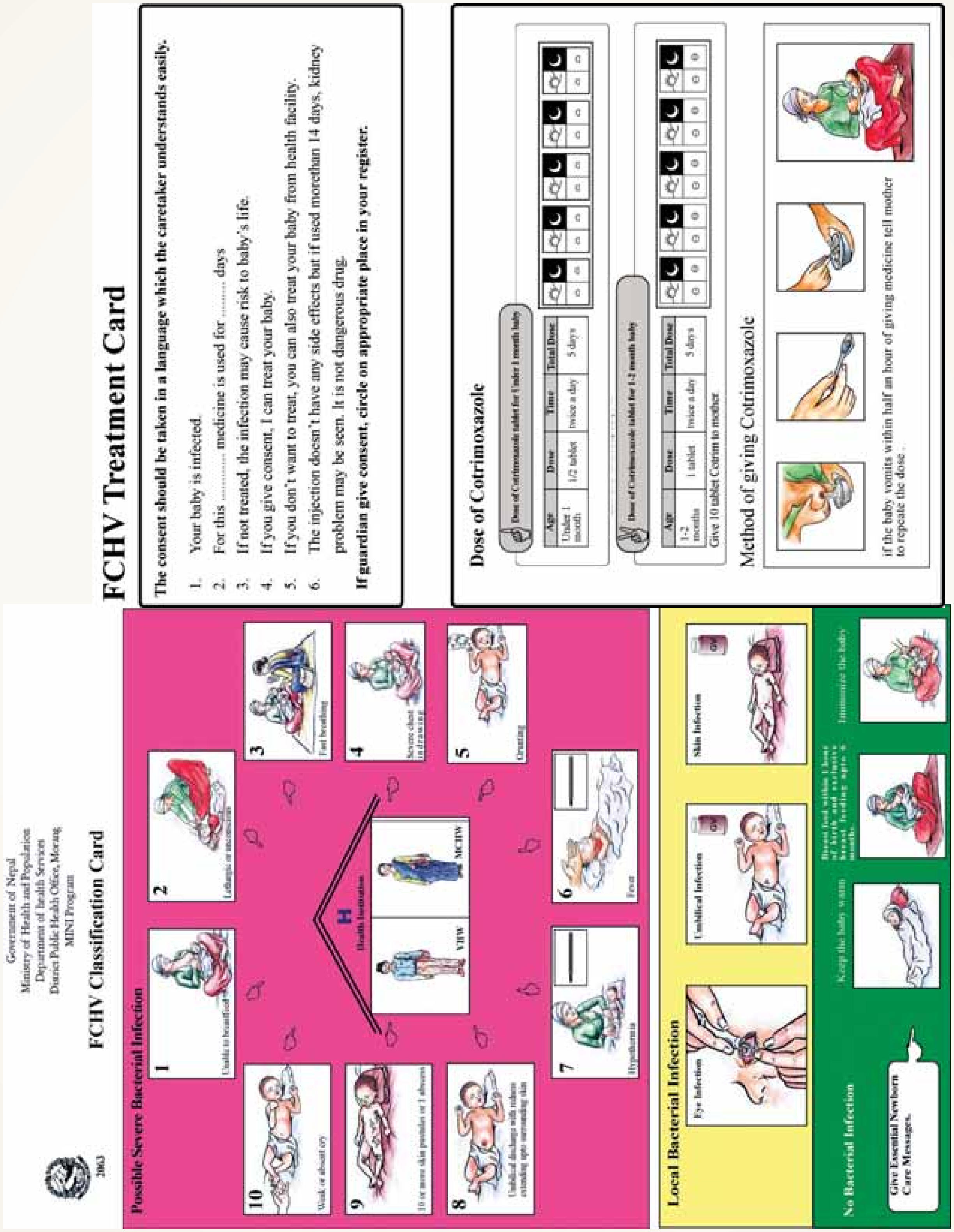
Sex:

Possbile Severe Bacterial Infection



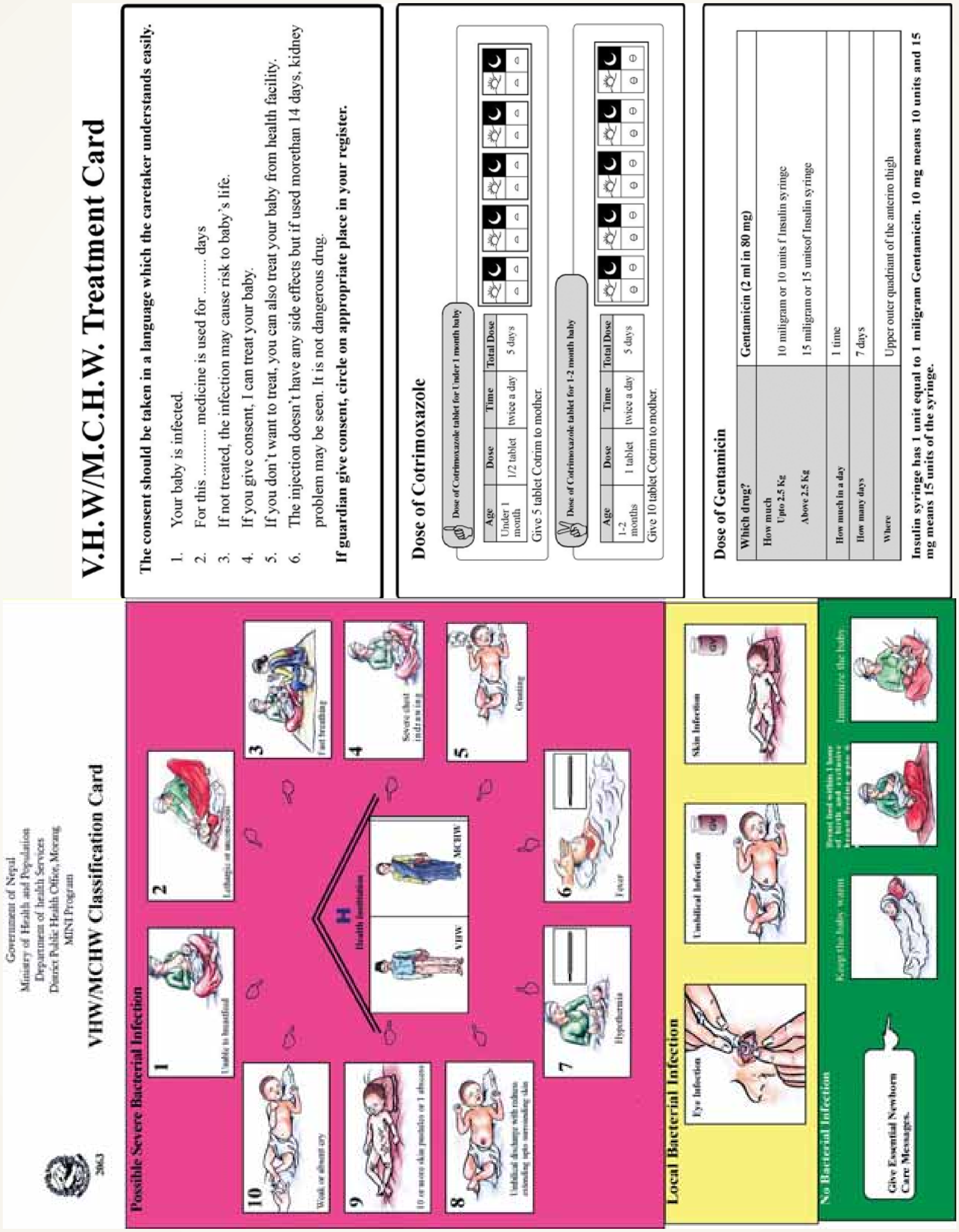
Appendix -E

FCHV Classification Card



Appendix -F

VHW Classification Card



V.H.W/M.C.H.W. Treatment Card

The consent should be taken in a language which the caretaker understands easily.

1. Your baby is infected.
2. For this .... medicine is used for .... days
3. If not treated, the infection may cause risk to baby's life.
4. If you give consent, I can treat your baby.
5. If you don't want to treat, you can also treat your baby from health facility.
6. The injection doesn't have any side effects but if used morethan 14 days, kidney problem may be seen. It is not dangerous drug.

If guardian give consent, circle on appropriate place in your register.

Dose of Cotrimoxazole

Dose of Cotrimoxazole tablet for Under 1 month baby

Age	Dose	Time	Total Dose
Under 1 month	1/2 tablet	twice a day	5 days

Give 5 tablet Cotrim to mother.

Dose of Cotrimoxazole tablet for 1-2 month baby

Age	Dose	Time	Total Dose
1-2 months	1 tablet	twice a day	5 days

Give 10 tablet Cotrim to mother.

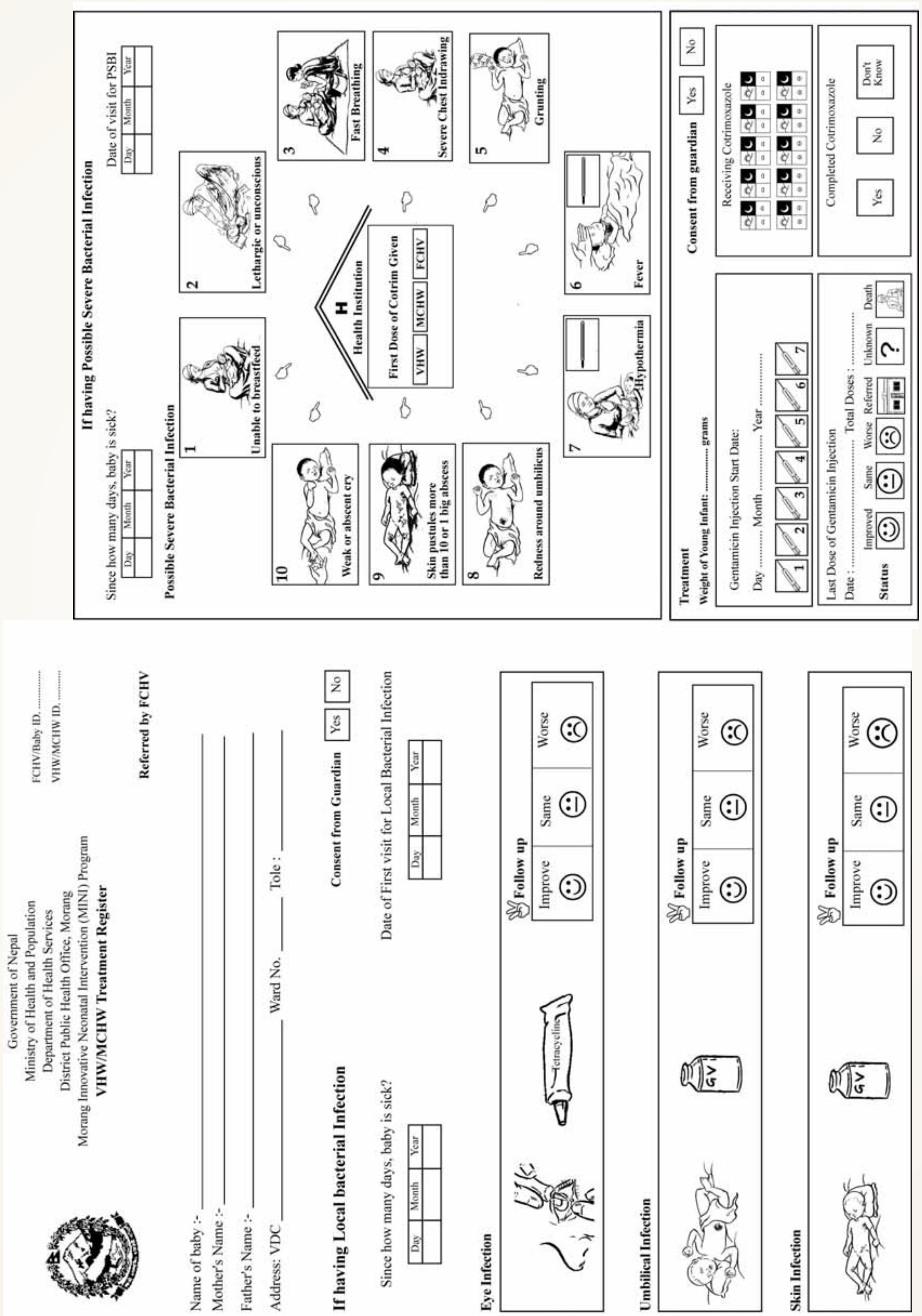
Dose of Gentamicin

Which drug?	Gentamicin (2 ml in 80 mg)
How much Upto 2.5 Kg	10 miligram or 10 units f Insulin syringe
Above 2.5 Kg	15 miligram or 15 unitsof Insulin syringe
How much in a day	1 time
How many days	7 days
Where	Upper outer quadriant of the anteriro thigh

Insulin syringe has 1 unit equal to 1 miligram Gentamicin. 10 mg means 10 units and 15 mg means 15 units of the syringe.

Appendix -G

VHW Treatment Register



Government of Nepal
Ministry of Health and Population
Department of Health Services
District Public Health Office, Morang
Morang Innovative Neonatal Intervention (MINI) Program
VHW/MCHW Treatment Register

FCHV/Baby ID. ....
VHW/MCHW ID. ....

Referred by FCHV

Name of baby :- ____________
Mother's Name :- ____________
Father's Name :- ____________
Address: VDC ________ Ward No. ________ Tole : ________

If having Local bacterial Infection

Consent from Guardian Yes No

Since how many days, baby is sick?

Day	Month	Year

Date of First visit for Local Bacterial Infection

Day	Month	Year

Eye Infection

Tetracycline

Follow up

Improve	Same	Worse

Umbilical Infection

GV

Follow up

Improve	Same	Worse

Skin Infection

GV

Follow up

Improve	Same	Worse

If having Possible Severe Bacterial Infection

Since how many days, baby is sick?

Day	Month	Year

Date of visit for PSBI

Day	Month	Year

Possible Severe Bacterial Infection

1 Unable to breastfeed
2 Lethargic or unconscious
3 Fast Breathing
4 Severe Chest Indrawing
5 Grunting
6 Fever
7 Hypothermia
8 Redness around umbilicus
9 Skin pustules more than 10 or 1 big abscess
10 Weak or absent cry

H Health Institution

First Dose of Cotrim Given
VHW MCHW FCHV

Treatment

Weight of Young Infant: .... grams

Consent from guardian Yes No

Gentamicin Injection Start Date:
Day .... Month .... Year ....

1 2 3 4 5 6 7

Receiving Cotrimoxazole

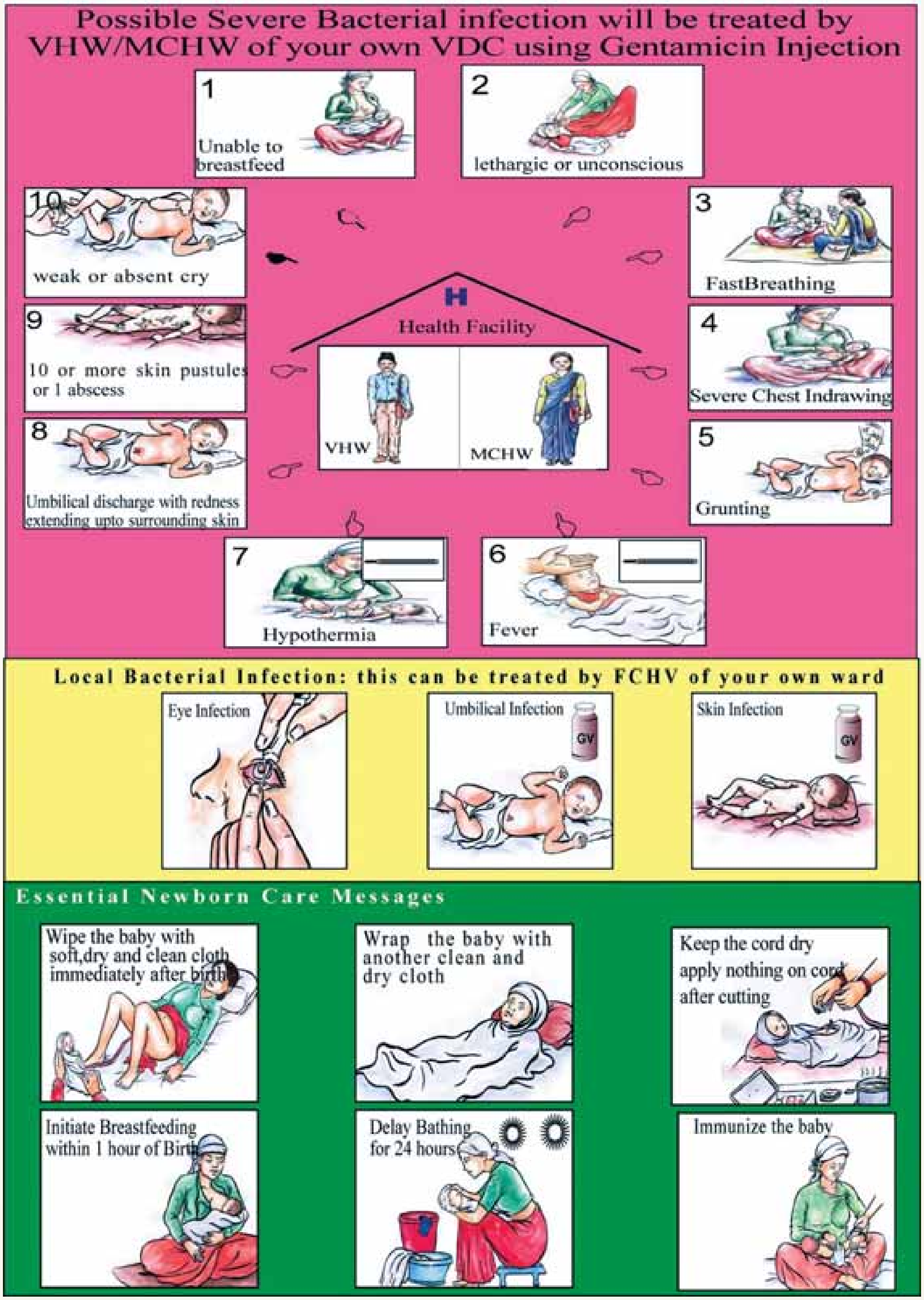
Last Dose of Gentamicin Injection
Date : .... Total Doses : ....

Status Improved Same Worse Referred Unknown Death

Completed Cotrimoxazole
Yes No Don't Know

Appendix-H

IEC Message



Appendix-I

Monthly Reporting Form

District Public Health Office, Morang

Morang Innovative Neonatal Intervention (MINI) Program

Monthly Reporting Form (Ilaka Level)

Name of Ilaka : Month : Fiscal Year :

S. N.	Activities	Name of Health Facility																					Others	Total			Remarks
		HF	VHW/MCHW	FCHV	HF	VHW/MCHW	FCHV	HF	VHW/MCHW	FCHV	HF	VHW/MCHW	FCHV	HF	VHW/MCHW	FCHV	HF	VHW/MCHW	FCHV	HF	VHW/MCHW	FCHV		HF	VHW/MCHW	FCHV	
1	Number of live births																										
	Number of still births																										
2	Number of babies for whom weight was taken																										
	Number of low weight babies																										
	Number of very low weight babies																										
	No. of babies who received 4 follow up visits																										
	Number of babies who were referred																										
3	Number of babies with LBI																										
	No. of babies treated having LBI																										
4	No of babies with PSBI																										
	No of babies treated with Cotrim																										
	No of babies treated with Gentamicin inj.																										
	No of babies completed Gentamicin Treatment																										
	No of babies improved among treated cases																										
	No of babies referred having PSBI																										
5	No of babies died within 2 months of age																										

Report prepared by Report Verified by Date:

Appendix - J

Form A

Form A *Revised*

03/02/08/v2

Nawajat Shishu Swasthya Karyakram

VDC: ______

Month ______

	For all young infants (<2 months)										2 months status				
Form No	Baby Identification Number	Date of Birth (MM/DD/YY)	Date of FCHV Visit (MM/DD/YY)	Birth Place (Home/HF)	SBA (Y/N)	Birth Condition (Live/Still)	Sex (M/F)	Ethnicity	Baby wt: (Normal, Low, Very low)	If low wt/ very low wt; # Visits/refer	2 months follow-up (Y/N)	Baby ill (Y/N)	Place of *first* treatment	2 months status (alive, unknown, dead)	If death, date (MM/DD/YY)

Appendix - K

Form B

Form B *Revised* **Nawajat Shishu Swasthya Karyakram** VDC: ____________

03/02/08/v3 Month ____________

ID	Form No.						
	Baby Number						
Local Infection	Any Local Infection (Y/N)						
	Date of baby sick (MM/DD/YY)						
	Date of FCHV visit (MM/DD/YY)						
	Eye discharge (Y/N)						
	Umbilical discharge (Y/N)						
	Skin infection (Y/N)						
	Consent for treatment (Y/N)						
	Tetra given (Y/N)						
	GV given (Y/N)						
	Status on 3rd day for eye infection						
	Status on 3rd day for umbilical infection						
	Status on 3rd day for skin infection						
FCHV section for PSBI & Follow up	Any PSBI (Y/N)						
	Case managed by FCHV (Y/N)						
	Date of baby sick (MM/DD/YY)						
	Date of FCHV visit (MM/DD/YY)						
	Unable to feed (Y/N)						
	Lethargic or unconscious (Y/N)						
	Fast breathing (Y/N)						
	Severe chest indrawing (Y/N)						
	Grunting (Y/N)						
	Fever by hand (Y/N)						
	Fever by thermometer (Y/N)						
	Hypothermia by hand (Y/N)						
	Hypothermia by thermo (Y/N)						
	Umbilical redness (Y/N)						
	>10 skin pustules (Y/N)						
	Weak or absent cry (Y/N)						
	VHW Call form given (Y/N)						
	Cotrim Given (Y/N)						
	3rd Day F/U (Y/N)						
	3rd day cotrim (Y/N)						
	3rd Day Genta (Y/N)						
	Status on 3rd day (I/S/W/R/Un/D)						
VHW/MCHW & HF Section	Baby examined by HW (Y/N)						
	Call form received date (MM/DD/YY)						
	Date of baby sick (MM/DD/YY)						
	Date of HW visit (MM/DD/YY)						
	Unable to feed (Y/N)						
	Lethargic or unconscious (Y/N)						
	Fast breathing (Y/N)						
	Severe chest indrawing (Y/N)						
	Grunting (Y/N)						
	Fever by hand (Y/N)						
	Fever by thermometer (Y/N)						
	Hypothermia by hand (Y/N)						
	Hypothermia by thermo (Y/N)						
	Umbilical redness (Y/N)						
	>10 skin pustules (Y/N)						
	Weak or absent cry (Y/N)						
	Cotrim given-VHW/MCHW/HF (Y/N)						
	Treated by VHW/MCHW/HF (Y/N)						
	If no, **reasons...**(Consent not given, CHW/HF problem, Referred, Others)						
	If yes, VHW/MCHW/HF ID No.						
	Wt in grams						
	Date of 1st Genta (MM/DD/YY)						
	No of doses Genta given						
	5 days cotrim completed (Y/N/DK)						
	Date of last Genta (MM/DD/YY)						
	Status on day of last Genta						

Appendix - L

Form D

Nawajat Shishu Swasthya Program

Gentamicin Injection Record

3-Apr-06

Form D

Form No	Baby ID	Date of 1st Genta	Total Dose(s)	HW/HF ID	First Dose Genta at (Home/HF/others)	No. of Genta dosed at			Remarks
						Home	HF	Other	

Appendix -M

Form E

Nawajat Shishu Swasthya Program

Case Study Form (PSBI treated with Cotrim only)

Form E

5/14/2006

Baby ID	No of Cotrim dose taken	Further treatment received (Y/N)	Place treated (Hospital/Nursing home, Private clinic, Drug shop, TH, Others)	Treatment by (Injection, Syrup, Tablet)	Treatment outcome (Improve, Same, Worse, DK, Death)

Appendix-N

MINI Program

Community Event Reporting Form

Date: ______________________________

Name of Event: ______________________________

VDC: ______________________ Ward # ________

Venue of Event: ______________________________

Event Facililator: ______________________________

Total Participants:

Female	Male	Total

Resource Person(s):

1

2

3

Discussion topics:

1

2

3

4

5

6

Decisions:

Name of Field Supervisor:

Signature:

Appendix-O

Format For Caretaker Interview

MINI-Caretaker-02

Caretaker Interview Form

IDENTIFICATION	
Name of interviewer ______	
Date of interview ______	MM DD YY
Name of caretaker ______	
VDC ______	
Ward No. ______	
Age *(in years)* ______	
Ethnicity ______	
No of living children ______	
Literacy ______ Read easily [1] Read with difficulty [2] Not able to read [0]	

QN	QUESTIONS AND FILTERS	CODING CATEGORIES		SKIP
1	Can you tell me the danger signs (PSBI) for a sick neonate? ***(Record unprompted answers)***	Yes	No	
	a. Unable to feed	1	0	
	b. Lethargic or unconscious	1	0	
	c. Fast breathing (RR over 60)	1	0	
	d. Severe chest in drawing	1	0	
	e. Grunting	1	0	
	f. Axillary temp > 37.5 or warm to touch	1	0	
	g. Axillary temp < 35.5 or cold to touch at both feet and abdomen	1	0	
	h. Redness around umbilicus	1	0	
	i. Skin pustules > 10 or 1 large abscess	1	0	
	j. Weak or absent cry	1	0	
2	What did you do to prevent your baby from cold? ***(For most recent delivery only. Do not prompt)***	Yes	No	
	a. Dried baby thoroughly	1	0	
	b. Wrapped baby with dry cloth and keep warm	1	0	
	c. Delayed bathing for 24 hours	1	0	
	d. Kept baby and mother in warm room	1	0	
	e. Kept baby in close contact with mother	1	0	
	f. Gave Kangaroo care	1	0	

[1]

MINI-Caretaker-02

Did you apply something to the cord of your newborn baby after it was cut? ***(For most recent delivery only)***	Yes....1 No....0		→ 5
If yes, can you tell me what was applied to the cord after it was cut? a. Oil b. Ash c. Sindoor d. Animal dung e. Medicated ointment f. Others....	Oil....1 Ash....2 Sindoor....3 Animal dung....4 Ointment....5 Others....6		
How soon did you breast feed after your baby was born? *(Write in hours)*	Hours [ ][ ] Don't know 99		
Can you tell me what essential care you need to do for your newborn baby? (Do not prompt—mark all responses)	Yes	No	
a. Dry baby thoroughly	1	0	
b. Wrap baby with dry cloth and keep warm	1	0	
c. Delay bathing for 24 hours	1	0	
d. Apply nothing to cord	1	0	
e. Breast feed within 1 hour	1	0	
How long after your recent delivery of newborn were you visited by an FCHV? *(Write in days)*	Days [ ][ ] Don't know 99		
Was your neonate ever sick before reaching 2 months of age? (Ask only for most recent delivery)	Yes....1 No....0		→ End
Was the baby ill before 7 days?	Yes....1 No....0		→ End
Section for Caretakers with neonates who was sick, or has been sick for at least 7 days			
Where did you go at **first take care** of your sick baby? a. Went to SHP/HP/PHC/Hospital b. Went to private clinic c. Home d. Others	HF....1 Private clinic....2 Home....3 Others....4		

[2]

Caretaker Interview Form contd....

11	Who helped you at **first take care** of your sick baby? a. FCHV b. VHW/MCHW c. HF staff (other than CHW) d. Private Practitioners e. Traditional Healers f. Others.	FCHV...................... VHW/MCHW............. HF Staff..................... Practitioners............. Traditional healers...... Others.......................	
12	About how long after your baby was sick were you visited by an FCHV or VHW/MCHW?	Days [|] Don't know .... !	
13	If your baby was seen by FCHV, when did she visit you again? a. Not visited again b. Visited on 3rd day c. Visited any time after 3rd day d. Don't know	Not visited................. Visited on 3[rd] day........ Anytime after 3[rd] day.... Don't know................	
14	Did your child have following problems? a. Skin pustules (<10)... b. Wet or infected cord stump... c. Eye infection..		Yes 1 1 1
15	What did you do for them? (Circle if correct answer is given without prompting)		Yes
A	Skin pustules (<10)	a. Wash hands... b. Wash off pus and crusts with soap and water................. c. Dry the area... d. Apply Gentian violet 2 times a day for 5 days................	1 1 1 1
B	Wet or infected cord stump	a. Wash hands... b. Wash off pus and crusts with soap and water................. c. Dry the area... d. Apply Gentian violet 2 times a day for 5 days................	1 1 1 1
C	Eye infection	a. Wash hands... b. Gently wipe away pus from eye using clean cloth and water... c. Apply tetracycline ointment on inside of lower lid (3 times a day).. d. Treat until redness is gone...	1 1 1 1

[3]

MINI-Caretaker-02

	Ask if the baby received treatment with injection Gentamicine		
16	Did your baby receive oral Cotrim from the FCHV/VHW/MCHW?	Yes.............................. 1 No............................... 0	→ 18
17	If yes, for how many days?	Days [|]	
18	Did your baby receive injection Gentamicine from VHW/ MCHW for illness?	Yes.............................. 1 No............................... 0	→ 21
19	If yes, for how many days?	Days [|]	
20	About how many hours after giving your baby Cotrim, was the first Injection given?	Hours [| |]	
21	Were you satisfied with the care you received from FCHV?	Yes.............................. 1 No............................... 0	
22	Were you satisfied with the care you received from VHW/MCHW?	Yes.............................. 1 No............................... 0	
23	If you have a sick baby (less then 2 months old), whom would you **first visit for care**? a. FCHV b. VHW c. MCHW d. Health Facility e. Others.............	FCHV...........................1 VHW............................2 MCHW..........................3 Health Facility.................4 Others...........................5	

Caretakerform [FINAL](6/7/05)

[4]

Appendix -P

Format for CHW Interview

MINI-CHW-02

Community Health Worker Interview Form
2005 (2062)

IDENTIFICATION	
Name of interviewer ________	
Date of interview ________	MM DD YY
Name of CHW ________	
VDC ________	
Designation ________ FCHV [1] VHW [2] MCHW [3]	
Ward No. ________	
HF Name ________	

QN	QUESTIONS AND FILTERS	CODING CATEGORIES		SKIP
1	Can you tell me the danger signs for a sick neonate? ***(Allow use of job aid, record unprompted answers)***	Yes	No	
	a. Unable to feed..........	1	0	
	b. Lethargic or unconscious..........	1	0	
	c. Fast breathing (RR over 60)..........	1	0	
	d. Severe chest in drawing..........	1	0	
	e. Grunting..........	1	0	
	f. Axillary temp > 37.5 or warm to touch..........	1	0	
	g. Axillary temp < 35.5 or cold to touch at both feet and abdomen..........	1	0	
	h. Redness around umbilicus..........	1	0	
	i. Skin pustules > 10 or 1 large abscess..........	1	0	
	j. Weak or absent cry..........	1	0	

[1]

MINI-CHW-02

			Yes	No	
2	Can you tell me what you should do for the following local infection in a neonate? ***(Circle correct answer without prompting)***		Yes	No	
A	Skin pustules (<10)	a. Wash hands..........	1	0	
		b. Wash off pus and crusts with soap and water..........	1	0	
		c. Dry the area..........	1	0	
		d. Apply Gentian violet 2 times a day for 5 days..........	1	0	
B	Wet or infected cord stump	a. Wash hands..........	1	0	
		b. Wash off pus and crusts with soap and water..........	1	0	
		c. Dry the area..........	1	0	
		d. Apply Gentian violet 2 times a day for 5 days..........	1	0	
C	Eye infection	a. Wash hands..........	1	0	
		b. Gently wipe away pus from eye using clean cloth and water..........	1	0	
		c. Apply tetracycline ointment on inside of lower lid (3 times a day)..........	1	0	
		d. Treat until redness is gone..........	1	0	
3	Can you tell me what are the key 5 educational messages for essential newborn care? ***(Do not prompt)***		Yes	No	
	a. Dry baby thoroughly..........		1	0	
	b. Wrap baby with dry cloth and keep warm..........		1	0	
	c. Apply nothing to cord..........		1	0	
	d. Breast-feed within one hour..........		1	0	
	e. Delay bathing for 24 hours..........		1	0	
4	Can you tell me what the correct dose of Cotrim P. for treating a sick neonate?		Yes	No	
	a. 1 tablet Cotrim 2 times per day for 5 days (1-2 months)..........		1	0	
	b. ½ tablet Cotrim 2 times per day for 5 days (<1 month)..........		1	0	
5	Can you tell me what the correct dose of Gentamicin for treating a sick neonate? ***(Ask only if VHW/MCHW)***		Yes	No	
	a. Injection Gentamycin 10mg for < 2.5 kg OD dose per day for 7 days..........		1	0	
	b. Injection Gentamycin 15mg for > 2.5 kg OD dose per day for 7 days..........		1	0	

[2]

MINI-CHW-02

6	At any time within the **last month**, were you not able to provide care because of lack of any supplies?	Yes..........1 No..........0		
7	Do you have **stock out** for any of the following?	**Yes**	**No**	
	a. Cotrim..........	1	0	
	b. Gentamicin..........	1	0	
	c. Syringes..........	1	0	
	d. Gentian violet..........	1	0	
	e. Cotton rolls..........	1	0	
	f. Spirits..........	1	0	
	g. Tetracycline..........	1	0	
	h. Timer..........	1	0	
	i. Thermometer..........	1	0	
	j. Scale..........	1	0	
	k. Job aids..........	1	0	
	l. Register..........	1	0	
	m. Call Form..........	1	0	
8	Did you receive any supervisory or support visit **within the past month**?	Yes..........1 No..........0		←End
9	If yes, from **where**?	Yes	No	
	a. RHD/DoHS/MoPH..........	1	0	
	b. District supervisors..........	1	0	
	c. Supervisors (PHC/HP/SHP)..........	1	0	
	d. VHW/MCHW..........	1	0	

CHWinterviewform(ver2)(7/25/05)

[3]

Appendix -Q

Format for HF Staff Interview

MINI-Caretaker-02

Caretaker Interview Form

IDENTIFICATION	
Name of interviewer ______	
Date of interview ______	MM DD YY
Name of caretaker ______	
VDC ______	
Ward No. ______	
Age *(in years)* ______	
Ethnicity ______	
No of living children ______	
Literacy ______ Read easily [1] Read with difficulty [2] Not able to read [0]	

QN	QUESTIONS AND FILTERS	CODING CATEGORIES Yes	No	SKIP
1	Can you tell me the danger signs (PSBI) for a sick neonate? ***(Record unprompted answers)***	Yes	No	
	a. Unable to feed	1	0	
	b. Lethargic or unconscious	1	0	
	c. Fast breathing (RR over 60)	1	0	
	d. Severe chest in drawing	1	0	
	e. Grunting	1	0	
	f. Axillary temp > 37.5 or warm to touch	1	0	
	g. Axillary temp < 35.5 or cold to touch at both feet and abdomen	1	0	
	h. Redness around umbilicus	1	0	
	i. Skin pustules > 10 or 1 large abscess	1	0	
	j. Weak or absent cry	1	0	
2	What did you do to prevent your baby from cold? ***(For most recent delivery only. Do not prompt)***	Yes	No	
	a. Dried baby thoroughly	1	0	
	b. Wrapped baby with dry cloth and keep warm	1	0	
	c. Delayed bathing for 24 hours	1	0	
	d. Kept baby and mother in warm room	1	0	
	e. Kept baby in close contact with mother	1	0	
	f. Gave Kangaroo care	1	0	

[1]

MINI-Caretaker-02

QN	Question	Coding		Skip
3	Did you apply something to the cord of your newborn baby after it was cut? ***(For most recent delivery only)***	Yes.....1 No.....0		→ 5
4	If yes, can you tell me what was applied to the cord after it was cut? a. Oil b. Ash c. Sindoor d. Animal dung e. Medicated ointment f. Others.....	Oil.....1 Ash.....2 Sindoor.....3 Animal dung.....4 Ointment.....5 Others.....6		
5	How soon did you breast feed after your baby was born? *(Write in hours)*	Hours ☐☐ Don't know 99		
6	Can you tell me what essential care you need to do for your newborn baby? (Do not prompt—mark all responses)	Yes	No	
	a. Dry baby thoroughly	1	0	
	b. Wrap baby with dry cloth and keep warm	1	0	
	c. Delay bathing for 24 hours	1	0	
	d. Apply nothing to cord	1	0	
	e. Breast feed within 1 hour	1	0	
7	How long after your recent delivery of newborn were you visited by an FCHV? *(Write in days)*	Days ☐☐ Don't know 99		
8	Was your neonate ever sick before reaching 2 months of age? (Ask only for most recent delivery)	Yes.....1 No.....0		→ End
9	Was the baby ill before 7 days?	Yes.....1 No.....0		→ End
	Section for Caretakers with neonates who was sick, or has been sick for at least 7 days			
10	Where did you go at **first take care** of your sick baby? a. Went to SHP/HP/PHC/Hospital b. Went to private clinic c. Home d. Others	HF.....1 Private clinic.....2 Home.....3 Others.....4		

[2]

Appendix- R

Format for Verbal Autopsy

MINI-VerAutopsy-05

Verbal Autopsy Form

IDENTIFICATION (पहिचान)

Name of interviewer ____ अन्तर्वार्ता लिनेको पुरा नाम	☐☐
Date of interview ____ अन्तर्वार्ताको मिति	☐☐☐☐☐☐ MM DD YY
Baby's Mother's Name ____ शिशुको आमाको नाम	
Baby identification number ____ शिशुको पहिचान संख्या	☐☐☐ - ☐☐☐
Name of interviewee ____ अन्तर्वार्ता दिनेको नाम, थर	☐
Relation to baby ____ शिशु संगको नाता	☐☐
Ethnicity (जात) ____	☐☐
Literacy (साक्षरता) ____ Read easily [01] Read with difficulty [02] Not able to read [00] सजिलै पढ्ने ०१ गाह्रो गरेर पढ्ने ०२ पढ्न नसक्ने ००	☐☐
Form Status: (फारमको अवस्था) ____ (1 =complete form, 2= Refused interview, 3= permanently transferred) पूर्ण १ अन्तरवार्ता इन्कार २ स्थायी रुपमा बसाई सरेको ३	☐

VITAL INFORMATION (जीवन / मृत्युको विवरण)

Date of birth of baby ____ शिशु जन्मेको मिति	☐☐☐☐☐☐ MM DD YY
Time of birth of baby (शिशु जन्मेको समय) ____	☐☐☐☐☐☐ HH MM SS
Date of death of baby (शिशुको मृत्युको मिति) ____	☐☐☐☐☐☐ MM DD YY
Time of death of baby (शिशुको मृत्युको समय) ____	☐☐☐☐☐☐ HH MM SS
Is it a still birth? (1=yes, 2=no) ____ के शिशु मृत जन्मेको हो ? हो होइन	☐ (If Yes, end here) यदि हो भने, अन्तर्वार्ता टुंग्याउने
Sex of baby: (1=Male, 2=Female) ____ शिशुको लिङ्ग (पुरुष, महिला)	☐
Where did the baby borne? (शिशुको जन्म कहाँ भएको हो?) ____ (1=Home, 2=Hospital, 3=Other HF, 4=On the way to HF, 5=Others,9=DK) १ घर , २ अस्पताल, ३ अन्य स्वास्थ्य संस्था, ४ स्वास्थ्य संस्था जाँदा बाटोमा, ५ अन्य, ९ थाहा छैन	☐

QN	QUESTIONS AND FILTERS	CODING CATEGORIES		SKIP
101	Was weight of your baby taken before the event? के मृत्यु पूर्व शिशुको तौल लिइएको थियो ?	Yes.....1 No.....0		
	If yes: What was the weight? यदि थियो भने, तौल कति थियो ?	.....GRMS DK.....2		
102	Can you tell me, was your baby ill before the event occurred? मृत्यु हुनु अगाडि शिशु बिरामी थियो कि थिएन ?	Yes.....1 No.....0		— 109
103	For how long was the baby sick before death? (मर्नु भन्दा कति दिन अगाडि देखि शिशु बिरामी थियो ?) (Write in days, write 00 for same day) (दिनमा लेख्नुहोस् । सोही दिनको लागि ०० लेख्नुहोस् ।) If same day state HH......MM......SS..... (सोही दिन भए घण्टा... मिनेट..सेकेन्ड..)	☐☐		
104	Can you tell me if any of the following signs were present before your baby died? (शिशुको मृत्यु हुनु अगाडि के निम्न चिन्हहरु थिए ?)	Yes	No	
	a. Unable to feed/ Suck milk (पिउन वा दुध चुस्न नसक्ने)	1	0	
	b. Lethargic or unconscious (सुस्त वा बेहोश)	1	0	
	c. Fast breathing (छिटो छिटो सास फेर्ने)	1	0	
	d. Severe chest in drawing (कडा कोखा हान्नेको)	1	0	
	e. Grunting (कन्नेको)	1	0	
	f. Fever (ज्वरो)	1	0	
	g. Hypothermia (शिताङ)	1	0	
	h. Umbilical discharge with redness around umbilicus (नाइटो पाकेर रातोपना नाइटोको वरिपरि सम्म फैलिएको)	1	0	
	i. Skin pustules > 10 or 1 large abscess (पिप भरिएका १० भन्दा बढी फोकाहरु वा १ ठूलो पिलो)	1	0	
	j. Weak or absent cry (कमजोर रुवाई वा नरुने)	1	0	
	k. Cyanosis (निलोपना)	1	0	
	l. Vomiting (खाएको सबै बान्ता गर्ने)	1	0	
	m. Diarrhea (पखाला)	1	0	
	n. Bleeding from sites other than vagina (योनी बाहेक अन्य ठाउँबाट रगत बग्ने)	1	0	
	o. Abdominal distension (पेट फुल्ने)	1	0	
	p. Congenital deformity *(any)* (जन्मदाको विकृति) ..... *If yes specify* (यदि छ भने वर्णन गर्नुहोस्)	1	0	
	q. Others *(if any)* (अन्य)	1	0	
105	How long after the signs first appeared, the child died? पहिलो चिन्ह देखिएको कति समय पछि शिशुको मृत्यु भयो? (If less than 1 day state HH.....MM.....SS.....) यदि १ दिन भन्दा कम छ भने घण्टा..... मिनेट..... सेकेण्ड..... मा लेख्नुहोस् ।	< 1 day.....1 1 day or more.....2 Don't Know.....3		

Verbal autopsy Final 1

105	Did the child have loose stool (diarrhea) in the 24 hours prior to death? मृत्यु पूर्वको २४ घण्टामा शिशुलाई पखाला लागेको थियो ?	Yes.....1 No.....0 Don't Know.....9	
106	Did the child have any blood in stool in the two days leading up to death? मृत्युको २ दिन अघिबाट दिसामा रगत देखिएको थियो ?	Yes.....1 No.....0 Don't Know.....9	
107	Did the child pass urine in the 24 hours prior to death? मृत्यु अगाडिको २४ घण्टामा शिशुले पिसाब फेरेको थियो ?	Yes.....1 No.....0 Don't Know.....9	
108	Did the child vomit persistently in the 24 hours prior to death? मृत्यु पूर्वको २४ घण्टामा शिशुले लगातार बान्ता गरेको थियो ?	Yes.....1 No.....0 Don't Know.....9	
109	Did the child have stiffening of the body, arching of the back, fits, convulsions, in the two days leading up to death ? शिशुको मृत्यु पूर्वका २ दिन भित्र निम्न चिन्हहरु थिए ? जस्तै शरिर अररो हुने, ढाड बाङिएर धनुष जस्तो हुने, कम्पन	Yes.....1 No.....0 Don't Know.....9	
110	Can you describe me what were the terminal sequences of events seen in your baby? (Also include any accidents, fall, animal bite, poisoning, burns) बिरामी भए देखि मृत्यु सम्मका घटनाक्रमहरु क्रमबद्ध रुपमा भन्नुहोस् । (दुर्घटना, उचाइबाट खसेको, जनावरको टोकाई, विष सेवन, पोलेको पनि उल्लेख गर्नुहोस् ।)		
112	Where did you go ***first*** for the treatment? सर्वप्रथम उपचार गर्न कहाँ जानु भयो ?		
	a. Health facility (all government health facility) स्वास्थ्य संस्था (सरकारी)	Govt. Health facility.....1	
	b. Private clinic (Including private hospitals) निजि क्लिनिक (निजी अस्पताल समेत)	Private clinic.....2	
	c. VHW/MCHW (ग्रा.स्वा.का. / मा.शि.का.)	VHW/MCHW.....3	
	d. FCHV (म.स्वा.स्वयं सेविका)	FCHV.....4	
	e. Traditional Healers (धामी, झाँक्री)	Traditional healers.....5	
	f. Home treatment/therapy (घरेलु उपचार)	Home treatment/therapy.....6	
	g. Others (*Specify*) (अन्य) ____	Others.....9	
113	What did the treating person diagnose the illness as? What was the diagnosis? उपचार गर्ने व्यक्तिले शिशुको बिरामीको के वर्गीकरण गर्नु भयो ?		
	1. 2. Don't Know		

Verbal autopsy Final 2

Format for Verbal Autopsy Contd...

114	What were the treatments given? कुन कुन उपचार दिइएको थियो?		
II.	**Pregnancy History (गर्भावस्थाको विवरण)**		
201	Gravida (गर्भवती भएको पटक)	☐☐	
	Parity (जीवित शिशु जन्मेको पटक)	☐☐	
	Abortions (गर्भ तुहिएको) If yes No of abortions (यदि छ भने, तुहिएको पटक) .... Time of abortion (pregnancy duration in month) .... (कति महिनामा गर्भ तुहिएको हो)	Yes .... 1 No .... 0 ☐☐	
	Still Births (मृत शिशु जन्मिएको छ / छैन) If yes No of still birth (यदि छ भने, मृत जन्मेको पटक)	Yes .... 1 No .... 0 ☐☐	
	Neonatal Deaths Yes /No (नवजात शिशुको मृत्यु छ / छैन) If yes no of neonatal death (यदि छ भने, मृत जन्मेको पटक) .... Age at death (in days) (मृत्यु हुँदाको उमेर दिनमा)	Yes .... 1 No .... 0 ☐☐	
	Young infant death >28 days (२८ दिन भन्दा माथिको शिशुको मृत्यु) Age at death (in days) (मृत्यु हुँदाको उमेर दिनमा)	Yes .... 1 No .... 0 ☐☐	
202	Mother's status (आमाको अवस्था)	Yes	No
	a. Young (कलिलो) (Age in years उमेर वर्षमा)	1	0
	b. Alcoholic or smoker (Drinks > 3 pegs/day, smokes >10 stick of cigarette/day) (जाँड रक्सी वा चुरोट पान गर्ने, जाँडरक्सी >३ पेग/दिन, चुरोट >१० /दिन)	1	0
	c. Has chronic illness (दीर्घ रोग भएको)	1	0
	d. Malnutrition (कुपोषित)	1	0
	e. Normal (साधारण)	1	0
	f. Others (अन्य)	1	0
203	Did the mother have TT during the pregnancy? Yes / No के आमाले गर्भावस्थामा टी.टी. सुई लिनुभएको थियो If taken, no of doses: .... Dose (यदि लिएको छ भने, कति पटक)	Not taken .... 0 Dose 1 .... 1 Dose2 .... 2 Don't Know 9	
204	Was the pregnancy full term or pre term? शिशु समय पुगेर जन्मेका थियो कि समय पूर्व Gestational Age in months (गर्भावस्थाको उमेर महिनामा)	Term .... 1 Pre term 2	

Verbal autopsy Final 3

205	Was fetal movement present during late stage of pregnancy? बच्चा पाउनु अघि पेटमा बच्चा चलेको थियो कि थिएन ?	Yes .... 1 No 0		
206	Was the labor normal? (के प्रसव व्यथा साधारण थियो ?) Duration of labor in hours ☐☐ प्रसव व्यथाको समय घण्टामा	Normal .... 1 Prolonged 2		
207	Was the membrane ruptured early? झिल्लि फुटेर हवाल्ल पानी समय पूर्व बगेको थियो Rupture of membrane was ☐☐ hours earlier than labor हवाल्ल पानी बग्ने प्रसवको .... घण्टा अघि थियो ।	Early .... 1 Normally 2		
208	Did the mother have any of the following problem during pregnancy के आमाको गर्भावस्थामा निम्न समस्याहरु थिए ?	Yes	No	DK
	a. Vaginal Bleeding (योनिबाट रगत बग्ने)	1	0	9
	b. Jaundice (जण्डिस)	1	0	9
	c. Less than normal movement of the baby (शिशुको सामान्य भन्दा कम चलाई)	1	0	9
	d. Diagnosed diabetes (मधुमेह)	1	0	9
	e. Other endocrine problems (अन्य ग्रन्थीको समस्या)	1	0	9
	f. Diagnosed Heart disease (मुटु सम्बन्धि रोग)	1	0	9
	g. Diagnosed hypertension (रक्त चापको समस्या)	1	0	9
	Other problem (अन्य समस्या)			
III.	**Delivery History (प्रसुति विवरण)**			
301	Type of delivery (प्रसुतिको किसिम _ सामान्य / असामान्य) If abnormal specify (असामान्य भए, विवरण)	Normal .... 1 Abnormal 2		
302	Where did the delivery occur? प्रसुति कहाँ गरियो ?	Home .... 1 Health facility 2		
303	Was the baby wrapped immediately in clean cloth after birth जन्मने बित्तिकै शिशुलाई नरम र सफा कपडाले बेरेको थियो ?	Yes .... 1 No .... 0 Don't know 9		
304	Was clean home delivery kit used? सफा सुत्केरी सामाग्री प्रयोग गरिएको थियो	Yes .... 1 No .... 0 Don't know 9		

Verbal autopsy Final 4

305	What was used to Cord Cutting? (नाल काट्न के प्रयोग गरिएको थियो?) a. Nothing (केहि पनि प्रयोग नगरेको) b. New blade (नयाँ पत्ति) c. Used blade (प्रयोग भैसकेको पत्ति) d. Knife (चक्कु) e. Sickle (हँसिया) f. Sterilized instrument (निर्मलीकृत साधन) g. Scissors (कैंची) h. Others (अन्य)	Nothing .... 0 New blade .... 1 Used blade .... 2 Knife .... 3 Sickle .... 4 Sterilized instrument .... 5 Scissors .... 6 Others 9
306	What was applied on the cord immediately after it was cut? (नाल काट्ना साथ के प्रयोग गरिएको थियो) a. Nothing (केहि पनि दिइन) b. Oil (तेल) c. Ash (खरानी) d. Sindoor (सिन्दुर) e. Cow/Animal Dung (गाईवस्तुको गोबर) f. Medicated ointment (औषधि) g. Others (अन्य)	Nothing .... 0 Oil .... 1 Ash .... 2 Sindoor .... 3 Animal Dung .... 4 Medicated ointment .... 5 Others 9
307	Was the place of delivery clean, unclean, don't know सुत्केरी गराएको ठाउँ कस्तो थियो ? सफा / फोहर / थाहा छैन	Clean .... 1 Unclean .... 2 Don't know 8
308	Who attended the delivery? प्रसुति कसले गरायो ? ________________ **Specify designation** (पद लेख्नुहोस्)	Skilled/Trained .... 1 TTBAs .... 2 TBA .... 3 Others 9
IV.	**Birth History (जन्म विवरण)**	
401	Was the child single birth or multiple births? एक्लो शिशु जन्मेको थियो वा धेरै शिशु जन्मेको थियो ? If multiple (यदि धेरै थिए भने,) 1. twins (दुई वटा) 2. triplets (तीन वटा)	Single .... 1 Multiple 2
402	How did the baby cry immediately after birth? जन्मने बित्तिकै शिशु कसरी रोयो ? Time from birth when the baby first cried HH.....MM.....SS जन्मेको कति समय पछि शिशु रोयो (घण्टा.... मिनेट.... सेकेण्ड....)	Did not cry .... 1 Weak Cry .... 2 Normal Cry .... 3 Don't know 9
403	How was the movement of the limbs of the baby after birth? जन्मे पछि शिशुको हात खुट्टाको चलाई कस्तो थियो	No movement .... 1 Less Movement .... 2 Normal .... 3 Don't know 9

Verbal autopsy Final 5

Format for Verbal Autopsy contd....

404	What was the color of the baby immediately after birth? जन्मने बित्तिकै शिशुको छालाको रंग कस्तो थियो ?	Whole Body Pink ....1 Limbs blue, body pink ...... 2 Whole body blue .... 3 Don't know 9	
405	How long after the birth did you **first** put the baby to the breast? (जन्मेको कति समय पछि शिशुलाई स्तनपान गराउन थाल्नु भयो?) Did the baby breast feed well? Yes / No (के शिशुले राम्ररी स्तनपान गर्‍यो ? गर्‍यो / गरेन)	Within 1 hour.................1 After 1 hour.....................2 Never............................ 3 Don't know 9	
406	Did the child choke or froth during any feeding? स्तनपान गरेपछि / दूध खाएपछि शिशुले सर्किने वा फिंज काड्ने गरेको थियो ?	Yes...............................1 No..................................0 Don't Know 9	
407A	Was the baby bathed after birth? जन्मना साथ शिशुलाई नुहाईएको थियो ?	Yes...............................1 No..................................0 Don't Know 9	} — 407B (No, Don't Know)
407B	If yes After how long (***Write in hours.)***................ यदि थियो भने, कति घण्टा पछि:	Hours	
408	Was any intervention by medical person done for any complication immediately after birth? स्वास्थ्य कर्मीले कुनै प्रकारको समस्याको लागि जन्मने बित्तिकै केही गर्नु भएको थियो? If yes, give detail (यदि थियो भने, विस्तृत विवरण)	Yes..............................1 No...............................0	
409	Any congenital anomaly? जन्मदाको कुनै विकृति थिए ? (0=Normal, 1=Major Abnormality, 2-Minor abnormality, 3= Not Compatible with Life ,9=DK) ० सामान्य १ प्रमुख विकृति २ सानो विकृति ३ बाँच्न नसक्ने ४ थाहा छैन	Give Description (विस्तृत विवरण)	
V.	**Opinion on the cause of death** (मृत्युको कारणबारे धारणा)		
501	Caretaker Opinion: (अभिभावको राय) 1 2 3		
502	Interviewer Opinion: (अन्तर्वार्ता लिने व्यक्तिको राय) 1. 2. 3.		

verbAutopsy (Final) (June 25, 2006)

Verbal autopsy Final 6

External Visitors to MINI-II

USAID Deputy Director, Jed Meline

Senior Paediatricians
Dr. PSS & and Dr. RBS with DPHO

ICDDRB, Bangladesh

Patricia Coffey, PATH

BRAC, Bangladesh

U.S. Ambassador

JSI Research and Training Institute, Inc. prepared this technical report and the publication was made possible through financial support from the Saving Newborn Lives program of Save the Children/USA with funds from the Bill and Melinda Gates Foundation. Technical and administrative support was provided by USAID/Nepal through Nepal Family Health Program/JSI R&T. The contents are the responsibility of the authors and do not necessarily reflect the views of Save the Children/USA, the Bill and Melinda Gates Foundations, NFHP, USAID, MoHP and other partners.