National Neonatal Health Strategy

Family Health Division
Department of Health Services
Ministry of Health
His Majesty's Government of Nepal
2004

NATIONAL NEONATAL HEALTH STRATEGY

Family Health Division
Department of Health Services
Ministry of Health
His Majesty's Government of
Nepal
Poush 2060
(January 2004)

His Majesty's Government

Ministry of Health

A Few Words

Every year thirty thousand Nepali children die before they are twenty-eight days old. The country with a neonatal mortality rate (NMR) of 39 per 1000 live births has the third highest neonatal mortality in the world. On the positive side the country has made significant improvement in infant mortality rates, which has fallen from 113 in 1987 to 64 in 2001. This decline has served to highlight the greater contribution of neonatal mortality to infant mortality, with NMR currently accounting for more than 60 percent of all deaths in infancy. Any further reduction in infant mortality rate is thus dependent on saving more newborn lives.

Nepal has made a commitment to achieve the Millennium development goals to reduce child mortality to 54 by the year 2015. This target cannot be achieved unless neonatal mortality is decreased. We are also a signatory to the Convention on the rights of the child. Every vulnerable Nepali newborn has the greatest right to be taken care of and therefore we have to immediately invest resources to improve their health and survival.

The National Neonatal Health Strategy is the first step taken by the Ministry of Health in its effort towards improving neonatal health and survival in the country. This policy document will be the main guide for the HMG and its partner agencies working for the improvement of neonatal health and survival in the country.

Finally I would like to take this opportunity to express my gratitude to all partner organizations for their continued support for our efforts to improve the conditions of the children in our country. My heartfelt thanks to the Saving Newborn Lives Initiative, SCF/US and the members of the neonatal working group who supported the MOH in the production of this document.

Mr. Lok Man Singh Karki
Secretary
Ministry of Health

His Majesty's Government
Ministry of Health
DEPARTMENT OF HEALTH SERVICES

Foreword

The first twenty-eight days of the life of a child is the most vulnerable period where most morbidity and mortality occur. His Majesty's Government, Ministry of Health, Department of Health Services with its commitment towards reducing child health mortality is now making focussed efforts towards improving neonatal health and survival in the country.

The present rate of neonatal mortality in our country can be reduced by the implementation of cost effective solutions. These are low cost proven interventions that can be implemented entirely within the framework of existing maternal and child health programs. The real challenge is to bring about behavior change for sound home based newborn health practices to those who need it – the nearly 90% of newborns born at home, their mothers and the decision-makers in their families.

I am sure the National Neonatal Health Strategy document will help MoH, other related line ministries, donors, INGOs and NGOs in the efficient and effective provision of neonatal interventions throughout Nepal.

BDChataut

Dr. B. D. Chataut
Director General
Department of Health Services

His Majesty's Government
Ministry of Health
DEPARTMENT OF HEALTH SERVICES
(.....)

☎ 4262238
4261436

Pachali, Teku
Kathmandu, Nepal
Date:

Preface

The Ministry of Health has taken successful strides towards improving policy guidelines and implementation plans for improving reproductive health issues in the country. Neonatal health has been outlined as an important component of the National Reproductive Health Strategy. The National Safe Motherhood Program, which aims to reduce maternal and neonatal mortality, has set the stage for the introduction of a policy for improving neonatal health and survival in the country. A situation analysis of newborns in the country, conducted jointly by the Ministry of Health and the Saving Newborn Initiative, SCF US has revealed the gravity of the conditions of the newborns. This has been further confounded by the lack of information about these children, nearly 90 percent of who are born at home.

Nepal at present faces huge challenges to improving the health and survival of its newborns but they are challenges that are being successfully addressed elsewhere in the developing world and which do not require high- tech or high-cost interventions. With the help of targeted behavior change and communication interventions at the homes and rural communities and at the critical link between healthy mothers and their babies, we can expect a major impact in improving neonatal health and survival in the country.

As the first major step of this goal, the Ministry of Health has initiated the development of the National Neonatal Health Strategy with technical and financial support from the Saving Newborn Lives Initiative, Save the Children Federation US. A Neonatal Working Group comprising of Specialists in the field of Neonatology, Safe Motherhood, Public Health, Community Mobilization and Research was established to work closely together for the development of the strategy document. The working group decided to produce a series of position papers on key aspects of neonatal care in Nepal. The eight position papers that resulted served to be an excellent basis for guiding the development of the strategy document. The Consultant drafted a skeletal strategy as the first working document for the group based on the information from the eight position papers. A series of meetings followed with the working group members drafting up to the fourth draft of the strategy. The fourth draft was then circulated among a bigger group of stakeholders and the various departmental heads in the Department of Health Services and the Ministry of Health. A final fifth draft was then drafted with the incorporation of all relevant comments from the wider group. We are very pleased to announce that the Ministry of Health has now endorsed this strategy.

The National Neonatal Health Strategy will be the document providing guidelines for policy makers, service providers, various line ministries, INGOs, NGOs and private sector organizations implementing programs for the improvement of neonatal health and survival in the country. It is our hope that all future programming for newborn health will be within the framework identified by this document.

The National Neonatal Health Strategy is the result of a strong ongoing collaboration among our partner organizations. We would like to extend our heartfelt thanks to Saving Newborn Lives, SCF US for its technical and financial support in this venture. We would also like to express our gratitude to all members of the working group (see Annex XI) who represented various departments and organizations, such as the Child Health Division, Kanti Children's Hospital, Institute of Medicine, Nepal Safer Motherhood Program, Nepal Family Health Program, Mother and Infant Research Activities, WHO and the United Mission to Nepal, and who dedicated their time and efforts and nurtured this document to its present form.

We would also like to express our gratitude to organizations such as USAID, UNICEF, GTZ and individuals such as Dr. Dibya Shree Malla who reviewed this document and provided valuable feedback to it. We would also like to thank Mr. Tek Bahadur Dangi (Senior Public Health Officer, Family Health Division) and Mr. Pradeep Subedi (Section Officer, Central Health Directorate) who translated this document to its Nepali version.

This document would not have come to this final stage without the expertise and commitment of the organizing, coordinating, writing and editing team: Dr. Ganga Shakya (Reproductive Health Coordinator, Family Health Division), Dr. Neena Khadka (Program Manager, Saving Newborn Lives) and Dr. Christopher Vickery (Consultant, Saving Newborn Lives). We give heartfelt thanks to this team for their untiring ground work and dedication.

In the end, we would like to re-emphasize this document as the guiding force directing all future programs for improving neonatal health and survival in the country. We look forward to collaborations with all partners for implementing this strategy in the immediate future.

Yashar

Dr. Yasho Vardhan Pradhan
Director
Family Health Division

Abbreviation

AHW	Auxiliary Health Worker
AIDS	Acquired Immune Deficiency Syndrome
ANM	Auxiliary Nurse Midwife
ARI	Acute Respiratory Infection
BCC	Behavior Change Communication
BEOC	Basic Essential Obstetric Care
BPP	Birth Preparedness Package
CEOC	Comprehensive Essential Obstetric Care
CHDK	Clean Home Delivery Kit
DH	District Hospital
ENC	Essential Newborn Care
FCHV	Female Community Health Volunteers
FHD	Family Health Division
HIV	Human Immunodeficiency Virus
HMG	His Majesty's Government of Nepal
HP	Health Post
IEC	Information, Education and Communication
IMCI	Integrated Management of Childhood Illness
IMR	Infant Mortality Rate
MCHW	Maternal and Child Health Worker
MNTE	Maternal and Neonatal Tetanus Elimination Program
NGO	Non Government Organization
NNHS	Nepal Neonatal Health Strategy
NMR	Neonatal Mortality Rate
PHC	Primary Health Care
PMR	Perinatal Mortality Rate
RH	Reproductive Health Care
SC US	Save the Children Federation, USA
SHP	Sub Health Post
SN	Staff Nurse
SNL	Saving Newborn Lives
STI	Sexually transmitted Infection
TBA	Traditional Birth Attendant
TT	Tetanus Toxoid
VHW	Village Health Worker
WHO	World Health Organization

Table of Contents

1. Introduction

Every year globally, an estimated four million babies die before they reach the age of one month. Nearly the same numbers die in late pregnancy or are stillborn and these deaths are rarely recorded. Millions more are disabled because of poorly managed pregnancies, deliveries and neonatal care. Deaths are far more likely to occur early in the neonatal period. This has been neatly summarized as the "two thirds rule" which states that approximately 2/3 of all deaths in the first year of life occur in the first month of life. Of these deaths, approximately 2/3 occurs in the first week of life. Of these deaths, approximately 2/3 occurs in the first day of life.

Prenatal and neonatal outcomes are inseparable from women's health status and the quality of care available during pregnancy, delivery and the post partum period. Complications that affect women during pregnancy and childbirth also affect fetal and newborn health (Annex VI). The mother and her baby should be treated as one entity and to be successful, any range of interventions that seek to prevent perinatal and neonatal deaths must address both maternal and neonatal factors (Annex III). In this context for Nepal many interventions that will reduce neonatal mortality are already well identified, such as those included in the Safe Motherhood program, broader reproductive health programs, the Integrated Management of Childhood Illness (IMCI), Maternal and Neonatal Tetanus Elimination (MNTE) Program, Immunization and Nutrition initiatives.

Neonatal health is an important component of the National Reproductive Health Strategy. The National Safe Motherhood Program, which also aims to reduce maternal and neonatal mortality, has always intended that the neonatal health component be developed as a separate document. As a part of this activity, the Ministry of Health initiated the development of the National Neonatal Health Strategy with support from the Saving Newborn Lives Initiative, Save the Children Federation US. This strategy will describe the more specific directions and broad objectives for future interventions focussed directly to improve neonatal health.

The National Neonatal Health Strategy is based on two key pieces of work; firstly a detailed situation analysis of neonatal health in Nepal completed in 2002 (1), and secondly the series of position papers produced by the Neonatal Health Working Group (2). This introduction only provides a brief outline of the background and present status of neonatal health in Nepal.

This strategy has been prepared by considering the magnitude and gravity of neonatal problems in Nepal. Great attention has been focussed on evidence based and proven interventions (Annex II & IV). Cost effectiveness of interventions, acceptability including innovativeness of approach and the capacity of the community, health and other systems in the country were other factors considered too.

1.1 A brief summary of neonatal health status in Nepal

In Nepal infant and neonatal mortality and morbidity is very high: IMR – 64, NMR - 39 per 1000 live births, and PMR 47.4 per 1000 live births and stillbirths (3). It is estimated that in Nepal nearly 50,000 children under one year of age die every twelve months. Two third of them die within 28 days of age, resulting in over 30,000 neonatal deaths per year. Among those dying within the neonatal period, 20,000 (two third) die in the first week of life. Nearly the same numbers of babies are stillborn (3). More than 16,000 of those dying within the first week of life, die within 24 hours. As things stand, this means that three to four newborns are dying every hour in Nepal.

There has been a remarkable decline in infant mortality rates in Nepal over the past fifteen years from 113 in 1987 to 64 in 2001 (3). However this has not been matched by a similar fall in neonatal mortality which has decreased from 45.2 in 1987 to 38.6 in 2001 (Annex V). Consequently neonatal mortality has risen from 40% to 60% as a proportion of infant mortality (3). Further significant reductions in infant and child mortality rates will largely be dependent on reducing neonatal mortality.

There are no population-based studies that describe the pattern of the direct causes of neonatal death available for Nepal. (See Annex VII for selected demographic information related to newborn health). Hospital based data suggest that the major direct causes of neonatal death in Nepal are:

- Infection
- Birth asphyxia/trauma
- Prematurity
- Hypothermia

Underlying these direct causes is a constellation of underlying causes, including:

- poor pre-pregnancy health,
- inadequate care during pregnancy,
- inadequate care during delivery,
- low birth weight, and
- inadequate newborn and postpartum care.

Fundamental to these underlying causes is the low status and priority given to women and newborns.

Only a half of Nepalese women receive any antenatal care from a trained health worker and only 14% attend four or more times. There are several common preventable and treatable maternal infections that affect fetal survival, such as syphilis, other STIs, malaria, urinary tract infection and tetanus.

Only one in four women report receiving any iron/folate during pregnancy and 75% are anemic. Half of all pregnant women receive no Tetanus Toxoid during their pregnancy and this state of affair is strongly negatively associated with maternal education (3).

Nearly ninety percent of women deliver at home and 55% deliver with the assistance of a friend or relative. In only 9% of home births are clean delivery kits used. A health worker assists only 13% of deliveries[1]. TBAs attend about a quarter of all deliveries (3). Referral systems often are not functional, and where they are, receiving facilities may be unable to provide services for maternal and neonatal complications.

Breastfeeding is almost universal in Nepal and continues for a mean of 29 months (3) but immediate and exclusive breastfeeding is often not practiced and colostrum is discarded in nearly a third of cases. Forty percent of neonates received a prelacteal feed, and initiation of breastfeeding is delayed for more than 24 hours for a third of neonates.

Appropriate care for the normal newborn is neither widely understood nor practiced in the community or health system. Traditional attitudes and practices dominate newborn care and are often hazardous (1). Hypothermia has been shown to be an important cause of neonatal morbidity in hospital settings in Nepal (8,9). Neonatal danger signs are commonly not recognized, whilst harmless conditions often lead to unnecessary referral.

A study of low birth weight from four regional hospitals has found a weighted mean incidence of 27%. The strongest risk factors for low birth weight were maternal weight, previous preterm delivery, short birth interval and paternal employment in agriculture (10). More than one in five pregnant women in Nepal use tobacco (3).

1.2 Strategic direction in context of Nepal

The National Neonatal Strategy recognizes that attempting to tackle all the issues surrounding neonatal mortality immediately is unrealistic. The key statistic to consider when setting priorities for interventions to reduce neonatal mortality in Nepal is that 90% of births take place in the home, in the absence of a skilled attendant (3). Therefore proven interventions addressing causes of maternal and neonatal complications at family and community levels will be the primary focus for immediate impact. These interventions will require the establishment of a chain of care linking families and communities with the health system.

To bring about medium to long term impact, interventions that improve women's nutrition, education, and access to resources need to be addressed. These interventions which address the underlying causes will be initiated simultaneously through multi-sectoral actions.

Advocacy for resource mobilization at different levels will be a major strategic aim for improving neonatal and maternal health.

2. Goal and Objectives

2.1 Goal

“To improve the health and survival of newborn babies in Nepal”

2.2 Strategic Objectives

- To achieve a sustainable increase in the adoption of healthy newborn care practices and reduce prevailing harmful practices.
- To strengthen the quality of promotive, preventive and curative neonatal health services at all levels.

2.3 Sub Strategic Objectives

- To make the care of the normal newborn the foundation of interventions for improving neonatal health in Nepal.
- To strengthen and expand evidence-based and cost effective newborn health care interventions (promotive, preventive and curative) at all levels.

- To identify and address specific practices, which are either harmful or not based on sound evidence.
- To promote accurately targeted research to fill gaps in knowledge and practice.
- To mobilize internal and external commitment and resources.

3. Strategic Interventions

The MoH will seek to achieve the above objectives by prioritizing the following interventions. To be successful, both inter- and intra-sectoral cooperation and collaboration must be realized. The major priority interventions can be categorized under five main headings:

- Policy
- Behavior Change Communication
- Strengthening health service delivery
- Strengthening program management
- Research

3.1 Policy

The National Neonatal Health Strategy will:

- ***Establish within the present Safe Motherhood Sub Committee a neonatal group which is also represented by members of the Child Health Sub Committee.***
- Institute Family Health Division as the focal point for neonatal health activities.
- Ensure close collaboration with the Safe Motherhood Programs and other related programs.
- Facilitate the institutionalization of neonatal care as a sub-specialty with appropriate training courses (both in-service and pre service) for different cadres of health workers at the tertiary and secondary level of care.
- Promote piloting of promising interventions followed by scaling up of successful ones.
- ***Ensure the activation of the National Breast Feeding Promotion and Protection Committee (to monitor health facility Baby-Friendly[2] status and adherence to Nepal's Code for Marketing of Breast milk Substitutes).***
- Support and coordinate for the strengthening of the system of universal registration of all births and deaths.
- Ensure gender equality into neonatal care.[3]

The National Neonatal Health Strategy recognizes that there are national policy objectives described elsewhere that will have an important effect on reducing neonatal mortality (Annex VII), notably increasing family planning coverage, which will reduce neonatal mortality through birth spacing.

3.2 Behavior Change Communication (BCC)[4]

In order to address the newborn care practices at the family and community levels the National Neonatal Health Strategy promotes:

- Development of a National Neonatal BCC strategy with a package containing key messages promoting newborn care that complements the National IEC strategy developed for safe motherhood and child health programs and is integrated with national policies, strategies and guidelines.
- The messages to address the geographical context and the ethnic heterogeneity of Nepalese culture, local flexibility of approach for BCC activities to be emphasized and all BCC messages to be locally appropriate and field-tested.
- The gradual phasing in of BCC messages and activities creating demand for neonatal services with establishment and improvement of neonatal service delivery
- Coordination with the Adolescent Health activities to promote delay in age of childbearing and improve knowledge on essential newborn care.
- Mass media BCC targeted towards women, husbands, and mothers-in-law to encourage proper care of pregnant, post partum women and newborns. This will include messages on four antenatal visits, increased TT coverage, rest, nutrition (adequate and nutritious diet including foods rich in Vitamin A, iron, iodine), skilled attendance at birth, and three postnatal checkups for both the mother and her newborn. Messages will emphasize improved immediate and exclusive breast feeding and newborn care practices such as clean cord cutting, drying, wrapping, delayed bathing, applying nothing on cord stump etc.
- The expanded testing of the Birth Preparedness Package (Jeevan Suraksha) to improve the decision making and health seeking behavior among community members.
- Strengthen the existing school and community reproductive health education and education on care of the normal newborn (e.g. breast feeding to be included in the nutrition curriculum for school children at levels 9 and 10).
- The introduction and evaluation of BCC activities to promote “kangaroo mother care” or other culturally suitable practices for LBW babies.
- Advocacy activities such as the establishment of a National Newborn Week of activities, strengthen coordination with other sub-committees (e.g. Reproductive Health Coordination Committee, Safe Motherhood sub-committee, Child Health Sub-committee) to promote care of pregnant women and newborns.
- Social mobilization of women's organizations, NGOs and local organizations to improve maternal and neonatal health.
- Promote BCC activities through TBAs, FCHVs[5], mothers’ groups and other community groups with the involvement of husbands and families such as parents-in-law focusing on:
  - The prevention of harmful traditional practices (especially those likely to cause or aggravate hypothermia, lead to infection, lead to sub-optimal breast feeding, lead to delays in seeking care for the sick newborn or inappropriate referral).
  - The recognition of neonatal danger signs (feeding difficulties or not sucking, breathing problems, convulsions / fits, fever / hypothermia, severe jaundice, continuous vomiting, severe infections of umbilicus, eyes, skin and other signs of infection) and appropriate action and appropriate referral.
  - Reinforcement of BCC messages targeting danger signs during pregnancy, delivery

- Promote BCC messages to community influential to support health providers and families to create an enabling environment for improved care of pregnant women and newborns.

3.3 Strengthening Health Service Delivery

The National Neonatal Health Strategy promotes:

- The implementations of specific levels of neonatal health care intervention to improve health service delivery. (Annexes I and VIII).
- The improved coverage of skilled attendance at delivery.
- Improving competence of all cadres of health workers in Essential Newborn Care.
- Improving BCC knowledge and skills to promote ENC messages in the community.
- Developing standard guidelines along with review and adaptation of in-service training manuals and curriculum for all cadres of health workers to include ENC.
- The development of pre-service training in appropriate ENC for all health workers, including doctors, nurses, ANMs, MCHWs, and auxiliary staff involved in newborn care.
- Preparing non-formal caregivers (friends, relatives, FCHVs, TBAs, other unskilled health workers) at delivery to assist in providing appropriate care for the neonate. Whilst the National Neonatal Health Strategy sees the presence of two attenders at all births (one to attend the mother and one the neonate) as ideal, with only 13% of deliveries currently receiving skilled attendance, the NNHS recognises that this must be a long term objective. ***Hence training of skilled attenders should emphasise how the assistance of non-formal caregivers at delivery can be best engaged to provide appropriate care for the neonate.***
- Postnatal visits (within 24 to 48 hours, again within 6 days and a third at 6 weeks) by skilled / trained attendants at home or at health facilities.
- The piloting of carefully supervised studies of the use of antibiotics (which could include both different drugs and modes of delivery) by community level health workers to treat neonatal infections followed by expansion of successful interventions.
- Linking up with the Integrated Management of Childhood Illnesses to include the total neonatal period as well.
- The introduction, promotion and evaluation of "kangaroo mother care" or other culturally appropriate practices for LBW babies at various levels of care.
- Support and coordinate so as to strengthen the National Maternal and Neonatal Tetanus Elimination (MNTE) program, National Nutrition and other related programs.
- Establishing a well functioning referral system with appropriate transfer for sick newborns.
- Piloting of a scheme to link skilled attendance at birth with birth registration.
- The notification of stillbirths and neonatal deaths by all community health workers.

3.4 Strengthening Program Management

The National Neonatal Health Strategy promotes:

- The review of neonatal content of existing curricula (pre- and in-service) and protocols, in particular the ones developed for Safe Motherhood, IMCI, for all levels of care providers.

levels of facilities for newborn care, to train and supervise staff and establish a strong referral system.

- The development of indicators (see annex IX for the recommended list of indicators) and the system to monitor and evaluate neonatal health status at all levels, integrated into the present HMIS.
- Assure quality of care, equipment, supplies and drugs for newborn care at all levels by regular monitoring using standard checklists.
- Continuing Medical Education for updating to be arranged at regular intervals for medical and paramedical personnel.
- Promote newborn care health practices in governmental, non-governmental and private through coordination and collaboration at different level.

3.5 Research

The National Neonatal Health Strategy promotes:

- Community based operations research to improve neonatal care (e.g. home based management of Low Birth Weight neonates, community based management of neonatal infections, care seeking behavior of families for their sick newborn and impediments to early care seeking etc.)
- ***The evaluation of the quality of maternal and neonatal care offered by all levels of health workers along with reassessment and strengthening of their role as skilled attenders in the light of the results.***
- The promotion of verbal autopsy of perinatal deaths in the community and perinatal death audit or review in peripheral hospitals.

3.6 Cross Cutting Issues

The National Neonatal Health Strategy promotes the following cross cutting issues, which applies for every strategic intervention.

- Multisectoral involvement
- Working in partnerships
- Participation from primary to higher levels of stakeholders, including the community, local authorities and leaders, civil society, professional organizations, private, non-governmental and governmental organizations.

4. References

1. State of the World's Newborns : Nepal. Saving Newborn Lives, Save the Children Federation US. Kathmandu. 2002.
2. Position Papers of the Neonatal Health Working Group, MoH, 2002.
3. Nepal Demographic and Health Survey, 2001.
4. World Bank. World Development Report 1993.
5. Bang et al. "Effect of home-based neonatal care and management of sepsis on neonatal mortality: Field trial in rural India." *Lancet.* Vol. 354, No. 9194, pp 1955-1961,1999.
6. WHO data: Quoted in State of the World's Newborns. Save the Children Federation US, Washington DC, 2001.
7. State of the World's Newborns. Save the Children Federation US, Washington DC, 2001.
8. Ellis M; et al. "Postnatal hypothermia and cold stress among newborn infants in Nepal monitored by continuous ambulatory recording." *Arch Dis Child Fetal Neonatal Ed. 1996 Sept, 75(2):122-5.*
9. Johanson RB et al. "Effect of post-delivery care on neonatal body temperature." *Acta Paediatr.* 1992; 81 (11): 859-63.
10. MIRA/UNICEF. Low Birth Weight prevalence and associated factors in four regions of Nepal. Kathmandu. 2000. Quoted in (1).
11. Vam Dam CJ. "HIV, STD and their current impact on reproductive health" *Int J Gynecol Obstet.* Vol 50(suppl), pp S121 – S129, 1995.
12. Garner P, Gulmezoglu AM, "Prevention vs treatment for malaria in pregnant women (Cochrane Review): In: Cochrane Library. Issue 1, Oxford: Software Update, 2002.
13. Mathai M, "Routine ANC for low-risk pregnancy in under resourced settings. WHO reproductive Health Library, Issue 2, pp 1-2,1998.
14. Newell KW et al, "The use of toxiod for the prevention of tetanus neonatorum." Bulletin of the WHO, 35, 863-871,1986.
15. Duley et al. "Anticonvulsants for women with pre-eclampsia." In The Cochrane Library, Issue 4, Oxford: Software Update, 2002.
16. Lumley et al. Interventions for promoting smoking cessation during pregnancy. In: The Cochrane Library, Issue 4, Oxford: Software Update, 2002.
17. Mohamed K. "Routine iron supplementation during pregnancy." In: The Cochrane Library, Issue 4, Oxford: Software Update, 2002.
18. Mohamed K. "Routine folate supplementation during pregnancy." In: The Cochrane Library, Issue 4, Oxford: Software Update, 2002.
19. WHO. "Making pregnancy safer." Geneva 2000.
20. Rahman S. "The effect of TBA and TT in reduction of neonatal mortality." *J Trop Paed Env Child Health.* 28: 164-165,1982
21. Schneider RM et al. Final evaluation of the Ghana National TBA Program. DUAL Incorporated and International Science and Technology Institute, Arlington, USA, 1992.
22. Kenyon et al. "Antibiotics for preterm rupture of membranes." In: The Cochran Library, Issue 1, Oxford: Software Update, 2002.
23. WHO. "Partograph reduces complications of labor and childbirth." Geneva, June 1994.
24. Hofmeyer GJ. "External Cephalic version". ." In: The Cochran Library, Issue 4, Oxford: Software Update, 2002.
25. Bryan E. "Twins and Higher Multiple births". London. Edward Arnold 1992.
26. Price S. "Birth plans and their impact on midwifery care. MIDIRS Midwifery Digest, 8(2): 189-191,1998.
27. Christensson et al. "Randomized study of skin-to-skin vs incubator care for rewarming low risk hypothermic neonates." *Lancet* 352:1115, 1998.
28. Widstrom AM et al. "Short term effects of early suckling and touch of the nipple on maternal

31. WHO. “Thermal Protection of the Newborn, a practical guide.” Geneva 1997.

32. Charpak et al. “Kangaroo mother versus traditional care for newborn infants <2000g: a randomised controlled trial.” *Pediatrics,* 100(4): 682-688,1997.

33. Young et al. “Babies and breast feeding.” MIDIRS Midwifery Digest, 8(3): 364-369,1998.

34. Conde-Agudelo et al. “Kangaroo mother care to reduce morbidity and mortality in low birthweight infants.” In: The Cochrane Library, Issue 4, Oxford: Software Update, 2002.

35. Stothers JK, “Head insulation and heat loss in the newborn.” *Arch Dis Child,* 56:530-534, 1981.

36. Zupan J, Garner P. “Routine topical umbilical cord care at birth.” In: The Cochrane Library, Issue 4, Oxford: Software Update, 2002.

37. WHO. “Clean delivery for the prevention of tetanus and sepsis.” Geneva 1994.

38. Palme-Kilander. “Methods of resuscitaton in low Apgar score newborns.” *Acta Paediatr* 1992; 739-44.

39. Saugstad OS et al. “Resuscitation of asphyxiated newborn infants with room air or oxygen; an international controlled trial. *Pediatrics*, 1998, 102:1

40. Craviato A et al “Inhibition of localised adhesion of enteropathic E Coli by breast milk.” *J Infectious Dis* 163: 1247-1255, 1991.

41. Angelsen NK et al. “Breastfeeding and cognitive development”. *Arch Dis Child,* 85(3): 183-188,2001

42. WHO. “Postpartum Care of the Mother and Newborn.” Geneva 1998.

43. WHO. "Mother – Baby Package: Implementing safe motherhood in countries" Geneva 1994

44. Sikorsky J et al. “Support for breast feeding mothers.” In: The Cochrane Library, Issue 1, Oxford: Software Update, 2002.

45. Howard et al. “Office prenatal formula advertising and its effect on breastfeeding patterns.” *Obst and Gynecology,* 95(2): 296-303, 2000.

46. LINKAGES project results. Presentation to a USAID stakeholders meeting. Washington DC: AED, Dec 14, 2000. Quoted in: State of the World’s Newborns. Save the Children Federation US, Washington DC, 2001.

47. Frank et al. “Commercial discharge packs and breastfeeding counseling.” *Pediatrics*,80: 854-64, 1987.

48. Houston R. “A short history of Nepal’s community-based pneumonia program.” JSI/USAID, Kathmandu, 2001.

49. Narayan et al. “Administration of colostrum for the prevention in the low birth weight infant in a developing country." *Trop Paediatr.* 1983; 29: 197-200.

50. Sanghvi TG, “Improving the cost-effectiveness of breastfeeding promotion in maternity services: summary of the USAID/LAC HNS study in Latin America.” San Diego, CA, Wellstart International 1995.

51. Behrman E. Richard, Vaughan C. Victor. "Nelson Textbook of Pediatrics." 124-125

52. WHO factsheet No. 245, June 2000

5. Definitions:

Essential Neonatal Care (ENC): ENC encompasses key aspects of the management of the neonate, whether in the community or a health facility including warmth, cleanliness, breastfeeding, cord and eye care, and immunizations.

Basic Essential Obstetric Care (BEOC): BEOC encompasses the management of normal and complicated pregnancy, delivery and the postpartum period for mothers and newborns. Services at the health center level include at least the following:

- Administration of parenteral antibiotics
- Administration of parenteral oxytocic drugs
- Administration of parenteral anticonvulsants
- Manual removal of placenta
- Evacuation of product of conception (MVA)
- Assisted deliveries by vacuum or forceps

(52)

Community Health Workers (CHW): A worker at the community level who has received training in aspects of preventive and simple curative cure. This individual could be a government staff or a volunteer. This document refers to the MCHW, VHW, FCHV and TBA as CHWs.

Comprehensive Essential Obstetric Care (CEOC): BEOC plus the following additional services:

- Anesthesia
- Blood transfusion
- Surgical obstetrics interventions including Caesarian delivery and repair of high vaginal or cervical tears.

(52)

Fetal death: Babies born dead after 22 weeks of gestation or birth weight between 500 to 1000 grams.

Late fetal death: Babies born dead after 28 weeks of gestation or birth weight over 1000 grams.

Infant: A child under the age of one year.

Infant mortality rate: The number of infant deaths per 1000 live births.

Intrauterine growth restriction: IUGR is a process of growth restriction during pregnancy that results in the birth of a baby who weighs less than expected for gestation.

Kangaroo Mother Care: An approach used in the care of both preterm and LBW babies based on continuous skin to skin contact with the mother designed to encourage breastfeeding and provide continuous warmth.

Low birth weight: Birth weight lower than 2,500 grams.

Intermediate/ moderate low birth weight: Birth weight of 1,500 to 2,499 grams.

Very low birth weight: Birth weight less than 1,500 grams

Neonate or Newborn: A live born infant from birth to before reaching 28 completed days of age.

Neonatal mortality rate: The number of liveborn babies who die in the first 28 days after birth, per 1000 live births.

Non-formal caregiver: Non-formal caregivers are those who possess the knowledge of a defined set of cognitive and practical skills that enables individuals to provide and assist in the appropriate care of mothers and newborns. They could be friends, relatives, family members, volunteers and other individuals.

Perinatal mortality rate: The number of stillbirths (weighing 1000 g or 28 completed weeks of gestation) and deaths in the first seven days of life, per 1000 total births.

Extended perinatal mortality rate: The number of stillbirths (weighing 500 g or 22 completed weeks of gestation) and deaths in the first seven days of life, per 1000 births.

Preterm/premature births: Live births before 37 weeks gestation.

Skilled attendance: Skilled attendance refers to the process by which a pregnant woman is provided with adequate care during labor, birth and the postpartum and immediate newborn periods. This requires the attendant to have the necessary skills, be supported by an enabling environment at the domiciliary, PHC or first referral levels where there must be adequate supplies, equipment and infrastructure as well as an efficient and effective system of communication and referral/transport (Inter-agency Group for Safe Motherhood, Nov 2000).

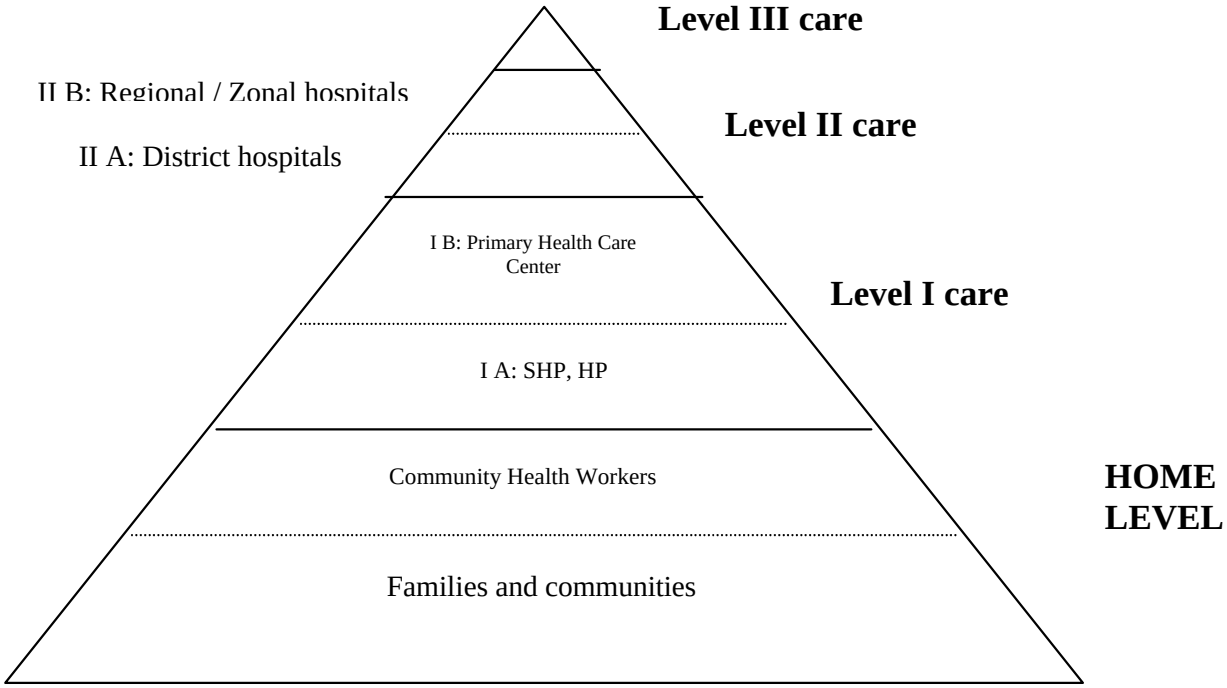
Skilled attendant: A skilled attendant is a "professional care giver who possess the knowledge and a defined set of cognitive and practical skills that enable the individual to provide safe and effective health care during childbirth to women and their newborns in the home, health center, and hospital settings" (WHO 2000). Skilled attendants include health personnel with midwifery and life saving skills. In the context of Nepal, the Maternal and Child Health Worker, Auxiliary Nurse Midwife, Nurse and Doctors are considered skilled attendants.

Small for gestational age: SGA refers to a baby whose weight is less than the 10^{th} percentile for gestation and gender.

Stillbirth: The death of a fetus weighing at least 500 grams (or when birth weight is unavailable after 22 completed weeks of gestation or with a crown-heel length of 25cm or more), before the complete expulsion or extraction from its mother.

Annexes

Annex I: Neonatal health care interventions by levels



Levels of care	Strategic aim	Type of neonatal care proposed
Home Level: 1. Families and communities	Raise families' and communities' awareness of normal newborn care, danger signs, appropriate action and reduce incidence of harmful traditional practices through promotion of BCC messages and tools (e.g. BPP) by FCHVs, mothers' groups and other community groups and community influentials to create an enabling environment for change.	• Families should seek antenatal checkups for all pregnant women • Families and communities should prepare for the birth of the child in an appropriate manner. • Skilled (MCHW, ANM, Nurse, Doctor) or trained (TTBA, non-formal caregivers) attendants should be arranged to attend deliveries. • Family should practice basic newborn care and avoid harmful newborn care practices • Families should be aware of the risks of infection and should prevent it by practicing clean deliveries including clean cord cutting, tying and applying nothing on the cord • Families should be aware of the risks of hypothermia and should prevent it by ensuring a warm delivery place, immediate drying and then wrapping of the newborn with warm clean clothes, and postponing bathing at least for 24 hours. • A baby having difficulty in breathing at birth should be recognized and helped to breathe by simple stimulation and the attendant should avoid all harmful practices (slapping, turning upside down, squeezing of cord etc.) • Immediate breast-feeding should be initiated, at least within one hour and exclusive breast feeding

		• Families should be aware of need for the mother and the newborn to be checked during the postnatal period and should seek this contact from a skilled / trained person. • Families should be able to identify simple infections and manage some of them at home. (Cleaning and putting breast milk for mild eye discharges, gently cleaning and washing off pus from skin infections with clean washed hands, gentle wiping of oral thrush with clean cloth wrapped around finger and wet with salt and water). • Families should be able to recognize severity of jaundice in newborns. Education should address not restricting mothers' diet, continued breastfeeding and no glucose or medicine for baby, exposure of baby's skin to sunlight but with awareness of hypothermia and continuation of oil massage. They should seek immediate advice for deep and early jaundice. • Families should be aware of danger signs and should seek early care at appropriate health facilities. • Families should recognize a small newborn, be aware of the need for extra care and seek care and advice from trained / skilled health worker. • Families should get the birth or death of a baby registered immediately.
Home Level: 2. Community health workers	Raise communities' awareness of normal newborn care, danger signs, appropriate action and reduce incidence of harmful traditional practices through promotion of BPP and BCC by FCHVs, TBAs, mothers' groups and others. Develop skilled attenders' abilities to mobilize the assistance of non-formal caregivers for neonatal care.	• All of the above plus • Community health workers should understand the causes of hypothermia and know how to prevent this and can advise families appropriately. • Skilled attendants should be able to resuscitate a baby asphyxiated by simple stimulation and ventilation with mouth to mask. • Skilled / trained health workers should provide postnatal contacts at home within 24 /48 hours, again within 6 days and again at 6 weeks at health facility. • All CHWs should give breast feeding advice and support. • Skilled and trained health workers should provide home based management of simple infections. (Penicillin eye drops prepared at health facility, or of tetracycline or chloramphenicol eye ointment for eye infection; half strength (0.25%) gentian violet for oral thrush; gentian violet or Betadine solution for skin infections and treat umbilical infections by drying and adding Neosporin powder). • CHWs should be included in pilot projects to identify neonatal infections at home and if successful could be trained to provide this service. This will include home based treatment with antibiotics such as Cotrimoxazole / referral by

		Other arrangements for treatment may be considered as well. • All CHWs should recognize danger signs and refer to the appropriate level of care. • CHWs should be supported to identify and provide home care for >1800 g, non sick, suckling LBW newborns and immediate referral of sick, non suckling >1800g LBW or any newborn <1800g . • CHWs should promote birth and death registration • A linkage chain should be established among community level workers to notify stillbirths and neonatal deaths
Facility Level Level I A: Sub Health Post and Health Post	Develop and strengthen facilities for maternal and newborn care. Deliver focused ANC, detect and refer women with danger signs, provide home based, outreach and in-facility post natal checks and refer complications. Provide simple newborn checks for normal newborn babies and identify and refer sick newborns with danger signs.	• All of the above plus • Link up with level I B and II care for referral of sick babies • Safe and rapid transport with thermal protection, breathing stabilization, continued supportive care on the way to facility providing appropriate level of neonatal care • Provide regular on the job training for community volunteers, non-formal care givers providing newborn care at homes • Monitor and supervise home level newborn care activities
<u>Level I B:</u> Primary Health Care Center	Develop and strengthen facilities for maternal and newborn care. Provide full ANC and PNC. Conduct clean and safe deliveries; offer essential newborn care services, all health staff conducting deliveries to be competent in basic resuscitation using a bag and mask. Staff able to recognise sick newborns and treat appropriately according to protocols.	• All of the above plus • Conduct uncomplicated deliveries and resuscitate new born with bag and mask when necessary • Manage new borns having birth asphyxia • Management of new-born infections with appropriate antibiotics • Feeding of non sick LBWs with spoon or tube feeding • Link up with Level II A, B and III care for referral of appropriate cases of sick newborns • Staff seconded from level I B to provide on the job training for staff working at level I A facilities (short term). • Monitor and supervise level I A newborn care activities
<u>Level II A:</u> District Hospital	Develop and strengthen facilities for maternal and newborn care. Offer competent newborn care services with proper diagnosis and management of sick newborns. All health staff conducting deliveries to be competent in basic resuscitation using a bag and mask.	• All the above, plus: • Obstetric and neonatal skills. • Manage deliveries that might be anticipated to be complicated and resuscitate with Ambu-bag and mask (+/- oxygen) • I.V. therapy, phototherapy, provision of warming devices for neonatal beds • Lumbar puncture • Basic lab services – Hb., TC, DC, blood grouping, bilirubin, CSF cell count • Kangaroo Mother care or other culturally

		• Perinatal and neonatal death audit • Link up with Level II B, III cares for referral of appropriate cases of sick new-borns • Staff seconded from level II A to provide on the job training for staff working at level I B facilities (short term). • Monitor and supervise level I A & B newborn care activities
<u>Level II B:</u> Regional/Zonal Hospitals	Develop and strengthen facilities for maternal and newborn care. Offer complete newborn care services with diagnosis and management of sick newborns. All health staff conducting deliveries to be competent in basic resuscitation using a bag and mask with intubation available from specially trained staff. Develop technical clinical and audit backup from central specialists	• All the above plus: • Specialist obstetric and neonatology services. • Management of complicated pregnancies and resuscitate if necessary by intubation and Ambu-bag and mask • Proper incubator care • Exchange transfusion • Management of preterm newborns. • Cardio-respiratory monitoring • Exchange transfusion. • Accepts incoming referral of all seriously ill neonates. • Link up with Level III care for the management and referral of appropriate cases of sick newborns through available communication media such as internet, email, telephone etc. • Staff seconded from level II B to provide on the job training for staff working at level II A facilities (short term). • Monitor and supervise level II A newborn care activities
<u>Level III:</u> Central specialist hospitals and Teaching Hospitals	Develop and strengthen physical facilities for maternal and newborn care. Develop technical clinical and audit backup from central specialists. Develop communications with peripheral facilities, and improve management and referral system. Create posts for neonatologists at level III facilities	• All the above plus • Diagnosis and management of complicated neonatal medical as well as surgical problems • Mechanical ventilation • Parenteral nutrition • Advanced neonatal monitoring. • Advanced lab services – blood gas estimation available. • Advanced imaging services. • Short term rotation by staff working at this level to provide on the job training for staff working at level II B facilities • Establish linkage with lower levels of care for proper and efficient management and transfer of sick newborns requiring level III care

Annex II: Evidence-based responses to neonatal health issues

There is a wide range of internationally accepted evidence-based interventions that are known to improve neonatal health. Some of these are listed below. This is not an exhaustive list, but highlights a body of key evidence that is relevant to Nepal and the foundation of the strategic direction described in this document.

The evidence base for interventions during pregnancy includes:

- The prevention, detection and treatment of various endemic diseases that present serious risks to the mother, fetus and neonate such as syphilis and other STIs (11), malaria (12), urinary tract infection (13) and tetanus (14).
- The detection and treatment of serious complication of pregnancy such as pre-eclampsia/eclampsia and vaginal bleeding (15).
- BCC can be effective in helping mothers stop smoking in pregnancy and lead to a reduction in the incidence of low birth weight and preterm birth (16).
- Iron/folate supplementation can reduce the incidence of maternal anemia (17,18).
- Detection and appropriate referral of multiple pregnancy and malpresentation reduces neonatal risk (24, 25).
- A birth plan can promote communication between the woman and her care givers (23).

The evidence base for interventions during labor includes:

- Childbirth is safer for mother and neonate if a skilled attendant is present at delivery (19).
- Promotion of clean delivery can reduce maternal and neonatal death (20, 21).
- Antibiotic prophylaxis for prelabor rupture of membranes for more than 18 hours, whether term or preterm improves maternal and neonatal outcome (22).
- In the hands of a competent health worker the partogram can reliably detect prolonged labor (23).

The evidence base for interventions for the care of the newborn includes:

Normal neonatal care

- Skin to skin contact immediately after birth maintains the neonate's temperature, promotes early breast-feeding, and helps to prevent neonatal infections (27, 28, 29, 40).
- Skin to skin contact can both prevent and reverse hypothermia (27).
- Covering the neonate's head can significantly reduce heat loss (35).
- Newborns that share their mothers' beds will breast feed more often and for longer periods (33).
- Early bathing of the newborn can lead to hypothermia (31).
- Nothing should be put on the cord stump (36): the application of substances and unsuitable dressings can lead to tetanus and septicemia (37).

Low birth weight

- "Kangaroo mother care" is safe for well, stable, low birth weight neonates (32), but there is a need for further pilot testing and evaluation in different settings (34).
- Infection rates are higher in low birth weight infants when no colostrum is given (48).

Breastfeeding

- Mothers who breastfeed early are more likely to breastfeed longer (30).
- Breastfeeding decreases the risk of neonatal sepsis (47).
- Breastfeeding aids cognitive development (41).
- In resource poor countries, artificial feeding is associated with a significantly higher infant morbidity and mortality (42).
- Support from Health workers and lay people can be effective in promoting exclusive breast feeding (43).
- The practice of giving free formula “gift” packs to new mothers results in a shorter duration of breastfeeding (44).
- Community breastfeeding promotion program can lead to dramatic increases in exclusive breastfeeding (45).
- Breastfeeding promotion is probably the most cost-effective intervention to reduce diarrheal disease (49).
- Colostrum contains antibodies, which afford local gastrointestinal immunity against organisms entering the body via this route (50).

Sepsis

- Home based neonatal care in rural India involving village health workers (whose role was extended to include antibiotic prescribing) and TBAs led to a remarkable and cost-effective reduction in neonatal mortality rate (5).
- In rural Nepal, the roles of FCHVs, MCHWs, and VHWs have been successfully extended to effectively recognize and treat pneumonia in older infants (47).

Birth asphyxia

Almost 80% of newborns that require resuscitation can be treated with no more than bag and mask ventilation, and most can be revived as effectively with air as with oxygen. (38, 39).

Annex III: Essential Care for newborn health

Care of future mothers

- Improve the health and status of women
- Improve the nutrition of girls
- Discourage early marriages and child bearing
- Promote safer sexual practices
- Provide opportunities for female education

Care during pregnancy

- Improve the nutrition of pregnant women
- Immunize against tetanus
- Screen and treat infections, especially syphilis and malaria
- Improve communication and counseling: birth preparedness, awareness of danger signs, and immediate and exclusive breastfeeding

Special attention:

- Monitor and treat pregnancy complications, such as anemia, pre-eclampsia, and bleeding
- Promote voluntary counseling and testing for HIV
- Reduce the risk of mother-to-child transmission (MTCT) of HIV

Care at time of birth

- Ensure skilled care at delivery
- Provide for clean delivery: clean hands, clean delivery surface, clean cord cutting, tying and stump care, and clean clothes
- Keep the newborn warm; dry and wrap baby immediately, including head cover, or put skin-to-skin with mother and cover
- Initiate immediate, exclusive breastfeeding, at least within one hour
- Give prophylactic eye care, as appropriate

Special attention:

- Recognize danger signs in both mother and baby and avoid delay in seeking care and referral
- Recognize and resuscitate asphyxiated babies immediately
- Pay special attention to warmth, feeding, and hygiene practices for preterm and LBW babies

Care after birth

- Ensure early postnatal contact
- Promote continued exclusive breastfeeding
- Maintain hygiene to prevent infection: ensure clean cord care and counsel mother on general hygiene practices, such as hand-washing
- Provide immunizations such as BCG, OPV, and hepatitis B vaccines, as appropriate

Special attention:

- Recognize danger signs in both mother and newborn, particularly of infections, and avoid delay in seeking care and referral
- Support HIV positive mothers to make appropriate, sustainable choices about feeding
- Continue to pay special attention to warmth, feeding, and hygienic practices for LBW babies

Source: State of the World's Newborns: A report from Saving Newborn Lives

Annex IV: Causes of newborn deaths and proven interventions to prevent it

Causes of newborn deaths	Proven interventions
Infections: sepsis, meningitis, pneumonia, neonatal tetanus, congenital syphilis	• Maternal tetanus toxoid immunization • Syphilis screening and treatment • Household use of clean delivery practices • Community level prevention of hypothermia • Early and exclusive breast feeding • Community level identification and prompt treatment of infections
Birth asphyxia	• Skilled attendant at birth • Effective management of maternal obstetric complications
Pre-term and / or low birth weight	• Malaria treatment in endemic area • Community level prevention of hypothermia • Early and exclusive breast feeding • Community level identification and prompt treatment of infections

Adapted from: Mother - Baby Package: Implementing safe motherhood in countries, WHO

Annex V: Trend of NMR and IMR

Year	IMR	NMR	Percent of IMR
1987	113	45.2	40%
1992	107	52.4	49%
1996	79	50.0	63%
2001	64.2	38.6	60%

Source: State of the World's Newborns: Nepal, SNL, SC/US, September 2002

Annex VI: How complications affect mother and baby

Problem or complication in mother	Most serious effects on mother's health	Most serious effects on fetus / newborn baby
Severe anemia	Cardiac failure	Low birth weight, birth asphyxia, stillbirth
Hemorrhage	Shock, cardiac failure, infection	Birth asphyxia, stillbirth
Hypertensive disorders of pregnancy	Eclampsia, cerebrovascular accidents	Low birth weight, birth asphyxia, stillbirth
Obstructed labor	Fistulae, uterine rupture, prolapse, amnionitis, sepsis	Stillbirth, birth asphyxia, sepsis, birth trauma, handicap
Infection during pregnancy, sexually transmitted diseases	Premature onset of labor, ectopic pregnancy, pelvic inflammatory disease, infertility	Premature delivery, neonatal eye infection, blindness, pneumonia, stillbirth, congenital syphilis
Unclean delivery	Infection, maternal tetanus	Neonatal tetanus, sepsis
Premature rupture of membrane and puerperal sepsis	Septicemia, shock	Neonatal sepsis
Hepatitis	Postpartum hemorrhage, liver failure	Hepatitis
Malaria	Severe anemia, cerebral thrombosis	Prematurity, intrauterine growth retardation
Unwanted pregnancy	Unsafe abortion, infection, pelvic inflammatory disease, hemorrhage, infertility	Increased risk of morbidity, mortality; child abuse, neglect, abandonment
Smoking	Abortion, pre mature labor	IUGR, prematurity
Alcohol intake	Alcoholism	IUGR, Fetal alcohol syndrome

Adapted from: Mother - Baby Package: Implementing safe motherhood in countries, WHO

Annex VII: Selected Demographic Information on Neonatal health (DHS 2001)

Status of mothers	
Literacy among women	35%
Mean Height of women	150.2 cms
Mean weight	46 kilograms
Mean BMI	20.3
BMI less than 18.5	27%
Night blindness during pregnancy	20%
Median age at first marriage	16.6 years
Adolescent pregnancy ages 15 to 19	21%
Total Fertility Rate	4.1 births per woman
Maternal mortality	539 per 100,000 live births (NFHS, 1996)
Pregnancy outcomes	
Live births	92%
Still births	2%
Spontaneous abortion	5%
Induced abortion	1%
Birth interval	
Less than 24 months	23%
More than 24 months	67%
Under 5 mortality	91 deaths per 1000 live births
Infant mortality	64 deaths per 1000 live births
Neonatal mortality	39 deaths per 1000 live births
Perinatal mortality	47 deaths per 1000 pregnancies
Antenatal care	
Doctor	17%
Nurse or ANM	11%
Health Assistant or AHW	11%
VHW	6%
MCHW	3%
TBA	<1%
No one	51%
TT vaccination	
None	45%
One	9%
Two +	45%
Micronutrient during pregnancy	
Intake of iron & folic acid during pregnancy	
None	77%
Less than 60 days	14%
90 days and more	6%
Place of delivery	
Health facility	9%

Assistance during delivery	
Doctors	8%
Nurse or ANM	3%
MCHW	<1%
TBA	23%
Relative or friends	55%
No one	9%
Use of CHDK	9%
Received postnatal care	21%
No postnatal care	79%
Mother received Vitamin A capsule within 2 months postpartum	10%
Breast feeding	
Percentage ever breast fed	98%
Breast fed within one hour of birth	31%
Breast fed within one day of birth	65%
Percentage receiving prelacteal feed	41%
Exclusively breast fed till 6 months of age	68%
Complementary food introduced by 6 months of age	10%

Neonatal mortality by socioeconomic and demographic characteristics

Socioeconomic and demographic characteristics	Neonatal mortality
Urban	36.6
Rural	48.5
Mountain	64.9
Hill	41.9
Terai	49.7
Eastern Region	50.5
Central Region	48.4
Western Region	39.1
Mid-western	40.5
Far-western	64.4
Mother with no education	51.6
Mother with primary education	41.2
Mother with some secondary education	31.3
SLC and above	8.8
Male newborn	52
Female newborn	43.3

Mother between 30 to 39 years at birth	42.8
First birth order	56.8
Second and third birth order	44.1
Forth to sixth birth orders	39.7
Seven + birth orders	63.0
Birth size small / very small	58.1
Birth size average or larger	32.4

Annex VIII: What can be done for newborn problems at different levels of health care system

Level	LBW	Birth Asphyxia	Hypothermia	Infection	Jaundice	Danger Signs
Family, communities	Raise families' and communities' awareness of normal newborn care, danger signs, appropriate actions and reduce incidence of harmful traditional practices					
	Recognize LBW babies, be aware of special needs of these babies and seek care and advice.	Identify a baby having breathing difficulty at birth and help breathing by simple stimulation. Avoid all harmful practices.	Be aware of the dangers of hypothermia and prevent it by arranging for a warm delivery place, immediate drying, and then wrapping of the newborn at birth. Postpone bathing at least for 24 hours.	Be aware of the dangers of infection and prevent it by practicing clean deliveries including clean cord cutting, tying, and applying nothing on the stump. Recognize simple eye infections and manage by cleaning and putting breast milk to control it. Recognize simple skin infections and clean it by washing off pus from it with clean washed hands. Recognize simple oral thrush and help to clean it with clean cloth wrapped around finger and wet with salt and water.	Families should recognize jaundice and should be aware that jaundice appearing after 24 hours and limited up to the face and upper trunk can be managed at home. There should be no dietary restriction for mother. Breast-feeding should continue and no glucose or medicine should be given to the baby. The baby should be exposed to sunlight but with awareness of hypothermia. Oil massage can be continued.	Families and communities should recognize danger signs, and seek immediate advice at appropriate level of care.

Community health workers at home level	Raise communities' awareness of normal newborn care, danger signs, appropriate actions and reduce incidence of harmful traditional practices					
	CHWs should identify LBW newborns with the use of weighing scales provided for this purpose. CHWs should be able to supervise closely the care of a non-sick, suckling > 1800g LBW. They should immediately refer sick, non suckling >1800 g LBW and any newborn <1800 g in weight.	CHWs attending deliveries should be able to identify a birth-asphyxiated baby and should help it breathe by simple stimulation and ventilation by mouth to mask.	CHWs should understand the causes of hypothermia and know how to prevent it and advise families appropriately.	CHWs should be able to manage simple neonatal infections. Eye infections should be treated with Penicillin eye drops prepared at health facility, or with tetracycline or chloramphenicol eye ointment. Oral thrush should be treated with half strength (0.25%) gentian violet. Skin infections with gentian violet or betadine solution and treat umbilical infections by drying and adding Neosporin powder.	CHW should recognize jaundice and advice families appropriately. They should be aware that jaundice seen on the first day of life and extending up to palms and soles need rapid referral to appropriate health facility	CHWs should recognize danger signs and provide prompt referral to appropriate level of care. CHWs should provide help for safe and rapid transport with thermal protection, breathing stabilization, continued supportive care on the way to facility

Level I A: Sub health post and Health post	Develop and strengthen facilities for maternal and newborn care					
	CHWs should identify LBW newborns with the use of weighing scales provided for this purpose. CHWs should be able to supervise closely the care of a non-sick, suckling > 1800g LBW. They should immediately refer sick, non suckling >1800 g LBW and any newborn <1800 g in weight.	CHWs attending deliveries should be able to identify a birth-asphyxiated baby and should help it breathe by simple stimulation and ventilation by mouth to mask.	CHWs should understand the causes of hypothermia and know how to prevent it and advise families appropriately.	CHWs should be able to manage simple neonatal infections. Eye infections should be treated with Penicillin eye drops prepared at health facility, or with tetracycline or chloramphenicol eye ointment. Oral thrush should be treated with half strength (0.25%) gentian violet. Skin infections with gentian violet or betadine solution and treat umbilical infections by drying and adding Neosporin powder.	CHW should recognize jaundice and advice families appropriately. They should be aware that jaundice seen on the first day of life and extending up to palms and soles need rapid referral to appropriate health facility	CHWs should recognize danger signs and provide prompt referral to appropriate level of care. CHWs should provide help for safe and rapid transport with thermal protection, breathing stabilization, continued supportive care on the way to referred facility
Level I B Primary Health Care Center	Develop and strengthen facilities for maternal and newborn care					
	Admit suckling, non- sick <1800 g or non-suckling and sick >1800 g LBW newborns who are not preterm for tube / spoon feeding.	Resuscitate birth asphyxiated babies with bag and mask.	Note temperature to rule out hypothermia, understand causes of hypothermia and prevent it appropriately.	Identify major newborn infections symptomatically. If possible refer to appropriate level of care for investigations. Otherwise admit for treatment with appropriate antibiotics.	Recognize pathological jaundice and refer rapidly to appropriate health facility	Link up with Level II A, B, and III care for referral of appropriate sick newborns Provide support for rapid transport with thermal protection, breathing stabilization, continued supportive care on the way to referred facility

Level II A District Hospitals	Develop and strengthen facilities for maternal and newborn care					
	Admit suckling, non- sick <1800 g or non-suckling >1800 g LBW newborns who are not preterm for management in warm neonatal beds, IV therapy.	Resuscitate birth-asphyxiated babies with bag and mask (+/- oxygen).	Note temperature to rule out hypothermia, understand causes of hypothermia and prevent it appropriately. Provide warm neonatal beds for hypothermic neonates.	Identify major newborn infections along with meningitis. Admit for treatment with appropriate antibiotics.	Phototherapy for babies with jaundice extending beyond the trunk but not up to soles and palms. Investigations for jaundiced babies Hb, TC, DC, bilirubin, blood grouping.	Link up with Level II B and III care for referral of appropriate sick newborns Provide support for rapid transport with thermal protection, breathing stabilization, continued supportive care on the way to referred facility.

Level II B Regional / zonal hospitals	Develop and strengthen facilities for maternal and newborn care					
	Admit suckling, non- sick <1800 g or non-suckling >1800 g LBW newborns who are also preterm for incubator management.	Resuscitate birth-asphyxiated babies with bag and mask (+/- oxygen). Intubate and suction under direct vision for babies with meconium or blood aspiration.	Proper incubator care.	Identify and manage all major newborn infections along with complete laboratory investigations – e.g. CSF cell count and culture, blood culture.	Phototherapy for babies with jaundice extending beyond the trunk but not up to soles and palms. Exchange transfusion when necessary. Investigations for jaundiced babies Hb, TC, DC, reticulocyte count, bilirubin, blood grouping.	Link up with Level III care for referral of appropriate sick newborns Provide support for rapid transport with thermal protection, breathing stabilization, continued supportive care on the way to referred facility.
Level III Central specialist hospitals and Teaching hospitals	Develop and strengthen facilities for maternal and newborn care					
	Incubator care, parental nutrition, advanced monitoring, advanced lab services	Mechanical Ventilator, blood gas analysis	Incubator care	Advanced lab services, neonatal monitoring and care	Advanced lab services, neonatal monitoring and care	Establish linkages with lower levels of care for proper transfer of sick newborns Establish skill sharing system between central specialists and staff working at lower levels

Annex IX: Some indicators of neonatal health and health services

Indicator *(community or facility as appropriate)*	**Source**	**Frequency** *(will vary with program needs)*
Reduction in neonatal mortality rate	Project area vital events register, HMIS, DHS	On-going, yearly, five yearly
% mothers whose birth was attended by a skilled provider	Sample surveys or HMIS	On-going, yearly.
% mothers whose birth was attended by a trained provider	Sample surveys or HMIS	On-going, yearly.
% of mothers who have received 2xTT during last pregnancy	Sample surveys or HMIS	On-going, yearly.
% of mothers who breast feed within 1st hour	Sample surveys	Yearly
% of mothers who exclusively breastfeed at 3 days and 1 month	Sample surveys	Yearly
% of mothers who received ANC x 4	Sample surveys	Yearly
% of mothers receiving ANC who were counseled in at least 2 of: delivery preparations, breastfeeding and danger signs.	Sample surveys	Yearly
% of home deliveries in which cord was cut with a clean/new instrument, or a clean delivery kit was used, and no substance was applied to the cord.	Sample surveys	Yearly
% women who deliver at home who receive a post natal visit within 48 hrs	Sample surveys	Yearly
% women who receive postnatal care who are counseled in at least 2 of: warmth, breastfeeding and danger signs.	Sample surveys	Yearly
% women who know at least 2 danger signs in each of pregnancy, delivery, postpartum and neonate.	Sample surveys	Yearly
Community cause-specific neonatal mortality rates	Verbal autopsy surveys	Variable
% FCHVs who have been successfully trained to conduct BCC activities with mothers' groups.	Training records	Yearly
% women in mothers' groups who have engaged in BCC activities that can identify at least 2 of warmth, breastfeeding and danger signs.	Surveys	Varies
No. districts in which BPP is promoted.	FHD data	Varies
% community health workers who know at least 4 danger signs in each of pregnancy, delivery, postpartum and neonate.	Sample surveys	Yearly

Some indicators of neonatal health and health services (cont.)

Indicator *(community or facility as appropriate)*	**Source**	**Frequency** *(will vary with program needs)*
% of facilities by level conducting regular neonatal and perinatal death audits for all deaths	Facility records	With each death
Facility cause-specific neonatal and perinatal mortality rates	Facility neonatal and perinatal death audits	Variable
Facility specific infection rates and % asphyxiated babies successfully resuscitated	Facility data	Monthly
% Facilities where staff have been trained in SM/neonatal core competencies.	FHD data	Yearly
Neonatal health advisory group formed and links with FHD focal point established.	FHD data	Monthly
HMG Breastfeeding Committee activated	HMG data	Monthly
National Neonatal Week activities successfully established	FHD, donor records	Yearly
% Facilities accredited as offering quality Level II neonatal care services	Neonatal Advisory group records	Yearly
% Facilities successfully re-accredited as offering quality level II neonatal care services.	Neonatal Advisory group records	Yearly
Neonatal Advisory group appraises and updates neonatal content for all RH (and other, including in-service) curricula for all levels.	Neonatal Advisory Group records	Variable
% Facilities designated as “baby friendly”	FHD data, HMG Breast Feeding Ctte records	Yearly
% Facilities successfully re-accredited as “baby friendly”	FHD data, HMG Breast Feeding Ctte records	Yearly
No. innovative pilot schemes to explore extension of roles of junior health workers approved.	FHD data, National Neonatal Advisory Group records	

Annex X: Authors of the National Neonatal Strategy Position Papers

Topics	Authors
Normal Newborn Care	**Mrs. Vijaya KC**, Retired Special Secretary, Ministry of Health, Kathmandu, Nepal **Dr. Neena Khadka**, SNL Program Manager, SCF/US, Kathmandu, Nepal
Breast feeding and micro-nutrients	**Dr. Prakash Sunder Shrestha**, Head of the Department of Pediatrics, Institute of Medicine, Maharajgunj, Kathmandu, Nepal **Dr. Madhu Dixit Devkota** Assistant Professor, Department of Community Medicine and Family Health, Institute of Medicine, Maharajgunj, Kathmandu, Nepal
Hypothermia	**Dr. Prakash Sunder Shrestha**, Head of the Department of Pediatrics, Institute of Medicine, Maharajgunj, Kathmandu, Nepal **Dr. Madhu Dixit Devkota** Assistant Professor, Department of Community Medicine and Family Health, Institute of Medicine, Maharajgunj, Kathmandu, Nepal
Low Birth Weight	**Prof. D.S. Manandhar**, Head of the department of Pediatrics, Kathmandu Medical College, and President, Mother and Infant Activities (MIRA), Kathmandu, Nepal **Mrs. Vijaya KC**, Retired Special Secretary, Ministry of Health, Kathmandu, Nepal
Jaundice	**Dr. Ranendra P.B. Shrestha**, Senior Pediatrician and Neonatogist, Kanti Children's Hospital, Maharajgunj, Kathmandu, Nepal **Dr. Tekendra Karki**, National Operations Officer, IMCI, WHO, Kathmandu, Nepal
Asphyxia	**Prof. D.S. Manandhar**, Head of the department of Pediatrics, Kathmandu Medical College, and President, Mother and Infant Activities (MIRA), Kathmandu, Nepal **Dr. Vijaya Manandhar**, National Operations Officer, Safe Motherhood WHO, Kathmandu, Nepal
Infection	**Dr. Ranendra P.B. Shrestha**, Senior Pediatrician and Neonatogist, Kanti Children's Hospital, Maharajgunj, Kathmandu, Nepal **Dr. Penny Dawson**, Chief, Nepal Family Health Program, Kathmandu, Nepal **Dr. Tekendra Karki**, National Operations Officer, IMCI, WHO, Kathmandu, Nepal **Mr. Dilip Chandra Paudel,** Child Health Team Leader, Nepal Family Health Program, Kathmandu, Nepal
Danger Signs	**Dr. Ranendra P.B. Shrestha**, Senior Pediatrician and Neonatogist, Kanti Children's Hospital, Maharajgunj, Kathmandu, Nepal **Dr. Tekendra Karki**, National Operations Officer, IMCI, WHO, Kathmandu, Nepal