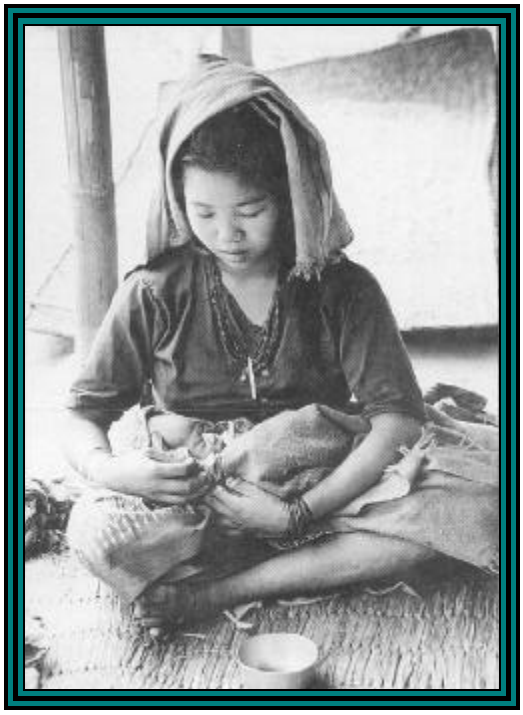
NEPAL MULTIPLE INDICATOR SURVEILLANCE

FIFTH CYCLE

CARE DURING PREGNANCY AND DELIVERY: IMPLICATIONS FOR PROTECTING THE HEALTH OF MOTHERS AND THEIR BABIES



FINAL REPORT

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EXECUTIVE SUMMARY

Introduction

The Nepal Multiple Indicator Surveillance (NMIS) began with a multisectoral baseline survey in early 1995. The NMIS was designed from the beginning as an-ongoing monitoring scheme to produce information useful for planning at national, district, community and household levels, rather than as a one-off survey.

Nepal, as a signatory to the 1989 UN Convention on the Rights of the Child, is committed to report on its implementation. Among other things, the NMIS serves as an important means of monitoring violations of children's rights in Nepal. It has also assisted HMG Nepal to monitor progress towards the 1990s Goals and Mid-decade Goals agreed at the World Summit for Children as embodied in its National Plan of Action for Children and Development for the 1990s.

The NMIS process comprises repeated cycles of data collection, analysis, interpretation, and communication of results to stimulate action. Each cycle focuses on a priority issue or set of issues. Cycle 2 focused on Primary Education in the spring and summer of 1995; cycle 3 on Diarrhoea, Water and Sanitation in the first half of 1996; and cycle 4 on early child feeding, nutrition and development in late 1996.

This fifth cycle of the NMIS focuses on care for women during pregnancy and delivery and the relationship between this and the outcome of pregnancy, in terms of estimates of low birth weight and survival of the baby. It is timely in view of the recent publication of the National Maternity Care Guidelines for Nepal. It is intended to provide information on the current situation in relation to the targets set in the guidelines and some insights about what might help to improve matters, for use by service planners and providers at national and local levels. No attempt was made to estimate maternal mortality. Estimates of maternal mortality in Nepal are available from other sources.

According to the 1996 Nepal Family Health Survey, the maternal mortality rate for the 1990-1996 period is 539 deaths per 100,000 live births (or alternatively 5 deaths per 1,000 live births). The 1991 Nepal Family Health Survey estimated the MMR as very similar: 515 deaths per 100,000 live births. However, according to the State of the Worlds Children of 1998 published by UNICEF, the MMR for Nepal is 1,500/100,000 live births. It is difficult to draw any conclusion regarding the trend of MMR in Nepal, but according to the UNICEF figures it remains as one of the highest in south Asia.

Existing figures for maternity care coverage are estimates from facility-based data and expected numbers of pregnancies. NMIS cycle 5 provides direct estimates to allow comparison with the standards set in the National Maternity Care Guidelines.

Methods

The NMIS employs Sentinel Community Surveillance (SCS). Features of this method include: the focus of each cycle on a small group of issues; the combination of quantitative and qualitative data from the same communities in a mesoanalysis; data analysis and risk analysis to produce results in a form useful for planning; revisiting of the same sites, making estimation of impact of interventions easier.

Thesites in NMIS cycle 5 are the same as for the first four NMIS cycles, selected by a multistage random sampling method. The sites are representative of the country, of the five development regions, of the three ecological zones, of the 15 eco-development regions, and of urban and rural situations. Representation of the 15 eco-development regions is among the rural sites only; the urban sites are stratified separately and are not intended to be part of the representation of the different eco-development regions. This reflects the high proportion of the population living in rural communities (nearly 90%).

A total of 18,996 households were visited in the 144 sites. Information was available for 18,653 households (99%). Only 1% households refused the interview. The total population in the households interviewed is 106,160 people. More detailed information was collected from ever-married women aged 15-49 years: a total of 19,557 women. They reported on their last pregnancy and data on a total of 17,609 pregnancies were collected.

Household information was collected from:

- 18,653 households
- 106,160 people
- 19,557 ever-married women 15-49 years
- 17,609 pregnancies

The instruments used in cycle 5 include a household questionnaire, focus group guides, key informant and

Traditional Birth Attendant (TBA) interviews, and a health facility review/interview. They are reproduced in Annex 2.

Instruments used in NMIS cycle 5:
- ❖ Household questionnaire
- ❖ Health facility interview schedule
- ❖ Key informant and TBA interviews
- ❖ Focus group guides

The sample sizes in districts are not proportional to the populations of the Districts; weights calculated to take this into account were applied when producing national indicators.

Results and risk analysis

Antenatal care and practices

Information was given about a total of 17,609 pregnancies. This includes 260 women pregnant at the time of the household questionnaire. The mean number of pregnancies the women had previously is 3.7 (s.d. 6.5), median 3.0. The mean time since the last pregnancy was 5.0 years, (s.d. 4.9 years). For 55% the last pregnancy was 3 years ago or less; for 67% it was 5 years or less ago; and for 85% it was 10 years or less ago. The mean age at the time of the last pregnancy was 26 years (s.d 6.3 years), median 26 years.

Three quarters (76%) of Nepali women giving birth in the last 5 years receive *no* formal antenatal care

Fewer than one in ten women receive the four antenatal care visits that are considered to be desirable in the National Maternity Care Guidelines. And among those who had any antenatal care visits, only 43% went for their first antenatal visit within the first three months of pregnancy. The commonest reasons given for not having antenatal care were to do with not perceiving a need for routine antenatal care, which has no part in local traditions, and which women are unaware of as a service.

A quarter (25%) of ever-married women of child bearing age (15-49 years) in the survey are literate by self report. One in three (34%) of these women admit to smoking during their most recent pregnancy. Nearly all the women in the survey (95%) reported that they worked for 8 or 9 months of their last pregnancy. And less than one in ten (8%) report having a health problem during their last pregnancy.

A number of variables individually increase the risk of women not attending for antenatal care.

- ★ Women who smoke are nearly 4 times less likely to attend for any antenatal care visits.
- ★ Literate women are nearly 7 times more likely than illiterate women to attend for antenatal care.
- ★ Women from families where the household head is literate are over 3 times more likely to attend for antenatal care.
- ★ Women living in urban areas are nearly 6 times more likely to attend for antenatal care than women in rural areas.
- ★ Women under 35 years old at the time of pregnancy are more than twice as likely to attend for antenatal care as older women.
- ★ Women reporting support from their families during pregnancy are nearly 3 times more likely to attend for antenatal care than women not supported by their families.
- ★ Women with 4 or more previous pregnancies are only half as likely to attend for antenatal care visits during the most recent of these pregnancies.
- ★ Women reporting health problems during the pregnancy are more than twice as likely as those not having such problems to attend for antenatal care. This suggest that much of the antenatal care is not really routine, but is in response to problems.
- ★ Women who continue to work for 8 or 9 months in pregnancy are less than half as likely as those who stop work sooner to attend for antenatal care.

The great majority of women who had any antenatal care visits went to government health facilities: over half (57%) reported going to the district hospital; 19% went to a health post and 13% to private clinics. As many as 50% of the women who reported having antenatal care said they were seen by a doctor. The mean payment reported per visit was 223 Rs (median 60 Rs).

Only one in ten (10%) women receive iron/folate supplements during pregnancy, and only 2% take them for more than three months. Half the women (50%) giving birth in the last 5 years received at least one dose of tetanus toxoid during their last pregnancy. Of women who attended for antenatal care, only a quarter (25%) recalled a discussion about place of delivery and only a quarter (25%) reported being advised about breast feeding. Most of them (59%) reported being 'somewhat satisfied' with the care they received, with 5% being 'not at all satisfied' and 36% being 'very satisfied'. Most (73%) women were not able to say what was the problem with antenatal services, but problems mentioned included

poor facilities, long waiting times, lack of medicines and absence of staff.

Only a minority of women could give suggestions for services to improve antenatal care. They mentioned more health posts and more, better trained staff. In the focus groups, women mentioned the need for more female doctors. Suggestions for what communities could do included reducing the work load of women and providing transport and urgent assistance when needed. Health workers generally suggested that more of everything would help them to provide a better service.

Delivery care

Nine out of ten (91%) women deliver their babies at home. A number of variables are related to the place of delivery:

★ A woman living in an urban area is 9 times more likely than a woman in a rural area to deliver her baby in a health facility.

★ Women with health problems during pregnancy are 1.6 times more likely to deliver in health facilities. Nevertheless, 84% of women with health problems still deliver at home.

★ A literate woman is 6 times more likely than an illiterate woman to deliver in a health facility.

★ Women aged 35 years and less are twice as likely as older women to deliver in health facilities, even when only deliveries in the last 5 years are considered.

Less than one in ten deliveries (6%) within the last 5 years is attended by a trained TBA or other trained worker. About half (54%) of families incurred some expenditure for the woman's last delivery. The median total cost is 400 Rs, and is higher if there are problems during labour and higher in urban locations.

Very few women (3%) reported they used a HDK for their last delivery. Even for deliveries in the last 3 years, since HDKs came onto the market, the use is only 4%. The likelihood of using an HDK for a home delivery is increased if the woman is literate, if she has attended for antenatal care and if the birth is attended by a trained TBA or other trained health worker.

Approaching two thirds (59%)of women reported that their last baby's cord was cut with a clean instrument, mostly a new blade or a boiled old blade. The chances of the cord being cut with a clean instrument are increased if the woman is literate, if she is less than 36 years old, and if the delivery is within the last 5 years.

About a third (37%) women reported that nothing was applied to the cord, 6% treated it with antiseptic and 57% with ash, cowdung or oil. If the cord is cut with a clean instrument, and either antiseptic or nothing is applied, the cord is regarded to have been treated safely. On the other hand, if the cord is cut cleanly but later on the stump is covered with unclean materials, the cord is regarded to have been treated unsafely. Using these criteria, 52% women reported the cord was treated safely.

The median reported duration of labour is 4 hours. A fifth (19%) of reported labours lasted more than 12 hours. About one in 25 (4%) women reported a health problem during their last labour. A woman with health problems during pregnancy is more than 5 times more likely to develop problems during labour.

Women with health problems during labour are three and a half times more likely to deliver in a health facility. Nevertheless, even among those reporting a health problem during labour, 71% still deliver at home. For three quarters of the women who had health problems during labour, their families sought help. A third sought help from a hospital, nearly a fifth from a private doctor or clinic and one in ten from another government health facility. Reasons given for not seeking help included that it was not thought necessary (44%), that the help was too far away (35%) and that it was too expensive (16%).

One in ten (10%) mothers reported health problems for themselves or for their babies after delivery. Common problems include: fever of mother or baby, retained placenta, excessive bleeding, and weakness of mother or baby. Help was sought from the same places as for problems during labour.

Delivery outcome

a. Birth weight

Birth weight was estimated by mothers as very small, small, normal or big. One in five (19%) of most recent births is reported by the mother to be small or very small. A higher proportion of babies born within the last ten years are reported to be small or very small. This might be due to better recall but certainly suggests no reduction in the proportion of low birth weight babies in recent years.

A number of variables increase the risk of a low birth weight baby:

★ Illiterate mothers are nearly twice as likely to deliver a baby with low birth weight compared with literate mothers.

★ Women from families with an illiterate household head have 1.4 times the risk of having babies with low birth weight compared with women from families with a literate household head.

★ Women younger than 19 years or older than 35 years at the time of giving birth have 1.2 times the risk of having low birth weight babies compared with women giving birth at ages 18-35 years.

★ Women living in rural areas have 1.4 times the risk of having low birth weight babies compared with women from urban areas.

★ Women who do not have support from their families during pregnancy have more than twice the risk of having babies of low birth weight compared with women whose families support them.

★ Women with more than four pregnancies (including the one reported on) are slightly more likely to deliver babies with low birth weight compared with women with four or less pregnancies.

★ Women who have no antenatal care have 1.4 times the risk of delivering babies with low birth weight compared with women who have any antenatal care.

★ Women who do not receive iron/folate during pregnancy have 1.5 times the risk of having babies with low birth weight compared with women who receive any iron/folate supplements.

★ A women who smokes during pregnancy has 1.5 times the risk of delivering a low birth weight baby compared with a woman who does not smoke.

★ Mothers with health problems during pregnancy are 1.5 times more likely to have babies with low birth weight compared with mothers who do not have health problems during pregnancy.

b. Survival of baby

Overall, 2.3% of babies were reported to have been still born or to have died soon after birth. A number of variables increase the risk of the baby dying before or soon after birth:

★ Illiterate mothers are 1.6 times more likely to have babies who are still born or die soon after birth compared with literate mothers.

★ Babies born to women in families with an illiterate household head are 1.4 times less likely to survive compared with babies in households with an literate head.

★ Women giving birth at younger than 19 years or older than 35 years have a 1.4 times increased risk of stillbirth or death of the baby soon after birth.

★ Women living in rural areas have 1.4 times the risk of still birth or death of the baby soon after birth compared with women living in urban areas.

★ Women who receive no help from their families during pregnancy have 1.6 times more risk of still birth or death of the baby soon after birth.

★ Women who smoke during pregnancy are 1.3 times more likely to have still born babies or babies who die soon after birth than women who do not smoke.

★ Mothers with health problems during pregnancy are more than twice as likely to have a stillborn baby or a baby dying soon after birth compared with mothers without health problems in pregnancy.

★ If the umbilical cord is cut with a non-clean instrument, the baby has twice the risk of dying soon after birth compared with if the cord is cut with a clean instrument.

★ Women reporting problems during labour are 6 times more likely to have a still born baby or a baby that dies soon after birth.

★ If labour is prolonged beyond 12 hours, the risk of the baby being still born or dying soon after birth is nearly double that when the labour lasts 12 hours or less.

★ Babies described by the mother as small or very small are nearly three times more likely to be stillborn or to die soon after birth than those said to be normal or big.

★ Mothers who are not 'very satisfied' with the care they received during labour have 1.6 times the risk of having a still born baby or a baby dying soon after birth, compared with mothers who are very satisfied with their care during labour.

★ Babies of mothers reporting health problems (either of mother or baby) after delivery are 6 times more likely to die soon after birth compared with babies of mothers not reporting such health problems.

Analysis for action

In this section, the combined effects of variables amenable to change upon the outcomes of interest are examined. The potential benefits that could be achieved by interventions to modify the factors related to adverse outcomes are estimated, with the intention of providing information to assist planners at all levels in their decision-making processes.

The effects of variables in combination are examined using multiple logistic regression. Step-down from a saturated model is used to find the best-fitting, most parsimonious model.

Variables related to the likelihood of attending for antenatal care that remain in the final logistic regression model are: literacy of mother; area of residence; working for more than 7 months of pregnancy; smoking in pregnancy; literacy of the household head; more than 4 pregnancies; and support from the family.

Variables increasing the risk of low birth weight babies in the final model are: illiteracy of the mother; health problems in pregnancy; smoking in pregnancy; illiteracy of the household head; lack of support from the family; and living in rural area.

Variables increasing the risk of still birth or death soon after birth in the final model are: health problems in labour; lack of satisfaction with care during labour; low birth weight; living in rural area; illiteracy of the mother; bhealth problems in pregnancy; and cutting the cord with a non-clean instrument.

The possible benefits to be gained from different interventions for each outcome are shown in Tables 99, 100 and 101 (reproduced below for convenience). The priority interventions, having potential benefits for more than one outcome, are: improving literacy of mothers, identifying and managing health problems in pregnancy, preventing smoking in pregnancy, improving services for rural areas, improving literacy of household heads, and encouraging family support for pregnant women.

Table 99. Possible benefits of different interventions to increase the proportion of women attending for antenatal care

Intervention	Potential individual benefit (from OR)	Potential population benefit (from RD)	Proptn of population who could benefit	Relative cost of possible interventions
Ensure literacy of women of child bearing age	Double the chance of ANC	18% more women to attend ANC	Three quarters of pregnant women	Moderate
Improve access and knowledge in rural areas	Double the chance of ANC	17% more women to attend ANC	Nine out of ten pregnant women	High
Discourage women from working up to end of pregnancy	Nearly double the chance of ANC	14% more women to attend ANC	Nine out of ten pregnant women	Low
Stop-smoking campaign for pregnant women	Increase chance of ANC by half	8% more women to attend ANC	About a third of pregnant women	Low/moderate
Ensure adult literacy (for household head)	Increase chance of ANC by a fifth	5% more women to attend ANC	About half of pregnant women	Moderate
Encourage limit of 4 pregnancies	Increase chance of ANC by a fifth	4% more women to attend ANC	Over a third of pregnant women	Low/moderate
Ensure family support for pregnant women	Increase chance of ANC by 10%	3% more women to attend ANC	About one out of ten women	Low

Note: The proportion of the population who could benefit is that proportion not currently having the favourable level of the variable. For example, the proportion of pregnant women currently illiterate.

Table 100. Possible benefits of different interventions to decrease the risk of low birth weight babies

Intervention	Potential individual benefit (from OR)	Potential population benefit (from RD)	Proptn of population who could benefit	Relative cost of possible interventions
Ensure literacy of women of child bearing age	Decrease risk of LBW by a quarter	4% less LBW babies	Three quarters of pregnant women	Moderate
Identify and manage pregnancy problems	Decrease risk of LBW by a quarter	4% less LBW babies	A tenth of pregnant women	High
Stop-smoking campaign for pregnant women	Decrease risk of LBW by 13%	2% less LBW babies	About a third of pregnant women	Low/moderate
Ensure adult literacy (for household head)	Reduce risk of LBW by 10%	2% less LBW babies	About half of pregnant women	Moderate
Improve access and knowledge in rural areas	Reduce risk of LBW by 8%	1% less LBW babies	Nine out of ten pregnant women	High
Ensure family support for pregnant women	Reduce risk of LBW by 8%	1% less LBW babies	About one out of ten women	Low

Note: The proportion of the population who could benefit is that proportion not currently having the favourable level of the variable.

Table 101. Possible benefits of different interventions to reduce risk of still birth and death soon after birth

Intervention	Potential individual benefit (from OR)	Potential population benefit (from RD)	Proportion of population who could benefit	Relative cost of possible interventions
Identify and manage labour problems	Reduce risk of death twofold	3% less babies dying	One in twenty pregnant women	High
Improve quality of delivery care	Reduce risk of death twofold	3% less babies dying	One in twenty women	High
Actions to prevent LBW (Table 100)	Reduce risk of death by two thirds	2% less babies dying	A fifth of pregnant women	High
Improve access and knowledge in rural areas	Reduce risk of death by more than half	2% less babies dying	Nine out of ten pregnant women	High
Ensure literacy of women of child bearing age	Reduce risk of death by 40%	1% less babies dying	Three quarters of pregnant women	Moderate
Identify and manage pregnancy problems	Reduce risk of death by a fifth	1% less babies dying	A tenth of pregnant women	High
Ensure cord cut with clean instrument	Reduce risk of death by a fifth	1% less babies dying	Four out of ten pregnant women	Low

Note: The proportion of the population who could benefit is that proportion not currently having the favourable level of the variable.

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ABBREVIATIONS

Abbreviations:

95% CI	95% Confidence Interval
AHW	Auxiliary Health Worker
ANM	Assistant Nurse Midwife
CBS	Central Bureau of Statistics
CEDAW	Convention on Elimination of Discrimination Against Women
FCHV	Female Community Health Worker
CRC	Convention on the Rights of the Child
HDK	Home delivery kit
IMR	Infant Mortality Rate
MCHW	Maternal and Child Health Worker
MMR	Maternal Mortality Rate
NMCG	National Maternity Care Guidelines Nepal
NMIS	Nepal Multiple Indicator Surveillance
NPC	National Planning Commission
OR	Odds Ratio: one way of estimating Relative Risk (see below)
TBA	Traditional birth attendant
VHW	Village Health Worker
UNICEF	United Nations Childrens Fund

Statistical and epidemiological terms

This report is deliberately written avoiding too many specialised statistical and epidemiological terms. However, some are unavoidable. A brief explanation of the main terms used in the report is given here; readers who are interested in more detailed explanations could refer to a textbook on modern epidemiological methods.

95% confidence interval:
A measure of the accuracy of an estimate, based on the normal distribution curve. The true value is 95% likely to lie between the upper and lower values of the 95% confidence interval.

Standard Deviation:
A measure of the spread of the distribution of a variable, based on the normal distribution curve. 99% of the population will have values within +/- two standard deviations from the mean value of the variable.

Odds Ratio:
One way of estimating Relative Risk. In a 2X2 table, with cells a,b,c,d, the Odds Ratio is calculated by ad/bc.

Relative Risk:
The risk in one group compared with another group (for example the risk of stunting in girls compared with the risk of stunting in boys). When the actual rates in each group are known (for example, the total number and the number with stunting), the relative risk can be estimated either by the Odds Ratio or by the Rate Ratio (the rate in one group divided by the rate in the other group). In a case-referent study, only the Odds Ratio can be calculated. For relatively rare conditions, the two estimates of Relative Risk give a similar answer. There is discussion about which estimate of Relative Risk it is better to use. For further details, a textbook of modern epidemiology should be consulted. In SCS methodology, the Odds Ratio is used as the estimate of Relative Risk.

The Relative Risk or Odds Ratio gives an idea of the risk for an **individual** in one group compared with an individual in another group (for example, a child of a literate mother compared with a child of an illiterate mother). It is therefore most useful when making decisions about the most benefit for an individual child (such as those taken by a mother for her child).

Risk Difference:
The risk in one group minus the risk in another group (for example the risk in children of illiterate mothers minus the risk in children of literate mothers). The risk difference can only be calculated when the rates in both groups are known.

The Risk Difference gives an idea of the risk for a **group** and how this could be changed by an action. It is most useful for planners who are considering how many children could benefit from an intervention.

INTRODUCTION

Nepal Multiple Indicator Surveillance

The Nepal Multiple Indicator Surveillance (NMIS) began in 1994, with a first cycle in early 1995 on Health and Nutrition[1] that covered a number of indicators necessary to assess progress toward development goals. The NMIS was designed as an-ongoing monitoring scheme rather than a one-off survey.

In 1989 the United Nations adopted the Convention on the Rights of the Child and it came into force in 1990. Nepal, as a signatory to this convention, is required to submit periodic reports on its implementation[2]. Nepal is also a signatory to the Convention to End Discrimination Against Women (CEDAW)[3]. Among other things, the NMIS serves as an important means of monitoring violations of the rights of children and women in Nepal. It has also assisted HMG Nepal to monitor progress against the 1990s Goals and Mid-decade Goals agreed at the World Summit for Children (WSC) as embodied in its National Plan of Action (NPA) for Children and Development for the 1990s[4]. These two purposes of the NMIS scheme are closely linked: the failure to meet children's needs as specified in the WSC and the Nepal NPA is, in fact, a violation of their rights[5]. The achievement of WSC goals is a necessary but not sufficient condition for the realisation of corresponding rights[6]. International research is on-going on defining the best indicators for childrens rights[7]. But some are clearly already included in the NPA goals.

The NMIS process comprises repeated cycles of data collection, analysis, interpretation, and communication of results to stimulate action. Each cycle focuses on a set of priority issues for the health, well-being and rights of children also for the whole population of Nepal. A steering group from the National Planning Commission, Central Bureau of Statistics and relevant line ministries agrees the focus of each cycle. The Steering Group nominates a technical group to develop and agree the cycle plan and instruments of data collection for each cycle as well as to play a key role in interpreting NMIS results and ensuring their use.

The four cycles of NMIS that have taken place so far are: Cycle 1 on Health and Nutrition[1] in early 1995; cycle 2 on Primary Education[8] in spring/summer 1995; cycle 3 on Diarrhoea, Water and Sanitation[9] in the first half of 1996; and cycle 4 on early childhood feeding, nutrition and development[10] in the autumn of 1996. Reports on these first four cycles are available[1,8,9,10].

This fifth cycle of the NMIS focuses particularly on women's access to and experience of antenatal and delivery care. This is timely in view of the recent publication of the National Maternity Care Guidelines for Nepal[11]. It is intended to provide information on the current situation in relation to the targets set in the guidelines and some insights about what might help to improve matters, for use by service planners and providers at national and local levels.

This fifth report in the NMIS Series includes a brief section in the Introduction on relevant existing data in Nepal, and the government strategy for promoting safe motherhood. The Methods section includes a background to the methodology used in the NMIS, which will be relevant especially for those readers who have not seen the first four reports in the NMIS Series[1,,8,9,10]. The methods used in the fifth cycle are described, including the instruments used and the sources of data from households, institutions, key informants and focus groups. The Results section gives the results of a descriptive analysis of the levels of antenatal care, delivery care and other practices during pregnancy and delivery, and information about the outcome of reported pregnancies in terms of the size of the baby and whether or not the baby survived. It includes a univariate risk analysis of those variables having an effect on the risk of not receiving antenatal care and of an adverse outcome of the pregnancy (undersized baby or death of the baby). It also shows the results of the risk analysis to examine the effects of variables in combination on the risk of not having antenatal and delivery care or of an undersized baby or death of a baby. It includes estimates of the possible effects of different interventions aimed at improving antenatal and postnatal care. Results disaggregated geographically and by ethnic group are given in Annex 5.

Note that in this fifth cycle of the NMIS there was no attempt to estimate maternal mortality. Recent estimates of the maternal mortality in Nepal are available from other sources[12,13]. Nevertheless, it includes data on access to emergency obstetric care and other variables known to be associated with maternal mortality. If it can indicate ways in which these indicators can be improved, this would be expected to result in a reduction in maternal mortality.

This report and the reports of cycles 1, 2, 3 and 4 are only part of the process of communicating the results of

the NMIS to those who need them for planning and development at national, local, community and household levels. The findings of cycles 1-4 have been discussed with decision-makers and planners in a number of different fora, including with Chairmen of District Development Committees (DDCs). For cycle 5 it will be particularly important to discuss the findings with health care planners and providers in both government and NGOs. Their actions can translate the potential benefits indicated by the information from NMIS cycle 5 into real benefits for women and the next generation of Nepali children.

CIETinternational facilitated a two-week workshop on the methodology used in the NMIS and the findings of the third cycle in Kathmandu in May 1996 for staff of the Central Bureau of Statistics (CBS). This was intended to build capacities for their increasing practical involvement in the NMIS process. The CBS has taken on the task of data collection and data entry for the NMIS as from cycle 5. A two-week workshop on analysis of the findings of NMIS cycle 5 was facilitated by CIETinternational in Kathmandu in September 1997. This was attended by staff in the CBS as well as several other Nepali statisticians and demographers.

Work on planning and implementing a communication strategy on the results of the NMIS is currently being undertaken, with the support of UNICEF. This includes establishing a network of all organisations, mainly NGOs, working on development issues in the different districts of Nepal. This network can be a key channel for communicating messages derived from the NMIS cycles, since many of the organisations have frequent contact with communities and are active in promoting literacy as well as providing services in health and other sectors.

Pregnancy and delivery care and outcome in Nepal

Maternal mortality

According to the 1996 Nepal Family Health Survey[12], the maternal mortality rate for the 1990-1996 period is 539 deaths per 100,000 live births (or alternatively 5 deaths per 1,000 live births). The 1991 Nepal Family Health Survey[13] estimated the MMR as very similar: 515 deaths per 100,000 live births. However, according to the State of the World's Children of 1998[14] published by UNICEF, the MMR for Nepal is 1,500/100,000 live births. It is difficult to draw any conclusion regarding the trend of MMR in Nepal, but according to the UNICEF figures it remains as one of the highest in south Asia.

Table 1. Estimates of Maternal Mortality Rate in South Asian countries.

Country	Maternal Deaths per 100,000 live births
Sri Lanka	140
Nepal	1500
Pakistan	340
India	570
Bhutan	1600

*Source: The State of the World's Children, 1998

Maternity care standards

Partly in response to the high maternal mortality rate, the Ministry of Health, HMG of Nepal issued the National Maternity Care Guidelines in 1996[11]. The guidelines point out that the provision of appropriate care for women during pregnancy and childbirth is essential to ensure a healthy and successful outcome of pregnancy for the mother and her newborn infant. Most women in Nepal reside in rural areas, where only basic health care services are available at the Health Post (HP) and Sub-Health Post (SHP), with some community-based services provided by trained Traditional Birth Attendants (TBAs) or Female Community Health Volunteers (FCHVs). The capacities of the various health worker categories vary and may not be sufficient to allow them to respond to women's needs effectively. Furthermore, access to health facilities is limited by difficult terrain, lack of roads and lack of transport facilities. The National Maternity Care Guidelines[11] define the basic care that should be available for women and newborns during pregnancy, delivery and the post-natal period, and set the national standard for maternity care in Nepal.

The Annual Report of the Department of Health Services 2053/54 (1996/97)[15] includes indirect estimates of maternity care coverage. The report includes data from health facilities, with estimates of coverage based on expected numbers of pregnancies. On this basis, it estimates that 21% of expected pregnancies had at least one antenatal care visit in 1996/97, and that 6% of expected deliveries were attended by a trained TBA or other trained health worker.

NMIS cycle 5 examines the current maternity care situation in Nepal directly, allowing comparison with the standards of the National Maternity Care Guidelines.

METHODS

BACKGROUND: THE NMIS METHODOLOGY

The NMIS uses a methodology known as Sentinel Community Surveillance (SCS). This is described in detail elsewhere[16,17,18]. It has the underlying aim of 'building the community voice into planning'. SCS can be described as a multi sectoral community-based information management system. There are a number of particular features of the SCS methodology.

- Data are collected from cluster sites, selected to be representative of a district, a region or a country.
- Typically, cluster sites are communities of around 120 households, and all households in the site are included in data collection.
- SCS is a repeated cyclical process, with each cycle including planning and instrument design, data collection, data analysis and interpretation, and communication of results.
- Each cycle focuses on a particular area or problem, rather than trying to collect data on a wide range of problems.
- Quantitative data from household questionnaires are combined with qualitative data from focus groups, key informant interviews and institutional reviews *from the same communities* (that is, the data are coterminous) to allow a better understanding of the quantitative data. This combined analysis is called mesoanalysis[18].
- Data analysis is not only in terms of indicators (for example, rate of childhood diarrhoea) but also in terms of *risk* (for example the risk of diarrhoea in a child with access to safe water compared with a child who does not have access to safe water).
- Data analysis, and especially risk analysis, is intended to produce results in a form that can be useful for planning at household, community, district and national levels.
- The same sites are revisited in subsequent cycles of data collection, allowing easy estimation of changes over time or as a result of intervention.
- Each cycle of data collection and analysis requires a communication strategy to get the information to those who need it for planning.
- Transfer of skills of data collection, analysis and communication over a number of cycles is an explicit aim of the methodology.

A key feature of SCS is the ability to do **risk analysis** to look at causes. In NMIS cycle five the focus is on reasons for not receiving antenatal care and for undersized babies or death of babies.

SCS is deliberately designed to concentrate data collection efforts: in time (a series of cycles in the sentinel sites, at approximately 6 monthly intervals); in space (representative communities are surveyed rather than collecting data from all communities); and in subject matter (each cycle focuses on one area at a time, rather than trying to collect all possible data on every occasion). SCS employs a type of cluster survey methodology, but the clusters are larger than in many cluster surveys: typically 100-120 households per site, rather than the 10-50 used in most cluster surveys. And in the SCS method, there is no sampling within each site; every household is included. This gives greater statistical power in the data analysis and also allows the linkage of data from the household questionnaires to other, mainly qualitative, data from the same sites. This data relating to the whole site is combined with the household data in a mesoanalysis[18].

A key issue in the SCS methodology and in the NMIS is the selection of sites so as to be representative. In some countries, random sampling is not a possibility because no adequate sampling frame exists. In these situations, purposive selection is used, drawing on local knowledge of conditions to choose sites as representative as possible of the situation in a district, region or country. When possible, random sampling methods are used and this is the case in Nepal, where a reasonably good census sampling frame exists. In both cases, stratification is first used to ensure that certain types of sites are included in proportion to their occurrence in the population. For example, stratification can be by urban and rural sites, or by ecological zones. In the NMIS, the sample sites for the NMIS were drawn by the Central Bureau of Statistics (CBS), after stratification into development regions, ecological zones and urban/rural sites. The details of the sampling method and the selected sites are given in the report of the first NMIS cycle[1] and the annexes to that report.

NMIS CYCLE 5: SAMPLE SITES

As mentioned above, these are the same sites as for the first four NMIS cycles, selected by a multistage random sampling method. As discussed in the report of the first NMIS cycle, the sites are representative of the country, of the five development regions, of the three ecological zones, of the 15 eco-development regions, and of urban and rural situations. The rural sites were selected primarily to give representation of the 15 eco-development regions but in 18 districts there are sufficient sites (four or more) to ensure reasonable district representativeness. In a further 19 districts, only 1-2 sites were selected so they cannot be relied upon to be representative of that district. Note that representation of the 15 eco-development regions is among the rural sites only; the urban sites are stratified separately and are not intended to be part of the representation of the different eco-development regions. This reflects the high proportion of the population living in rural communities (around 90%) and the difficulty of having a large enough urban samples to stratify separately among the 15 eco-development regions.

There are a total of 144 sites in the sample: 126 rural and 18 urban. The location of the sites is shown on the map in Annex 1. Annex 1 also gives the names of the Districts in the NMIS sample, with the number of sites in each. It also includes a list of all Districts in Nepal grouped into the 15 eco-development regions. This is intended for officials from non-NMIS Districts who read the report to find which results most nearly approximate to their situation (the results for the relevant eco-development region).

THE POPULATION IN NMIS CYCLE 5

A total of 18,996 households were visited in the 144 sites. Information was available for 18,653 households (99%). Only 1% households refused the interview. The total population in the households interviewed is 106,160 people. More detailed information was collected from ever-married women aged 15-49 years: a total of 19,557 women. They reported on their last pregnancy and data on a total of 17,609 pregnancies were collected.

Household information was collected from:
- 18,653 households
- 106,160 people
- 19,557 ever-married women 15-49 years
- 17,609 pregnancies

INSTRUMENTS

The instruments used in cycle 5 are reproduced in Annex 2. They include a household questionnaire, focus group guides, key informant and Traditional Birth Attendant (TBA) interviews, and a health facility review/interview. The instruments were designed with a Technical Group of the NMIS Steering Committee, including government, university and UNICEF experts in antenatal and obstetric care, and subsequently approved by the Steering Committee.

Instruments used in NMIS cycle 5:
- Household questionnaire
- Health facility interview schedule
- Key informant and TBA interviews
- Focus group guides

The household questionnaire includes questions about each ever-married woman aged 15-49: age, literacy, timing of last pregnancy, antenatal care, other practices during pregnancy (such as smoking), place of delivery and attendance at delivery, size of the baby and survival of the baby. The reference periods for the different questions on the household questionnaire are shown in the questionnaire itself (Annex 2).

For 132 of the 144 communities, the health facility that most served the community was visited and the most senior worker was interviewed. The visit and interview focused on aspects of antenatal and delivery care.

TBAs working in the communities were interviewed about their practices for care and advice during pregnancy and delivery. In total, 177 TBAs were interviewed. Up to 4 were interviewed in a single community, but no TBA was interviewed in 23 of the 144 communities (16%).

In 142 of the 144 communities, a focus group of ever-married women of child bearing age (15-49 years) was held to discuss practices and care during pregnancy and delivery and the best ways to give messages about antenatal and delivery care to communities. A second focus group of mothers of young children was held in each community to discuss the findings of NMIS cycle 4 (on early childhood feeding, nutrition and development) and the best way to pass on the important messages about this to communities.

The focus group guide for cycle 5 covers reasons for not having antenatal care and suggestions for improving

antenatal services, arrangements for emergencies during pregnancy and delivery and suggestions about improving matters. The cycle 4 focus group guide covers ways in which mothers could be helped to feed their young children more often and the importance of feeding food of high nutritional value to children. The results of the cycle 4 feedback are not given in this report.

Coding sheets and data entry formats were created for each instrument. Data entry was programmed using Epi Info (version 6)[19]. The data were entered twice and validated using Epi Info. Epi Info was also used for the analysis of the data. The data collection instruments were piloted several times to ensure that they were appropriate to the households, health facility workers and focus groups concerned and that the coding and data entry arrangements were satisfactory.

Training and field work

Field staff were recruited in March 1997. They were recruited from and trained in five regional centres: Kathmandu, Janakpur, Nepalgunj, Pokhara and Sunsari. Twenty-six teams, each containing four or five members, were recruited. The thirty field supervisors were trained in Kathmandu. The field survey was carried out between March and April 1997.

When communities were visited, the opportunity was taken to give them a summary of the results of cycle 4 and conduct focus groups to discuss the implications of the key findings and the ways in which important messages might best be disseminated.

Data coding and entry began during fieldwork, with messengers bringing back as much data as possible to Kathmandu from each of the field teams. Data entry began in July 1997 and data entry and cleaning of quantitative data was completed by mid September 1997. Data entry of qualitative data from focus groups was completed by the end of October 1997.

Analysis

The analysis aimed to produce national indicators on antenatal and delivery care in Nepal; to examine variables that might be related to this antenatal and delivery care and birth weight and survival of the baby; and, importantly, to look for contrasts so as to discover actionable factors that might help to improve the situation. This required an analysis of the risk of not having adequate care or of an adverse outcome for the baby in relation to possible explanatory variables (for example, literacy, access to facilities, advice from health workers, antenatal and delivery practices - for the baby outcomes). The effects of variables in combination were examined using multiple stratification and logistic regression. The logistic regression was a step down from a saturated model to find the best fitting, most parsimonious model.

For most of the analyses, all reported last pregnancies are included. Analyses including only pregnancies within the last 5 years were also undertaken. In most cases the results for all pregnancies are very similar to those when only more recent pregnancies are included, suggesting little recent change in practices. Any differences are highlighted in the report.

The analysis used the EpiInfo package (version 6)[19]. This public domain package assists with questionnaire creation, data entry and data analysis. The strength and statistical significance of associations were tested using the Mantel-Haenszel X^2 test[20] and the Mantel Extension of this test[21]. Logistic regression used SPSS[22].

Quantitative analysis was supplemented by qualitative data from focus groups, key informants and observation. The records of all focus groups were reviewed for an overview of the ideas expressed. Each record was then coded the issues raised by the participants. These codes were then related to information from the household questionnaires from the same community. The focus group themes and data from other qualitative instruments are shown in Annex 3, with the frequencies of each theme and response.

Weighting of results to give national indicators.

As explained previously[1], the sample sizes of Districts were not proportional to the populations of the Districts and weights were calculated to take this into account for national indicators. The weights give the correct balance of individual areas in national figures, for example taking into account relative over sampling of mountain eco development regions and urban sites. These weights were used in this cycle of the NMIS for national indicators. The weighted and unweighted national values for key indicators are shown in annex 4. The Epi Info programme CSAMPLE was used to calculate weighted values of key indicators. In practice, the weighted values are close to the unweighted values. Unless stated otherwise, values of indicators quoted in the Results section for the whole of Nepal are weighted. Values of indicators at subnational levels (such as eco development regions and in urban and rural sites separately) given in Annex 5 are deliberately *not* shown weighted.

RESULTS: I. BASIC INDICATORS AND RISK ANALYSIS

1. ANTENATAL CARE AND PRACTICES

The women and their pregnancies

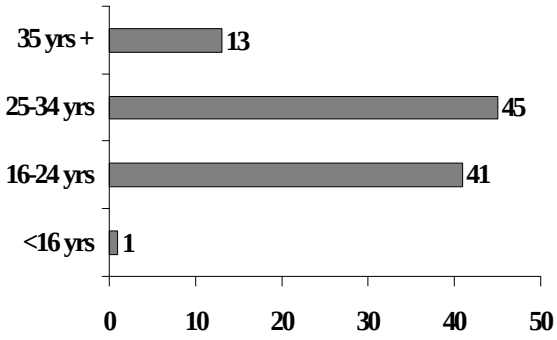
The sample includes 19,557 ever-married women aged 15-49 years. Their average age at the time of answering the survey was 30.4 years (s.d. 8.4 yrs). Information was given about a total of 17,609 pregnancies, including 260 women pregnant at the time of the survey. These current pregnancies are included in analyses of antenatal care but excluded in analyses of pregnancy outcome (birth weight estimate and survival of the baby). The mean number of pregnancies the women had previously is 3.7 (s.d. 6.5), median 3.0.

The women were asked how long ago their last pregnancy was. The mean time since the last pregnancy was 5.0 years, (s.d. 4.9 years). For 55% the last pregnancy was 3 years ago or less; for 67% it was 5 years or less ago; and for 85% it was 10 years or less ago. The woman's age at the time of the last pregnancy was calculated by subtracting the time since the last pregnancy from the woman's age at the time of the survey. The mean age at the time of the last pregnancy was 26 years (s.d 6.3 years), median 26 years. The distribution of age at the time of the last pregnancy is shown in Table 2 and Figure 1.

Table 2. Distribution of age of women at the time of their last pregnancy

Age group	No of women	% of women
Up to 15 years	175	1
16 - 24 years	7316	41
25 - 34 years	7734	45
35 years plus	2075	13

Figure 1. Age of women at time of last pregnancy



Antenatal visits

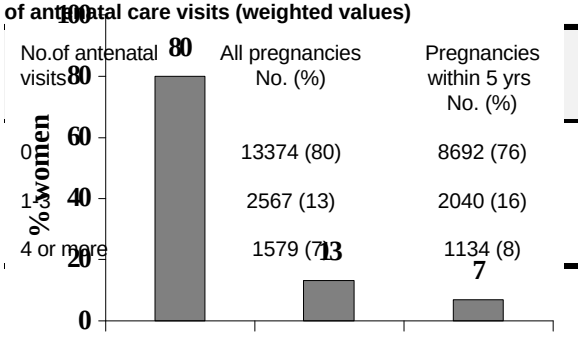
The National Maternity Care Guidelines have a target of four antenatal visits for each pregnancy. In NMIS cycle 5, women were asked about how many antenatal care visits they had during their last pregnancy. The proportions having no visits, 1-3 visits and 4 or more visits are shown in Table 3 and Figure 2.

Currently, fewer than one in ten women are receiving the number of antenatal care visits that are considered to be desirable in the National Maternity Care Guidelines.

Figure 2. % of women with different numbers of antenatal care visits

Table 3. Proportion of women receiving different numbers of antenatal care visits (weighted values)

No.of antenatal visits	All pregnancies No. (%)	Pregnancies within 5 yrs No. (%)
0	13374 (80)	8692 (76)
1-3	2567 (13)	2040 (16)
4 or more	1579 (7)	1134 (8)



Three quarters (76%) of Nepali women giving birth within the last 5 years receive *no* formal antenatal care

There is variation in the proportion of women receiving formal antenatal care (one visit or more) by geographic area and by ethnicity. This variation is shown in Annex 5, tables A5.1 and A5.5 and Figure A5.1. Note that the

figures for individual eco development regions etc are shown *unweighted*, while the aggregated figure for Nepal is shown *weighted*. It is clear that routine antenatal care is mainly confined to urban sites. The higher figure among Newari people may be because many of them live in urban or peri-urban areas.

Timing of the first antenatal care visit

The National Maternity Care Guidelines advise that women should seek antenatal care from a trained TBA, MCHW, or ANM as soon as a pregnancy is suspected. However, among women who had any antenatal care visits, only 43% (1857 out of 4162) of them went for their first antenatal visit within the first three months of pregnancy. For pregnancies within the last 5 years, 41% of the women who had antenatal care had the first visit within 3 months.

Reasons for not having antenatal care

The reasons for not having formal antenatal care were explored: women who had not had any antenatal care visits were asked why and the issue was also discussed in focus groups of women in the communities. Table 4 shows the reasons given by women in households for not having formal antenatal care.

Table 4. Reasons given by women who did not have any antenatal care visits during their last pregnancy

Reason	Number of women	% women
No need perceived	4485	34%
Not part of local tradition	4184	31%
Not aware of a service	3107	23%
Too far to health facility	1642	11%
No money to pay for visits	648	5%
No time to go for visits	301	2%
The serv ice is poor	157	1%
Family don't allow to go	136	1%
Don't know/missing	300	2%
Total	14780	

Note: Up to three reasons were allowed for each respondent.

Issues of access, time for visits and payment for visits were raised but the commonest reasons were to do with not perceiving a need for routine antenatal care, which has no part in local traditions, and which women are unaware of as a service. Even when women are aware of the existence of antenatal care services in their area, there is no perceived benefit of routine antenatal care, so it is not seen to be worth the time and effort it entails. If women in Nepal are to be persuaded to have routine antenatal care, much more effort needs to go into marketing the service, including demonstrating the advantages of having such care. Part of the purpose of this survey was to explore whether women who have antenatal care have a better outcome of pregnancy (excluding maternal mortality which was not measured) than those who do not, taking other factors into account (see later).

In focus group discussions, lack of awareness and lack of tradition of having antenatal care were mentioned in three-quarters of the communities (76%). Bad attitudes of staff (8%) and poor facilities (8%) were raised in focus group discussions, although only 1% of household responding women mentioned poor service (see Table 4). Perhaps women felt able to speak more freely in the focus groups. The proportions of focus groups mentioning different reasons for not having antenatal care are shown in Annex 3.

Other factors during pregnancy

Smoking

A sizeable proportion of Nepali women smoke during pregnancy.

> Nearly one in three (31%) of Nepali women giving birth within the last 5 years admit to smoking during their most recent pregnancy.

Considering all reported pregnancies, the proportion smoking is little different (34%). The proportion of women who smoke during pregnancy varies by geographic area and by ethnicity. The figures disaggregated by area and by ethnic group are shown in Annex 5, Tables A5.1 and A5.5 and Figure A5.2.

Women were asked how many cigarettes/beedi they smoked per day during pregnancy. Self-reported level of smoking is known to be much less reliable than reports of smoking at all (smokers underestimate the number of cigarettes smoked but are less likely to report themselves as complete non-smokers), so this report does not analyse the data on self-reported level of smoking. However, most of the women smokers reported themselves as light smokers; only 5% of women (17 % of smokers) reported smoking more than 10 cigarettes/beedi per day.

Working during pregnancy

Working during the whole or nearly the whole of pregnancy is the norm in Nepal. This is the same

whether all reported pregnancies or only more recent pregnancies are condsidered.

Nearly all the women in the survey (95%) reported that they worked for 8 or 9 months of their last pregnancy.

he geographic and ethnic variation in working during pregnancy is shown in Annex 5, Tables A5.1 and A5.5 and in Figure A5.3.

Health problems during pregnancy

Women were asked about what health problems, if any, they had experienced during pregnancy. The great majority denied any problems, suggesting that only relatively serious conditions are considered as problems. For example, morning sickness is clearly not reported here as a problem. This may mean that many minor problems, that could nevertheless be an indicator of more serious conditions, are not being noted. For example, it seems likely that ankle oedema (swelling) is not identified as a health problem, but it is often the sign of high blood pressure that can be a serious problem for both mother and baby. Another early warning sign of serious hypertension in pregnancy is the finding of protein in the urine on routine testing; such testing is not undertaken in women who do not attend for antenatal care, who also do not have their blood pressure checked.

Less than one in ten (9%) women in Nepal giving birth in the last 5 years report having a health problem during their last pregnancy

Table 5 shows the type of health problems reported.

Table 5. Health problems during most recent pregnancy reported by women household respondents(n=17409)

Health problem	No. women	% women
Pains in body/stomach	617	4%
Weakness	299	2%
Vomiting/dizziness	260	1%
Fever	252	1%
Swelling of body	157	1%
Bleeding	81	0.5%
Headache	77	0.5%
Urine infection	25	-
High blood pressure	15	-
Don't know / not specified	156	1%

Note: Up to three problems were allowed for each respondent.

Variables affecting the likelihood of receiving antenatal care

In this section, the effects of variables individually are examined . Analysis of variables in combination is shown in the second Results section. In this section all reported pregnancies are included, since the relationships between antenatal care and other variables are not likely to change with time since the pregnancy.

Smoking

Women who smoke are less likely to have attended for any antenatal care visits. Table 6 shows the relationship.

Table 6. Smoking and antenatal care visits

Smoking during pregnancy	Antenatal care visits	
	At least one	None
Non smoker (%)	3608 (30)	8584 (70)
Smoker (%)	525 (10)	4725 (90)
Odds Ratio=3.78 (95% CI 3.42-4.18)		

Literacy

A quarter of the women respondents (ever married women aged 15-49) reported being able to read and write a simple letter (the indicator of literacy used in this and other similar studies, including the Nepal national census).

A quarter (25%) of ever-married women of child bearing age in Nepal are literate by self report.

Literate women are much more likely than illiterate women to have attended for antenatal care during their last pregnancy. This is shown in Table 7.

Table 7. Literacy and antenatal care visits

Literacy of women	Antenatal care visits	
	At least one	None
Literate (%)	2395 (52)	2200 (48)
Illiterate (%)	1750 (14)	11167 (86)
Odds Ratio=6.95 (95% CI 6.42-7.51)		

Literacy of household head

Nearly half (48%) of household heads are literate by self report. The rate is 52% among male household heads and 17% for the few (10%) female household heads.

Women from families where the household head is literate are over 3 times more likely to attend for antenatal care, as shown in table 8. This is true in both urban and rural areas, and whether the women herself is literate or not.

Table 8. Literacy of household head and antenatal care visits

Literacy of household head	Antenatal care visits	
	At least one	None
Literate (%)	3092 (33)	6219 (67)
Illiterate (%)	1113 (14)	7150 (87)
Odds Ratio=3.13 (95% CI 2.89-3.38)		

Area of residency

Women living in urban areas are nearly 6 times more likely to attend for antenatal care visits than women in rural areas. This is shown in table 9.

Table 9. Area of residence and antenatal care visits

Area of residence	Antenatal care visits	
	At least one	None
Urban (%)	1385 (57)	1050 (43)
Rural (%)	2761 (18)	12324 (82)
Odds Ratio=5.89 (95% CI 5.37-6.46)		

Literacy and smoking

Literate women are less likely than illiterate women to be smokers, as shown in Table 10.

Table 10. Literacy and smoking during pregnancy

Literacy of woman	Smoking during pregnancy	
	Non smoker	Smoker
Literate (%)	4055 (88)	534 (12)
Illiterate (%)	8176 (63)	4733 (37)
Odds Ratio=4.40 (95% CI 3.98-4.85)		

Nevertheless, the greater risk of not having antenatal care among smokers persists when literacy is taken into account by stratification. The association with literacy does not explain the effect of smoking on the likelihood of attending antenatal care.

Age at time of pregnancy

Women younger at the time of pregnancy are more likely to attend for antenatal care than older women. The relationship is shown in Table 11.

Table 11. Age at time of pregnancy and antenatal care visits

Age at time of pregnancy	Antenatal care visits	
	At least one	None
Up to 35 yrs (%)	3814 (25)	11344 (75)
> 35 yrs (%)	244 (12)	1822 (88)
Odds Ratio=2.51 (95% CI 2.18-2.90)		

Family support

Women reporting 'very much' and 'some' support from their families during pregnancy are nearly 3 times more likely to attend for antenatal care than women reporting 'no' support from their families. This is shown in table 12.

Table 12. Family support and antenatal care visits

Family support	Antenatal care visits	
	At least one	None
Very much and some (%)	3904 (25)	11482 (75)
None (%)	198 (10)	1738 (90)
Odds Ratio=2.98 (95% CI 2.55-3.49)		

Number of pregnancies

The National Maternity Care Guidelines advise that women should avoid having more than 4 pregnancies. In this survey, women with 4 or more previous pregnancies are less likely to attend for antenatal care visits during the most recent of these pregnancies, as shown in table 13. However, the number of pregnancies is strongly related to the age of women at the time of pregnancy.

Table 13. Number of pregnancies and antenatal care visits

Number of pregnancies	Antenatal care visits	
	At least one	None
Up to 4 times (%)	3392 (28)	8932 (73)
5 or more times (%)	754 (15)	4442 (86)
Odds Ratio=2.24 (95% CI 2.05-2.44)		

Influence of trained TBAs

Women from communities where there was at least one trained TBA (interviewed for this survey) are more likely to attend for antenatal care than those from communities where the interviewed TBA was untrained. This is shown in table 14. This should be interpreted with caution, since no TBA was interviewed in 23 of the 144 communities.

Table 14. Presence of trained TBA and antenatal care visits

Trained TBA in community	Antenatal care visit	
	At least one	No visits
Yes (%)	1905 (23)	6410 (77)
No (%)	1299 (19)	5418 (81)
Odds Ratio=1.24 (95% CI1.14-1.34)		

Note: 177 TBAs were interviewed but no TBA was interviewed in 23 of the 144 communities.

Health problems during pregnancy

Women reporting health problems during the pregnancy are more than twice as likely as those not having such problems to have attended antenatal care. This is shown in Table 15.

Table 15. Health problems in pregnancy and antenatal care visits

Health problems during pregnancy	Antenatal care visits	
	At least one	None
Problem (%)	548 (40)	815 (60)
No problem (%)	3466 (22)	12361 (78)
Odds Ratio=2.40 (95% CI 2.13-2.70)		

This suggests that many antenatal care visits are to seek help for a health problem, rather than for routine, preventive care as they are intended to be. This is in line

with the perception (see above) that routine antenatal care is not necessary.

Literate women are actually somewhat more likely than illiterate women to report health problems during pregnancy. This may be because literate women are better aware of health issues generally and of problems to look out for in pregnancy specifically. The association is shown in Table 16.

Table 16. Literacy and health problems during pregnancy

Literacy of woman	Health problem in pregnancy	
	Problem	No problem
Literate (%)	429 (10)	4074 (90)
Illiterate (%)	937 (7)	11805 (93)
Odds Ratio=1.33 (95% CI 1.17-1.50)		

The association between health problems in pregnancy and attending antenatal care is not changed when literacy is taken into account by stratification.

Length of working during pregnancy

Women who continue to work for 8 or 9 months in pregnancy are less likely than those who stop work sooner to attend for antenatal care. This is shown in Table 17.

Table 17. Working during pregnancy and antenatal care visits

Working during pregnancy	Antenatal care visits	
	At least one	None
8 or 9 mnths (%)	3765 (23)	12834 (77)
< 8 m nths (%)	353 (43)	476 (57)
Odds Ratio=0.40 (95% CI 0.34 -0.46)		

This maybe because women with health problems are more likely to stop work before 8 months of pregnancy. This is indeed the case, as shown in Table 18.

Table 18. Health problems in pregnancy and working during pregnancy

Health problems during pregnancy	Working during pregnancy	
	8 or 9 mnths	< 8 mnths
Problem (%)	1139 (84)	211 (16)
No problem (%)	15230 (96)	586 (4)
Odds Ratio=0.21 (95% CI 0.17-0.25)		

The quality of antenatal care

The fact of receiving antenatal care does not mean much unless the quality of the care is adequate. The National Maternity Care Guidelines specify certain minimum standards for what should be covered in antenatal care visits. In this survey we collected details about where any antenatal care was received, from what type of health worker, how long into pregnancy, and how much it cost. The quality of antenatal care was examined in this survey partly by interviewing services providers, both staff in health facilities and Traditional Birth Attendants (TBAs). It was also examined by asking women whether they had received doses of tetanus toxoid and iron/folate tablets during the pregnancy, and their views of the problems with antenatal services and possible improvements that could be made.

Source of antenatal care

Women were asked where they received antenatal care. The great majority of those who had any antenatal care visits went to government health facilities. Table 19 shows the reported sources of antenatal care.

Table 19. Reported sources of antenatal care among 4040 women with at least one visit and who could report the source

Source of antenatal care	No. women	% women
District hospital	2286	57%
Health post	775	19%
Private clinic	517	13%
Sub health post	185	5%
Primary health care centre	114	3%
Own home	61	2%
Nursing home	52	1%
FPA clinic	50	1%

The high proportion of visits that were to the district hospital suggests that many visits were made because of

some perceived health problem rather than as a routine. It also suggests that visits are made by those women who either live close to the district hospital or can afford the time and money for the travel to get there.

The few women who reported they had a health problem during pregnancy were specifically asked where they went to seek help for this problem. Table 20 shows the sources of help used. Of those who sought help anywhere, the district hospital was the most popular source. Very few women reported seeking help from Traditional Birth Attendants, whether trained or untrained.

Table 20. Reported sources of help for pregnancy health problems among 1574 women who could report the source

Source of help	No. women	% women
Did not seek help	491	31%
District hospital	400	25%
Private clinic	215	14%
Sub health post	210	13%
Health post	98	6%
Private doctor	98	6%
Primary health care centre	35	2%
Untrained TBA	19	1%
Trained TBA	8	1%

Person providing antenatal care

Women who received any antenatal care were asked from what type of health worker they got this care. The responses are shown in Table 21. As many as 50% of the women who reported having antenatal care said they were seen by a doctor. Some of these will have been doctors providing care in private clinics.

Table 21. Type of health worker seen for antenatal care among 4170 women who could report this information

Type of health worker	No. women	% women
Doctor	2064	50%
Assistant nurse midwife	1516	36%
Auxiliary health worker	329	8%
Govt health worker (unspecified)	114	3%
Maternal and Child Health Worker	54	1%
Village Health Worker	49	1%
Female Community Health Volunteer	21	1%
Untrained TBA	16	0.5%
Trained TBA	7	0%

Very few women get antenatal care from TBAs, trained or untrained.

Iron and folate supplements

Few women in Nepal receive iron and folate supplements during pregnancy.

Among women who attended for antenatal care at least once, nearly half (46%) reported taking iron/folate tablets at some stage during the pregnancy. A few (2%) of women who had *not* attended antenatal care also reported taking iron/folate tablets, presumably having obtained them from local drug shops.

Only one in ten (10%) women receive iron/folate supplements during pregnancy, and only 2% take them for more than three months.

The situation does not seem to have improved in recent years. Of women giving birth within the last 5 years, still only 12% received iro/folate supplements.

The variation in the proportion of women receiving iron/folate supplements in pregnancy by geographic area and by ethnicity is shown in Annex 5, Tables A5.2 and A5.6 and Figure A5.7.

According to the National Maternity Care Guidelines, all women should take iron/folate tablets during pregnancy and these should be supplied when they attend for antenatal care. The big majority of the health facilities visited (89%) said they supply iron/folate tablets to pregnant women. Despite this, even even among the minority of women who have any antenatal care, less then half actually take iron/folate tablets at all. Women in communities where the health facility reports supplying iron/folate tablets are more likely to take iron/folate during pregnancy than those in communities where the facility does not report supplying these tablets. This is shown in Table 22.

Table 22. Supply of iron/folate tablets by health facility and taking iron/folate in pregnancy

Health facility supplies iron/folate	Women taking iron/folate	
	Yes	No
Yes (%)	1590 (12)	11701 (88)
No (%)	91 (6)	1343 (94)
Odds Ratio=2.0 (95% CI 1.59 -2.50)		

Tetanus toxoid

The situation with tetanus toxoid is rather complicated because the number of doses a woman should receive during a pregnancy depends upon how many doses she has previously received. As an indicator of care, we have used the number of women who are given at least one dose of tetanus toxoid during the pregnancy.

Four out of ten women (42%) received at least one dose of tetanus toxoid during their last pregnancy.

The variation in the proportion of women receiving at least one dose of tetanus toxoid during their last pregnancy by geographic area and by ethnicity is shown in Annex 5, Tables A5.2 and A5.6 and Figure A5.6.

There is evidenc fo some improvement over time, in that among women giving birth within the last five years, 50% received at least one dose of tetans toxoid.

Since more women report receiving tetanus toxoid than report attending for antenatal visits, clearly many women must receive the tetanus toxoid from other sources. For example, this might be from mobile vaccination teams coming into villages. Most (95%) of the health facilities serving the sites report they give injections of tetanus toxoid to pregnant women. But women in communities where the health facility reports giving tetanus toxoid are somewhat *less* likely to have tetanus toxoid in pregnancy than women from other communities. This is shown in Table 23.

Table 23. Provision of tetanus toxoid by health facility and receiving tetanus toxoid in pregnancy

Health facility provides tetanus toxoid	Women receiving tetanus toxoid	
	Yes	No
Yes (%)	6113 (43)	8066 (57)
No (%)	420 (53)	373 (47)
Odds Ratio=0.67 (95% CI 0.58 -0.78)		

Cost of antenatal care

Women who attended for antenatal care during their last pregnancy were asked how much they had to pay per visit. For the 4170 women who were able to give a cost figure, the mean payment per visit was 223 Rs, and the median was 60 Rs.

Advice given in antenatal visits

According to the National Maternity Care Guidelines, the place of delivery and breast feeding issues should be discussed with women at antenatal care visits. Women who had attended for antenatal care were asked if they were advised about these issues. Most reported they were not advised: only a quarter (25%) recalled a discussion about place of delivery and only a quarter (25%) reported being advised about breast feeding.

The advice that health facilities and TBAs report giving to pregnant women is shown in Tables 24 and 25.

Table 24. Advice reported given by health facilities and TBAs about place of delivery

Type of advice	No (%) facilities	No (%) TBAs
Clean, dry place	94 (71)	156 (88)
Well ventilated place	90 (68)	102 (58)
Well lit place	54 (41)	93 (53)
Go to Primary Health Care Centre	28 (21)	12 (7)
No dust or smoke	15 (11)	8 (5)
Lined with cowdung	7 (5)	4 (2)
Don=t know / no advice	0	9 (5)

Up to 3 answers were allowed

It is notable that the same pattern of advice is given by both health facilities and TBAs.

Table 25. Advice reported given by health facilities and TBAs about breast feeding

Type of advice	No (%) facilities	No (%) TBAs
Use colostrum	91 (69)	105 (59)
Clean nipples	64 (48)	101 (57)
Feed frequently	46 (35)	41 (23)
Start immediately	43 (33)	6 (3)
Exclusive for 6 months	0	21 (12)
Don't know / no advice	0	12 (7)

Up to 3 answers were allowed

Again, a similar pattern of advice is reported by both health facilities and TBAs.

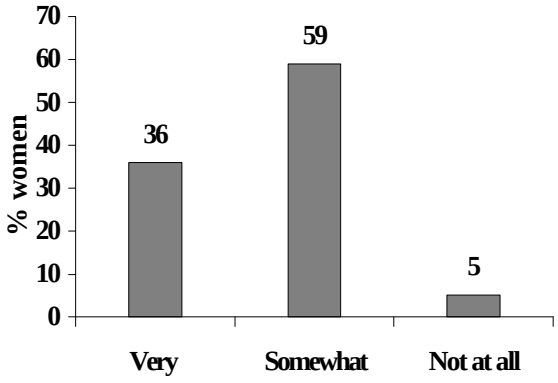
Satisfaction with quality of antenatal care

Household respondents were asked about their satisfaction with antenatal care services and what problems they perceived with the current service. Table 26 and Figure 3 shows satisfaction with the antenatal services received.

Table 26. Reported satisfaction with antenatal care services

Level of satisfaction	No. women	% women
Not at all satisfied	218	5%
Somewhat satisfied	2548	59%
Very satisfied	1653	36%

Figure 3. Proportion of women with different levels of satisfaction with antenatal care



Note that responses to this question were mainly confined to those women who had attended for formal antenatal care.

The satisfaction with antenatal care by ethnic groups and by geographic location is shown in Annex 5, Tables A5.1 and A5.5, and Figure A5.4.

Table 27 shows the perceived problems with antenatal care services.

Table 27. Perceived problems with antenatal care services reported by 17537 women

Problem	No. women	% women
Don't know	12848	73%
Poor facilities	1283	7%
Long waiting times	977	6%
No medicines	927	5%
No staff	915	5%
Bad attitude of staff	715	4%
No access to facilities	535	3%
Have to pay	226	1%
No problem/missing	708	4%

Note: Up to 3 problems were allowed per respondent.

In focus groups, similar views about the problems with antenatal care services were voiced. The focus group responses are shown in Annex 3.

Suggestions for improving antenatal care services

Suggestions about how to improve antenatal care were sought in the household questionnaire, in the focus group discussions of women in the sites, and from the workers in the health facilities serving the sites.

Table 28 shows the household suggestions for what services could do to improve antenatal care, while Table 29 shows their suggestions for what communities themselves could do to help.

Table 28. Suggestions for how services could improve antenatal care from 17294 women

Suggestion	No. women	% women
Don't know/missing	10075	58%
More health posts etc	2817	16%
Better quality service	2569	15%
Train staff	2186	13%
More medicines	1793	10%
More staff	723	4%
Educate women	350	2%

Note: Up to 3 suggestions were allowed per respondent.

Table 29. Suggestions for how communities could help pregnant women (from 17352 women)

Suggestion	No. women	% women
Don't know/missing	7758	45%
Less work for women	6341	37%
Provide transport	1976	11%
Assist with cash / kind	1727	10%
Community groups	1555	9%
Better diet for pregnant women	538	3%
Train FCHVs	296	2%

Note: Up to 3 suggestions were allowed per respondent.

Focus group suggestions for improving care for pregnant women are shown in Annex 3. Nearly a third of focus groups (30%) mentioned that providing female doctors would help improve services and make them more acceptable to women. And 20% of groups suggested there should be free antenatal care. Asked about what else could help, focus groups mentioned (33%) the need to give pregnant women more help with household work and the need to create awareness about good care and practices in pregnancy (32%).

The views of health workers in health facilities on how to improve antenatal services are shown in Table 30.

Table 30. Suggestions from workers in health facilities on how antenatal services could be improved

Suggestion	No. women	% women
More health facilities	72	55%
Staff training	55	42%
More medicines	41	31%
More hospitals	35	27%
More staff	29	22%
Regular check ups	21	17%
Better home care	19	14%
More funding	11	8%
Early referral	6	5%

Note: Up to 3 suggestions were allowed per respondent.

There are many points of similarity between the suggestions of women and those of the health workers.

2. CARE DURING DELIVERY

Place of delivery

Nine out of ten (91%) women deliver their babies at home.

Home is by far the most common place for delivery of babies in Nepal. There is no evidence of any increase in hospital deliveries over recent years. The National Maternity Care Guidelines recognise that the great majority of deliveries will be at home. They advise that the family should prepare a room that is well ventilated but not cold or draughty. This same advice is given to pregnant women seen for antenatal care by TBAs or health facilities (see above).

There are differences among different ethnic groups and geographic regions in the proportion of women delivering at home. These are shown in Annex 5, tables A5.2, A5.6 and Figure A5.8.

Variables related to place of delivery

Area of residence

A woman living in an urban area is 9 times more likely than a woman in a rural area to deliver her baby in a health facility. This is shown in Table 31.

Table 31. Place of delivery in urban and rural areas

Residence	Place of delivery	
	Health Facility	Home
Urban site (%)	976 (41)	1429 (59)
Rural site (%)	1025 (7)	13850 (93)
Odds Ratio=9.00 (95%CI 8.33-10.0)		

Health problems during pregnancy

The National Maternity Care Guidelines advise that women with health problems during pregnancy should deliver in a health facility rather than at home. Table 32 shows the relationship between health problems during pregnancy and place of delivery. Although women with health problems during pregnancy are 1.6 times more likely to deliver in health facilities, the majority of them still deliver at home.

Table 32. Health problems during pregnancy and place of delivery

Health problem in pregnancy	Place of delivery	
	Health facility	Home
With problem (%)	219 (16)	1126 (84)
No problem (%)	1714 (11)	13897 (89)
Odds Ratio=1.58 (95% CI 1.35-1.85)		

Literacy

A literate woman is much more likely than an illiterate woman to deliver in a health facility. This is shown in table 33.

Table 33. Literacy of mother and place of delivery

Literacy of mother	Place of delivery	
	At home	Health facility
Illiterate (%)	12056 (94)	735 (6)
Literate (%)	3212 (72)	1265 (28)
Odds Ratio=6.46 (95% CI 5.84 - -7.14)		

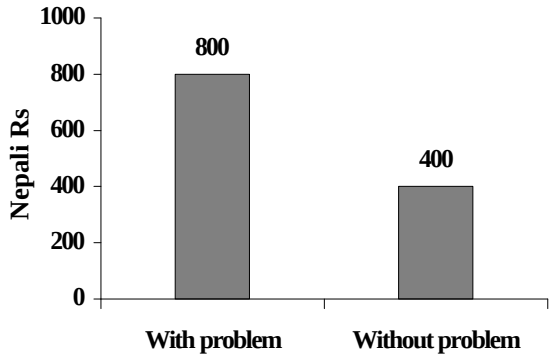
Age

Younger women are more likely than older women to deliver in health facilities. This is true when literacy and area of residency of the woman are both taken into account. Table 34 compares place of delivery among women older and younger than 35 years, who had deliveries within 5 years prior to the survey.

Table 34. Age of women at time of delivery and place of delivery (deliveries within the last five years)

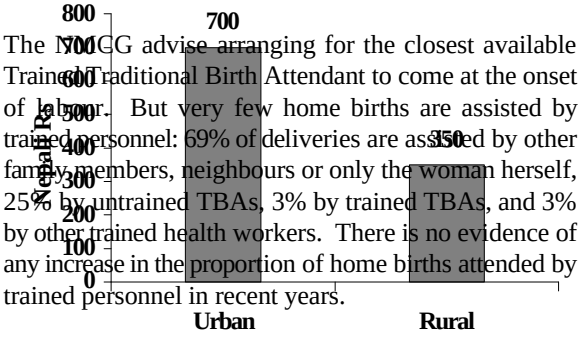
Age of woman	Place of delivery	
	At home	Health facility
Up to 35 yrs (%)	8591 (88)	1222(12)
> 35 yrs (%)	1674 (95)	98 (5)
Odds Ratio=2.44 (95% CI 1.96- 3.03)		

Figure 4. Median cost of delivery with/without problems



Persons attending during labour

Less than one in ten deliveries (6%) in the last 5 years is attended by a trained TBA or other trained worker.



The NMCG advise arranging for the closest available Trained Traditional Birth Attendant to come at the onset of labour. But very few home births are assisted by trained personnel: 69% of deliveries are assisted by other family members, neighbours or only the woman herself, 25% by untrained TBAs, 3% by trained TBAs, and 3% by other trained health workers. There is no evidence of any increase in the proportion of home births attended by trained personnel in recent years.

Costs of delivery care

About half (54%) of families incurred some expenditure for the woman's last delivery. These costs include Home Delivery Kits (HDK) and related materials, attendance, transportation and other costs. The median costs are shown in Table 35.

Table 35. Costs of delivery among families that spent anything for the last delivery

Item	Median (NRs)	Number (%) with any expenditure
HDK Materials	20	233 (1%)
Attend/medicine	250	3705 (18%)
Transportation	1000	1278 (6%)
Other cost	400	7993 (40%)
Total cost	400	10843 (54%)

The median total cost of delivery for women with labour problems is higher than for women without labour problems, whether all deliveries are considered or just those where there was any expenditure (see Figure 4).

The median total cost of deliveries is higher in urban than rural areas, whether all deliveries or just those with any expenditure are considered (see Figure 5).

The cost of delivery varies with type of health facility and type of attendant. This is shown in tables 36 and 37.

Table 36. Median total cost of delivery by type of facility in Nepali Rupees

Facility	All deliveries		Deliveries with any expenditure	
	Cost	No.	Cost	No.

Home	150	15279	300	8902
SHP/HP	1500	15	1500	15
PHCC	800	8	1000	7
Private clinic/ nursing home	3000	76	3000	75
Hospital	1300	1902	1400	1837

Table 37. Median attendance cost of delivery by type of attendant

Type of attendant	All deliveries		Deliveries with any expenditure	
	Cost	No.	Cost	No.
Family/ neighbours	0	10513	200	509
TTBA	160	460	250	292
UTBA	150	3885	250	2347
CHW	0	13	500	5
Paramedics	200	319	500	193
Doctor	300	81	575	49

Use of Home Delivery Kit (HDK)

It is recommended that families preparing for a birth buy a Home Delivery Kit (HDK) or separately prepare a new blade, soap, new thread and clean sheets. In this survey, women were asked about the use of a HDK at their last delivery. Very few women (3%) reported they used a HDK. However, HDKs have only been available on the market for 3 years. The use of HDKs over the last three years is shown in Table 38.

Table 38. Trend of using HDK in the past 3 years (1994-97)

Year of delivery	No.using HDK	% of deliveries using HDK
1996/1997	260	5%
1995/1996	47	2%
1994/1995	23	2%

The proportion of women who recall using an HDK for delivery is higher for deliveries within the last three years, although some women claim they used one before they were available (probably they mean they used the separate components). Women delivering less than three years ago are more than four times more likely to have used an HDK than those delivering more than three years ago (Table 39).

Table 39. Time since delivery and reported use of HDK

Last delivery	Use of HDK	
	Used HDK	Did not use HDK
< 3 yrs ago (%)	330(4)	8007 (96)
> 3 yrs ago (%)	62 (1)	6755 (99)
Odds Ratio=4.49 (95% CI 3.38-5.98)		

The variation in the use of HDK by geographic areas and by ethnicity is shown in Annex 5, tables A5.3 and A5.7, and figure A5.9.

Factors related to the use of HDK

Literacy

A literate woman is 3 times more likely than an illiterate woman to use an HDK. This relationship is shown in Table 40.

Figure 6. Proportion of births using HDK in relation to birth attendant

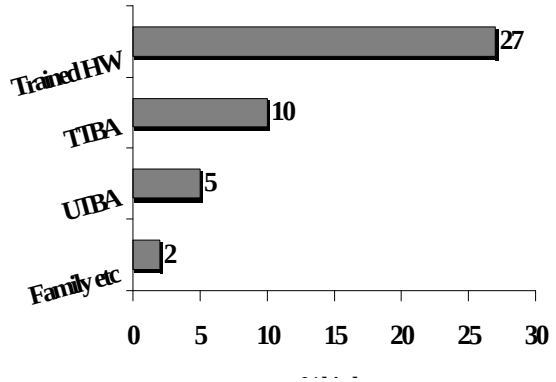


Table 40. Literacy of mother and use of HDK, 1995-1997

Literacy of mother	Use of HDK	
	Used HDK	Did not use HDK
Literate (%)	141 (8.3)	1554 (91.7)
Illiterate (%)	190 (2.8)	6485 (97.2)
Odds Ratio=3.10 (95% CI 2.45-3.91)		

This relationship is still found when area of residence (urban or rural) is taken into account.

Antenatal care

A woman who attends for antenatal care during pregnancy is almost 4 times more likely to use an HDK (Table 41). This is still true when literacy of the woman and area of residence are taken into account.

Table 41. Having antenatal care and use of HDK, 1995-1997

Antenatal care	Use of HDK	
	Used HDK	Did not use HDK
At least one visit (%)	164 (9.5)	1556 (90.5)
No visits (%)	157 (2.4)	6457 (97.6)
Odds Ratio=4.33 (95% CI 3.43-5.48)		

Birth attendants

Use of HDK is related to the type of birth attendant. Trained TBAs and other trained health workers are more likely to use an HDK than family members and untrained TBAs. This is shown in table 42 and Figure 6.

Table 42. Use of HDK by various birth attendants, 1995-1997

Birth attendant	Number	% using HDK
Family/neighbours	5614	2%
Untrained TBAs	323	5%
Trained TBAs	303	10%
Trained health workers	231	27%

Training of TBAs

Amongst the 2517 births attended by a TBA between 1995 and 1997, those where the TBA was trained were twice as likely to include the use of an HDK. This is shown in Table 43.

Table 43. Training of TBAs and use of HDK: births attended by TBA between 1995 and 1997

Status of TBA	Use of HDK in the delivery	
	Used HDK	Did not use HDK
Trained (%)	30 (10)	273 (90)
Untrained (%)	113 (5)	2101 (95)
Odds Ratio=2.04 (95% CI 1.30-3.19)		

Practice of TBAs in the communities

Use of HDKs in communities is perhaps influenced by the practice of the local TBAs. Nearly a quarter (23%) of the 177 TBAs interviewed reported using HDKs routinely, and 16% reported using HDKs 'sometimes' in their practice. Women in communities where the interviewed TBA(s) report(s) using HDKs are more likely to report using an HDK for their last delivery. This is shown in Table 44. This may indicate an influence of TBA practice on prevailing practice in the community. But it should be interpreted with caution because no TBA was interviewed in 23 of the 144 communities.

Table 44. Practice of TBAs serving the community and use of HDK by households, 1995 -1997

TBA practice	Use of HDK by households	
	Used HDK	Did not use HDK
Use HDK (%)	160 (6)	2749 (94)
Do not use HDK (%)	147 (3)	4377 (97)

Odds Ratio=1.73 (95% CI 1.37-2.20)

Note: Although 177 TBAs were interviewed, no TBA was interviewed in 23 of the 144 communities.

Cutting the umbilical cord

Approaching two thirds (59%)of women reported that their last baby's cord was cut with a clean instrument, mostly a new blade or a boiled old blade. The proprotion using a clean instrument was higher for deliveries in the last 5 years (63%). The variation in how the cord is cut by geographic area and by ethnicity is shown in Annex 5, Tables A5.3 and A5.7, and Figure A5.10.

Factors related to how the cord is cut

Literacy of women

A literate woman is more likely to report using a clean instrument is used to cut the umbilical cord. This is shown in Table 45.

Table 45. Literacy and clean cutting of umbilical cord

Literacy of mother	Cutting of cord	
	with clean instrument	without clean instrument
Literate (%)	2290 (72.1)	884 (27.9)
Illiterate (%)	7089 (59.2)	4886 (40.8)

Odds Ratio=1.78 (95% CI 1.63-1.95)

Age of women

Younger women are twice as likely to use a clean instrument for cutting the cord as older women, as shown in Table 46. This is still true when the literacy of the mother and area of residence (urban/rural) are taken into account.

Table 46. Age of mother and clean cutting of cord

Age of mother at delivery	Instrument used to cut cord	
	Clean	Not clean
<35 years (%)	6954 (67)	3361 (33)
> 35 years (%)	2440 (50)	2411 (50)

Odds Ratio=2.04 (95% CI 1.90-2.20)

Trend with time

In more recent deliveries, there is an increased chance of using a clean instrument to cut the cord. Deliveries taking place within the last 5 years are 1.7 times more likely to have the cord cut cleanly than deliveries more than 5 years ago. This is seen in both urban and rural areas, and among both literate and illiterate women. It is shown in table 47.

Table 47. Time since delivery and use of a clean instrument to cut the cord

Time since delivery	Instrument used to cut cord	
	Clean	Not clean
Up to 5 years (%)	6731 (66)	3451 (34)
> 5 years (%)	2663 (53)	2321 (47)

Odds Ratio=1.70 (95% CI 1.58-1.82)

Practice of TBAs

Women in communities where the interviewed TBA(s) reported using clean instruments to cut the cord are nearly 3 times more likely to cut the cord with a clean instrument than women in communities where the TBA had less good practice. This is shown in Table 48. This should be interpreted with caution because no TBA was interviewed in 23 of the 144 communities.

Table 48. Practice of TBAs in the community and household use of a clean instrument to cut the cord

TBA practice	Instrument used by households to cut cord	
	Clean	Not clean
Clean instrument (%)	7757 (69)	3545 (31)
Unclean instrument (%)	1632 (44)	2121 (56)
Odds Ratio=2.84 (95% CI 2.63-3.07)		

Note: 177 TBAs were interviewed but no TBA was interviewed in 23 of the 144 communities.

Practice of health facilities

Staff in all the health facilities interviewed reported that they cut the umbilical cord with clean instruments: 82% with a new blade, 2%with a boiled old blade, and 16% with boiled scissors.

Treating the umbilical cord

About a third (37%) women reported that nothing was applied to the cord, 6% treated it with antiseptic and 57% with ash, cowdung or oil. If the cord is cut with a clean instrument, and either antiseptic or nothing is applied, the cord is regarded to have been treated safely. On the other hand, if the cord is cut cleanly but later on the stump is covered with unclean materials, the cord is regarded to have been treated unsafely. Using these criteria, 52% women reported the cord was treated safely.

The geographic and ethnic breakdown of safe treatment of the cord is shown in Annex 5, Tables A5.3, and A5.7, and Figure A5.11.

The TBAs interviewed reported the materials used by them to treat the umbilical cord (Table 49). There is no obvious difference between trained and untrained TBAs in terms of the materials they use to treat the cord.

Table 49. Materials used by TBAs to treat the umbilical cord

Cord treated with	Number	%
Nothing	62	35.6
Antiseptic	88	50.6
Ash	24	13.8
Total	174	100

Duration of labour and problems during labour

The median reported duration of labour is 4 hours. However, 19% of reported labours lasted more than 12 hours.

About one in 25 (4%) women reported a health problem during their last labour. The variation in proportion of women having a problem during labour by geographic area and ethnicity is shown in Annex 5, Tables A5.3 and A5.7 and Figure A5.12. The type of problems reported are shown in Table 50.

Table 50. Health problems during labour

Health problems	No. women	% women
Excessive bleeding	222	31%
Baby upside down	84	13%
Obstructed/prolonged labour	251	36%
Weakness of mother	139	21%
Convulsion	19	3%
Weakness of baby	8	1%

There is a strong association between health problems during pregnancy and problems during labour. A woman with health problems during pregnancy is more than 5 times more likely to develop problems during labour. This is still true when age of the mother, literacy and area of residence are taken into account (Table 51)

Table 51. Health problems during pregnancy and during labour

Health Problems during pregnancy	Problems during labour	
	yes	no
with problems (%)	277 (16.2)	1437 (83.3)
without problems (%)	514 (3.3)	14902 (96.7)
Odds Ratio=5.59 (95% CI 4.77-6.55)		

Women with health problems during labour are three and a half times more likely to deliver in a health facility (Table 52). Nevertheless, even among those reporting a health problem during labour, 71% still deliver at home. There is an urban-rural difference: 25% of urban women with labour problems delivered at home compared with 79% of rural women with labour problems.

Table 52. Health problems during labour and place of delivery

Health problem in labour	Place of delivery	
	Health facility	Home
With problem (%)	207 (29)	505 (71)
No problem (%)	1687 (10)	14556 (90)
Odds Ratio=3.54 (95% CI 2.97-4.21)		

There is no apparent effect of age at the time of pregnancy on the risk of having a problem during labour. Although women with more previous pregnancies are apparently at some increased risk of problems during pregnancy, this association could easily have been due to chance.

Problems during labour reported by TBAs and health facilities.

TBAs and health facilities were asked about the types of emergency problems during labour that they dealt with. The proportions of different problems reported by TBAs and health facilities are shown in table 53.

Table 53. Health problems during labour seen by TBAs and health facilities

Problems	TBAs (%)	Facility (%)
Obstructed/pro-longed labour	61 (36.7)	36 (38.3)
Bleeding	42 (25.3)	53 (56.4)
Infection	33 (19.9)	27 (27.66)
Retained placenta	17 (10.2)	28 (29.8)
Eclampsia	10 (6.0)	10 (10.6)
High Blood pressure	1 (0.6)	7 (7.4%)

Health facilities see more cases of bleeding and of retained placenta, presumably because these tend to be referred to health facilities when they occur.

Seeking help for labour problems

For three quarters of the women who had health problems during labour, their families sought help. The sources of help approached are shown in Table 54.

Table 54. Sources of help approached for problems during labour

Source	Number	%
Hospital	280	31
Private doctor / clinic	159	17
Traditional healer	79	9
TBA	58	6
HP, SHP, PHCC	91	10
Other	23	3
Did not seek help	224	25

Reasons for not seeking help for problems during labour

Women with problems during labour who did not seek help for the problem were asked their reasons for not seeking help. Their responses are shown in Table 55.

Table 55. Reasons for not seeking help for problems during labour

Reasons	Number of Responses	%
Not necessary	85	44
Too far away	67	35
Too expensive	30	16
Family not allow	16	8
No transport	8	4
Too late	5	3
Total respondents	194	

Danger signs reported by TBAs

The 177 TBAs interviewed reported that excessive bleeding, obstructed labour, convulsions and excessive pain are the danger signs during delivery. Trained TBAs knew more danger signs than untrained TBAs. The proportions of trained and untrained TBAs mentioning each danger sign are shown in Table 56.

Table 56. The proportions of trained and untrained TBAs mentioning different danger signs during labour

Danger signs	Trained TBAs (%)	Untrained TBAs(%)
Bleeding	62 (40)	27 (17)
Convulsion	39 (25)	23 (15)
Obstructed/ prolonged labour	54 (35)	41 (27)
Infection	57 (37)	40 (26)

Causes of maternal death and prevention*, as reported by TBAs and health facilities*

The TBAs interviewed reported 105 cases of maternal death in total during delivery and soon after birth, in the three years prior to the survey. Causes of death were identified in 60 cases. Among these 60 cases, TBAs thought that 41 cases of death (68%) could have been prevented if proper management had been available, including early referral to a suitably equipped and staffed health facility. The common causes of death reported were obstructed labour and prolonged labour, bleeding, eclampsia and infection. (Table 57).

Tables 57. Causes of maternal deaths and deaths that could have been prevented, as reported by TBAs

Causes of death	No.	No. (%) preventable
Bleeding	44	32 (82)
Convulsion	8	4 (50)
Obstructed Labour	4	2 (50)
Infection	4	3 (75)
Total	60	41 (68)

The nearest health facilities serving the communities surveyed were visited. The staff situation, essential equipment and medicine, antenatal check up, delivery, and emergency referral in the last 12 months were reviewed.

Table 58 shows the mean number of deliveries and maternal deaths per year reported by different types of health facilities.

Table 58. Mean number of deliveries and maternal deaths per year reported by health facilities

Type of Facility	No. of facility	No. of deliveries Per year	No. of death per year
SHP	70	5	0.806
HP	35	22	3.294
PHCC	7	4	1.000
Dist. Hosp	14	96	7.000

Referral of obstetric emergencies

The sub health posts, health posts, PHCCs and FPA clinics reported that they manage less than 15% of emergency cases referred to them. The rest of the emergency cases, 85% of them, are further referred to district hospitals. This might be due to limited emergency care capacity and availability of trained health professionals in other facilities.

There is no relationship between how soon a woman is referred during an obstetric emergency and the type of health facility nearby. Nor is there a clear relationship between the distance from a community to the nearby health facility and the timing of emergency obstetric referrals. Referral of obstetric emergencies relies not only on access to a health facility, but also on attendants during labour having adequate information and knowledge to make prompt decisions to refer women with danger signs during delivery.

In the focus group discussions held in 142 of the 144 communities women were asked what happens if there is an emergency health problem during pregnancy or childbirth. In half of the communities the focus group reported calling a health worker, 42% arranged transport, 29% turned to spiritual healing, and 27% called an experienced woman for help. Focus groups suggested that some communities prefer herbal treatment, massage and other traditional methods.

More than 80% of the focus groups mentioned that it is the household head who makes the decision when to seek help during an emergency, followed by other reputable/educated persons (29%) and TBAs (14%). The focus group responses in relation to obstetric emergencies are shown in Annex 3.

When discussing how to reduce maternal death during pregnancy and childbirth, more than 90% of the focus groups suggested it is necessary to recognise and refer emergencies as early as possible. A third suggested having more health facilities nearby, and another 20% suggested improving transport. (See Annex 3).

Health problems after birth

One in ten (10%) mothers reported health problems for themselves or for their babies after delivery. Sometimes more than one health problem was reported by one respondent. The common health problems reported are shown in table 59.

Table 59. Reported health problems after birth

Problems	Number	%
Fever/infection (mother)	365	24%
Delayed discharge of placenta	307	20%
Excessive Bleeding	304	20%
Weakness of mother	282	19%
Fever/infection (baby)	270	18%
Weakness of baby	125	8%
Baby breathing problem	80	5%
Convulsion (mother)	51	3%
Convulsion (baby)	10	1%

There was no apparent difference in the type and pattern of problems reported by women of different ages and with different numbers of previous pregnancies.

There is a strong relationship between health problems during pregnancy and health problems after delivery. This is still true when age of the mother, literacy and area of residence are taken into account (Table 60).

Table 60. Health problems during pregnancy and after delivery

Health problems during pregnancy	Problems after delivery	
	yes	no
With problems (%)	530 (30)	1251 (70)
Without problems (%)	1335 (9)	14160 (91)

Odds Ratio=4.49 (95% CI 3.99-5.06)

Among women with problems after delivery, nearly three quarters (73%) sought help. Table 61 shows where these women seek help for problems after delivery.

Table 61. Sources of help for problems after delivery

Source of help	Number	%
No where	495	27
District Hospital	420	23
Private clinic	378	21
Traditional healer	193	11
Health post	137	8
Dispensary	65	4
Sub health post	60	3
Untrained TBAs	47	3
Trained TBAs	25	1
Total	1838	100

Of women who did not seek help for their health problems after labour, 57% thought it was not necessary, 22% said facilities were too far away, 13% thought it too expensive, 9% said their families did not allow them to go, and 3% blamed lack of time.

Traditional Birth Attendants (TBAs)

A total of 177 TBAs were interviewed in the survey. No TBA was interviewed in 23 of the 144 communities and up to 4 were interviewed in others. The average age of these TBAs was 45 years, and on average they have been working as TBAs for 8 years. Less than a third of them can read and write. Two thirds (67%) of TBAs interviewed learnt their skills from their mothers or other family members, 26% from Government TBA training programme, 4% were trained by NGOs and 3% by the private sector.

On average, TBAs are paid more for delivering a boy than a girl (Table 62). Perhaps surprisingly, an untrained TBA is paid more for a delivery than a trained TBA. Perhaps people think that trained TBAs are paid or subsidised by the Government, therefore they need to be paid less by the community members. This is not likely to encourage TBAs to go through a training programme.

Table 62: Payment to TBAs for delivery (Nepali Rs)

	Trained TBA		Untrained TBA	
	Boy	Girl	Boy	Girl
Mean	115	85	143	142
Median	50	23	125	100

A trained TBA is more likely to use a HDK for delivery than an untrained TBA, as shown in Table 63.

Table 63. Training of TBA and use of HDK (1)

Use HDK	Trained TBAs	Untrained TBAs
Always	38 (40%)	3 (4%)
Sometimes	23 (24%)	5 (6%)
Do not use	34 (36%)	72 (90%)

A trained TBA is 16 times more likely to use an HDK sometimes or always, compared with an untrained TBA (Table 64).

Table 64. Training of TBA and use of HDK (2)

Training of TBA	Use of HDK by TBA	
	Sometimes/ always	Not used
Trained(%)	61 (64)	34 (36)
Untrained (%)	8 (10)	72 (90)
Odds Ratio=16.15 (95% CI 6.49-41.60)		

85%(148 out of 174) TBAs reported that they washed their hands with water and soap; 10.3%(18/174) washed hands with water only before attending a delivery; 4% (7/174)did not wash hands, and 0.6% (1/174) used ash. There is no apparent difference between trained and untrained TBAs in hand washing practice.

3. RISK ANALYSIS OF DELIVERY OUTCOME

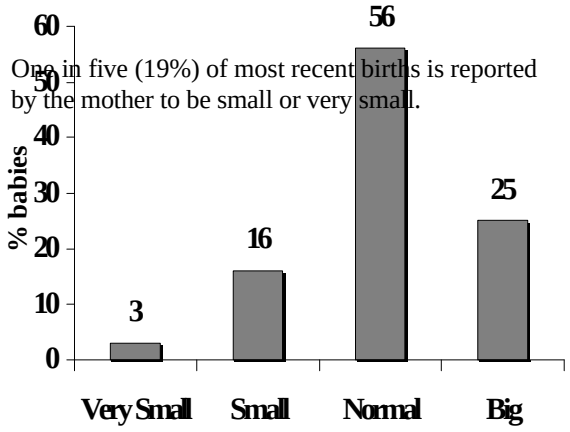
A: Birth weight

Since there is no birth registration system in Nepal and more than 90% of deliveries take place at home, there is no systematic recording of birth weight. Therefore, in this survey, mothers were asked to recall the birth weight of their last born child. The birth weight reported by mothers were divided into four categories: very small, small, normal and big. Their reports are shown in table 65 and Figure 7.

Table 65. Birth weight estimate of last born child reported by mothers.

Birth weight estimate	Number (%)
Very small	440 (3%)
Small	2899 (16%)
Normal	9677 (56%)
Big	4227 (25%)
Total	17243 (100%)

Figure 7. % of babies with different estimated birth weights



One in five (19%) of most recent births is reported by the mother to be small or very small.

The proportion of very small and small babies amongst recent deliveries (up to ten years prior to the survey) is higher than amongst deliveries prior to this time (Table 66). It seems unlikely that there has been a real increase in the proportion of low birth weight babies of this magnitude, and the difference probably reflects poorer recall of low birth weight for births a long time ago.

Table 66. Birth weight estimate and time since delivery

Time since delivery	Size of baby	
	small/very small	big/normal
Up to 10 yrs (%)	2963 (20)	11713 (80)
>10 yrs (%)	364 (14)	2167(86)
Odds Ratio=1.51 (95% CI 1.33-1.70)		

The figures certainly provide no suggestion of any decrease in the proportion of low birth weight children in the last decade. While the measure of low birth weight used here is crude, there is no reason to believe it is biased. If anything, it will give an underestimate of the proportion of low birth weight babies, since minor degrees of low birth weight may go unrecognised.

The variation in the reported proportion of low birth weight babies by geographic area and ethnicity is shown in Annex 5, Tables A5.4, A5.8 and Figure A5.13.

Factors related to low birth weight

Clearly, a number of factors affect birth weight. In this section, the effects of a number of different variables individually on birth weight are examined. Their effects in combination are further examined in a later section.

Literacy of mother

Literate mothers are less likely to deliver a baby with low birth weight compared with illiterate mothers. This is shown in table 67.

Table 67. Literacy of mother and low birth weight

Literacy of mother	Size of baby	
	small/very small	big/normal
Literate (%)	599 (13)	3868 (87)
Illiterate (%)	2739 (22)	10027(78)
Odds Ratio=0.57 (95% CI 0.51-0.63)		

Literacy of household head

Women from families with a literate household head have less risk of having babies with low birth weight compared with women from families with an illiterate household head. This is still true when the literacy of mother and area of residence (urban/rural) is taken into account. This is shown in table 68.

Table 68. Literacy of household head and low birth weight

Literacy of household head	Size of baby	
	small/very small	big/normal
Literate (%)	1524 (17)	7594 (83)
Illiterate (%)	1812 (22)	6305 (78)
Odds Ratio=0.70 (95% CI 0.65-0.75)		

Age of mother

Women younger than 18 years or older than 35 years at the time of giving birth are at increased risk of having low birth weight babies compared with women giving birth at ages 18-35 years. This is shown in table 69.

Table 69. Age of mother and low birth weight

Age of mother	Size of baby	
	small/very small	big/normal
<19 and >35 yrs(%)	670 (22)	2401 (78)
18-35 (%)	2669 (19)	11503 (81)
Odds Ratio=1.20 (95% CI 1.09-1.33)		

Area of residence

Women living in urban areas have less risk of having low birth weight babies compared with women from rural areas. This is shown in table 70.

Table 70. Area of residence and low birth weight

Area of residence	Size of baby	
	small/very small	big/normal
Urban (%)	367 (15)	2032 (85)
Rural (%)	2972 (20)	11872 (80)
Odds Ratio=0.72 (95% CI 0.64-0.81)		

Support received from family

Care and support to a pregnant woman from her family is important. Women were asked how much support they received from their families during their last pregnancy. Table 71 shows that women who report having support from their families during pregnancy have less than half the risk of having babies with low birth weight compared with women whose families did not support them. This is true in both urban and rural areas, and among both literate and illiterate women.

Table 71. Family support and low birth weight

Family support	Size of baby	
	small/very small	big/normal
Yes (%)	2652 (18)	12491 (83)
No (%)	645 (34)	1273 (66)
Odds Ratio=0.42 (95% CI 0.38-0.47)		

Number of pregnancies

Women with more than four pregnancies (including the one reported on) are slightly more likely to deliver babies with low birth weight compared with women with four or less pregnancies. This is shown in Table 72.

Table 72. Number of pregnancies and low birth weight

Number of pregnancies	Size of baby	
	small/very small	big/normal
5 or more (%)	1102 (21)	4095 (79)
Up to 4 (%)	2237 (19)	9809(81)
Odds Ratio=1.18 (95% CI 1.09-1.28)		

Antenatal care

Women who attend for antenatal care during pregnancy have a reduced risk of delivering babies with low birth weight compared with women who do not have any antenatal care. This is shown in table 73.

Table 73 Antenatal care visits and low birth weight

Antenatal visit	Size of baby	
	small/very small	big/normal
Any visit (%)	639 (16)	3408 (84)
No visit (%)	2684 (20)	10448 (80)
Odds Ratio=0.73 (95% CI 0.66-0.80)		

Timing of first antenatal visit

Among women who attended for any antenatal visits, those who had their first visit within 3 months of the start of pregnancy are less likely to deliver babies with low birth weight than those who had their first visit later in pregnancy. This is shown in table 74.

Table 74. Timing of first antenatal visit and low birth weight

First antenatal visit	Size of baby	
	small/very small	big/normal
within 3 mnths (%)	229 (13)	1572 (87)
After 3 mnths (%)	415 (18)	1847 (82)
Odds Ratio=0.65 (95% CI 0.54-0.78)		

Iron/folate

Anaemia is common in Nepal, especially among pregnant and lactating women. In this survey, only one in ten women received any iron/folate supplementation during pregnancy (see above). Women who do not receive iron/folate have 1.5 times the risk of having babies with low birth weight compared with women who receive any iron/folate supplements. This is shown in table 75.

Table 75. Iron/folate supplementation and low birth weight

Iron/ folate supplementation	Size of baby	
	small/very small	big/normal
No (%)	2984 (20)	11797 (80)
Yes (%)	310 (15)	1812 (85)
Odds Ratio=1.48 (95% CI 1.30-1.68)		

Smoking

A women who smokes during pregnancy has 1.5 times the risk of delivering a low birth weight baby compared with a woman who does not smoke. This is shown in table 76.

Table 76. Smoking during pregnancy and low birth weight

Smoking during pregnancy	Size of baby	
	small/very small	big/normal
Yes (%)	1245 (24)	3979 (76)
No (%)	2085 (18)	9860 (82)
Odds Ratio=1.48 (95% CI 1.37-1.60)		

Health problems during pregnancy

Mothers with health problems during pregnancy are 1.5 times more likely to have babies with low birth weight compared with mothers who do not have health problems during pregnancy. This is shown in table 77.

Table 77. Health problems during pregnancy and low birth weight

Problems during pregnancy	Babysize	
	small/very small	big/normal
Yes (%)	341 (25)	1004 (75)
No (%)	2910 (19)	12665 (81)
Odds Ratio=1.48 (95% CI 1.29-1.69)		

Quality of antenatal service

Women were asked if they were satisfied with the antenatal service they received during pregnancy. Their level of satisfaction is one measure of the quality of antenatal care provided to them. Women who are not satisfied or only partly satisfied with the antenatal service have about 1.5 times the risk of delivering babies with low birth weight compared with women who are very satisfied. This is shown in table 78.

Table 78. Satisfaction with antenatal care and low birth weight

Satisfaction with antenatal care	Size of baby	
	small/very small	big/normal
Not /somewhat (%)	482 (18)	2241 (82)
Very (%)	211 (13)	1414 (87)
Odds Ratio=1.45 (95% CI 1.22-1.75)		

Note: Responses to the question on satisfaction with antenatal care were mainly confined to women who had attended for formal antenatal care visits

Traditional Birth Attendant (TBAs)

Women from communities with trained TBAs (interviewed for this survey) are less likely to have babies with low birth weight than those from communities where the interviewed TBA(s) were untrained, as shown in table 79. This could be because trained TBAs have better maternal care practice. However, this should be interpreted with caution because no TBA was interviewed in 23 of the 144 communities.

Table 79. Training of TBAs in serving community and low birth weight

TBA interviewed	Size of baby	
	small/very small	big/normal
Trained (%)	1433(18)	6738 (82)
Untrained (%)	1345 (21)	5256 (79)
Odds Ratio=0.83 (95% CI 0.76-0.90)		

Note: No TBA was interviewed in 23 of the 144 communities

B. Survival of newborn babies

Mothers were asked about the outcome of their last pregnancy, including the survival of the baby. This information is shown in table 80.

Table 80. Outcome of last delivery reported by mothers

Survival of baby	Number (%)
Survived healthy	16530 (95.8%)
Survived but unhealthy	281 (1.6%)
Survived but disabled	26 (0.2%)
Lived for short time	240 (1.5%)
Still birth	149 (0.8%)
Total	**17226 (100%)**

For the analysis of pregnancy outcome, still born babies and babies who lived for a short time are considered together in one category, with all those who survived, even if unhealthy, in another category, as shown in table 81.

Table 81. Survival of babies

Status of baby	Number (%)
Stillborn or died after birth	389 (2.3%)
Survived	16837 (97.7%)
Total	**17226 (100%)**

The variation in survival of babies by geographic area and ethnicity is shown in Annex 5, Tables A5.4, and A5.8 and Figure A5.14.

Variables related to the survival of babies

As in the previous section on birth weight, this section examines the effects of a number of variables individually

on the survival of babies. The analysis of the effects of these variables in combination is described in a later section.

Use of antenatal care

There is no realtionship between the use of antenatal care and the survival of the baby in this survey. This may reflect poor quality of antenatal care or the fact that most antenatal care in Nepal is in response to health problems rather than being routine preventive care.

Literacy of mother

Newborn babies of literate mothers are less likely to be stillborn or die soon after birth compared with babies of illiterate mothers. This is shown in table 82.

Table 82.. Literacy of mother and survival of baby

Literacy of mother	Survival of baby	
	Stillborn/died	Survived
Literate (%)	71 (1.6)	4388 (98.4)
Illiterate (%)	318 (2.5)	12439 (97.5)
Odds Ratio=0.63 (95% CI 0.48-0.83)		

Literacy of household head

Babies born to women in families with a literate household head are more likely to survive compared with babies in households with an illiterate head. This is shown in table 83.

Table 83. Literacy of household head and survival of baby

Literacy of household head	Survival of baby	
	Stillborn/died	Survived
Literate (%)	175 (1.9)	8935 (98.1)
Illiterate (%)	214 (2.6)	7894 (97.4)
Odds Ratio=0.72 (95% CI 0.59-0.89)		

Age of mother

Women giving birth at younger than 19 years or older than 35 years have an increased risk of stillbirth or death of the baby soon after birth. This is shown in Table 84.

Table 84. Age of mother and survival of baby

Age of mother	Survival of baby	
	Stillborn/died	Survived
<19 or >35 yrs (%)	75 (3.0)	2457 (97.0)
19-35 yrs (%)	314 (2.1)	14380 (97.9)
Odds Ratio=1.38 (95% CI 1.08-1.82)		

Support received from family

The results in table 85 show that women who receive help from their families during pregnancy have less risk of still birth or death of the baby soon after birth.

Table 85. Family support and survival of baby

Family support	Survival of baby	
	Stillborn/died	Survived
Yes (%)	321 (2.1)	14813 (97.9)
No (%)	63 (3.3)	1848 (96.7)
Odds Ratio=0.64 (95% CI 0.48-0.85)		

Smoking

Women who smoke during pregnancy are more likely to have still born babies or babies who die soon after birth than women who do not smoke, as shown in table 86.

Table 86. Smoking during pregnancy and survival of baby

Smoking during pregnancy	Survival of baby	
	Stillborn/died	Survived
Yes (%)	140 (2.7)	5079 (97.3)
No (%)	245 (2.1)	11689 (97.9)
Odds Ratio=1.31 (95% CI 1.05-1.64)		

Health problems during pregnancy

Mothers with health problems during pregnancy are more likely to have a stillborn baby or a baby dying soon after birth compared with mothers without health problems in pregnancy. This is shown in table 87.

Table 87. Health problems during pregnancy and survival of baby

Problems during pregnancy	Survival of baby	
	Stillborn/died	Survived
Yes (%)	63 (4.7)	1280 (95.3)
No (%)	309 (2.0)	15251 (98.0)
Odds Ratio=2.43 (95% CI 1.82-3.24)		

Cutting of umbilical cord

For more than a third (41%) of deliveries in Nepal, the umbilical cord is cut with a non-sterile instrument (see above). If the umbilical cord is cut with a clean instrument, the baby has only half the risk of dying soon after birth compared with if the cord is cut with a non-clean instrument. This is shown in table 88. Note that in this comparison, stillbirths are not considered.

Table 88. Instrument used to cut cord and survival of baby

Instrument for cutting cord	Survival of baby	
	Died soon after birth	Survived
Clean (%)	93 (1.0%)	9267 (99.0%)
Not clean (%)	109 (1.9%)	5633 (98.1%)
Odds Ratio=0.52 (95% CI 0.39-0.69)		

Problems during labour

Not surprisingly, women reporting problems during labour are 6 times more likely to have a still born baby or a baby that dies soon after birth, as shown in Table 89.

Table 89. Problems during labour and survival of baby

Problems during labour	Survival of baby	
	Stillborn/died	Survived
Yes (%)	71 (10.0)	641 (90.0)
No (%)	292 (1.8)	15904 (98.2)
Odds Ratio=6.03 (95% CI 4.54-8.00)		

Duration of labour

If labour is prolonged beyond 12 hours, the risk of the baby being stillborn or dying soon after birth is nearly double that when the labour lasts 12 hours or less. This is shown in table 90.

Table 90. Duration of labour and survival of baby

Duration of labour	Survival of baby	
	Stillborn/died	Survived
>12 hours (%)	115 (3.7)	2989 (96.3)
Up to 12 hours (%)	271 (1.9)	13729 (98.1)
Odds Ratio 1.95 (95% CI 1.55-2.45)		

Birth weight

Babies described by the mother as small or very small are more likely to be stillborn or to die soon after birth than those said to be normal or big. This relationship is shown in table 91. Note that the question on size of the baby came before the question about survival of the baby in the questionnaire, making it less likely that the question about size would be biased by a preceding question on death of the baby.

Table 91. Estimate of birth weight and survival of baby

Reported size of baby	Survival of baby	
	Stillborn/died	Survived
Small/very small (%)	148 (4.4)	3180 (95.6)
Normal and big (%)	232 (1.7)	13621 (98.3)
Odds Ratio=2.73 (95% CI 2.20-3.40)		

Satisfaction with care received during labour

The satisfaction reported by the mother with the care she received during labour is one measure of the quality of care. Mothers who are not satisfied with the care they received during labour have 6 times the risk of having a still born baby or a baby dying soon after birth, compared with mothers who are very or somewhat satisfied with their care during labour. This is shown in Table 92. It is quite possible that a mother's view of the quality of care she received during labour may be biased by whether or not the child survived and this may be part of the reason for the association shown in Table 92.

Table 92. Reported satisfaction with care during labour and survival of baby

Satisfaction with care during labour	Survival of baby	
	Stillborn/died	Survived
Not satisfied (%)	94 (10.0)	849 (90.0)
Satisfied (%)	293 (1.8)	15929 (98.2)
Odds Ratio=6.02 (95% CI 4.68-7.74)		

Health problems after delivery

Babies of mothers reporting health problems (either of mother or baby) after delivery are more likely to die soon after birth compared with babies of mothers not reporting such health problems. This is shown in table 93. This analysis does not include stillbirths.

Table 93. Reported problems after delivery and survival of baby

Health problems after delivery	Survival of babies	
	Died soon after birth	Survived
Yes (%)	106 (5.4)	1841 (94.6)
No (%)	134 (0.9)	14995 (99.1)
Odds Ratio=6.44 (95% CI 4.92-8.44)		

Area of residence

Women living in rural areas have 1.4 times the risk of still birth or death of the baby soon after birth compared with women living in urban areas. This is shown in Table 94.

Table 94. Area of residence and survival of baby

Area of residence	Survival of baby	
	Stillborn/died	Survived
Rural (%)	348 (2.3)	14481 (97.7)
Urban (%)	41 (1.7)	2356 (98.3)
Odds Ratio=1.38 (95% CI 0.98-1.95)		

Traditional Birth Attendants (TBAs)

Mothers from communities where there is at least one trained TBA (interviewed for this survey) are less likely to have a stillborn baby or a baby that dies soon after birth, compared with mothers in communities where the interviewed TBA was untrained. This is still true when area of residence (urban or rural) and literacy of the mother are taken into account. The association is shown in Table 95. This should be interpreted with caution because no TBA was interviewed in 23 of the 144 communities.

Table 95. Training of TBA interviewed in community and survival of baby

Status of interviewed TBA	Survival of baby	
	Stillborn/died	Survived
Trained (%)	158 (1.9)	8004 (98.1)
Untrained (%)	164 (2.5)	6442 (97.5)
Odds Ratio=0.78 (95% CI 0.62-0.98)		

Note: No TBA was interviewed in 23 of the 144 communities

RESULTS :II. ANALYSIS FOR ACTION

Analysis in the previous section provides information about a number of variables that apparently increase or decrease the risk of three important adverse outcome variables: lack of antenatal care, low birth weight and death of the baby (still birth and death soon after birth). The effect of each of the potential causal variables separately on the outcome of interest is shown in the relevant part of the Results I section. However, the apparent effect of a variable might in reality be due to its association with another variable (confounding) or two or more variables might interact to produce the effect on the outcome variable (effect modification). In this section of the analysis, the effects of the variables found to change the risk of the outcome variable separately are examined in combination. The focus is on those variables amenable to change and the aim is to indicate how much improvement in the present situation could potentially be achieved by different interventions. For example: how much reduction in the proportion of low birth weight children could be achieved by stopping women smoking during pregnancy, taking the effects of other variables into account? How much could the risk of an individual woman giving birth to a low weight baby be reduced? And how many cases of low birth weight in the population could be prevented?

The multivariate analysis used was a multiple logistic regression, using a step-down from an initial saturated model to find the best-fitting, most parsimonious model.

The three issues of interest to planners considered in this section are: attendance for antenatal care; prevention of low birth weight babies; and prevention of still births and deaths soon after birth. The second two are actual outcomes, while the first is an important process indicator. For individual mothers, the second two (and especially the last one, prevention of death of the baby) are of the most interest.

1. Risk of not attending antenatal care

A number of variables individually increase the risk of not attending antenatal care and are potentially amenable to change. Eight variables were included in the logistic regression analysis.

Variables included in combined analysis of risk of not attending for antenatal care:

1. Literacy of mother (risk=illiteracy)
2. Literacy of household head (risk=illiteracy)
3. Smoking during pregnancy (risk=smoking)
4. Mother's age at pregnancy (risk=age >35 years)
5. Family support (risk=no support)
6. Working during pregnancy (risk=working for >7 months)
7. Number of pregnancies (risk=4 or more)
8. Area of residence (risk=rural dwelling)

Seven out of these eight variables remained in the final model, as shown in table 96.

Table 96. Combined Odds Ratios and Risk Differences of variables affecting the risk of not attending antenatal care visits, from logistic regression analysis

Variable	Combined OR (95% CI)	Combined Risk Difference
Illiterate mother	2.07 (1.97-2.17)	17.9% (16.1-19.8)
Rural residence	2.01 (1.91-2.12)	17.2% (15.1-19.4)
Working >7 months of preg	1.75 (1.58-1.93)	13.8% (9.6-17.9)
Smoking in pregnancy	1.40 (1.32-1.49)	8.3% (6.5-10.1)
Illiteracy of household head	1.24 (1.18-1.30)	5.2% (3.5-6.8)
More than 4 pregnancies	1.20 (1.14-1.27)	4.4% (2.7-6.2)
No family support	1.12 (1.03-1.21)	2.7% (0.1-5.3)

2. Risk of low birth weight

Variables that increase the risk of low birth weight separately were considered together in a logistic regression analysis. The ten variables included in the logistic regression are shown in the box. .

Variables included in combined analysis of risk low birth weight:

1. Literacy of mother (risk=illiterate)
2. Literacy of household head (risk=illiterate)
3. Smoking in pregnancy (risk=smoking)
4. Mother's age (risk=age <19 or >35 yrs)
5. Number of pregnancies (risk=4 or more)
6. Area of residence (risk=rural)
7. Taking iron/folate (risk=not taking)
8. Health problems in pregnancy (risk=with problem)
9. Family support (risk=no support)
10. Antenatal care (risk=no care)

In the final model of the logistic regression, six variables remained, as shown in Table 97.

Table 97. Combined Odds Ratios and Risk Differences of variables affecting the risk of low birth weight, from logistic regression analysis

Variable	Combined OR (95% CI)	Combined Risk Difference
Illiterate mother	1.26 (1.18-1.34)	4.0% (2.4-5.6)
Problems in pregnancy	1.24 (1.16-1.34)	3.8% (1.1-6.5)
Smoking in pregnancy	1.13 (1.08-1.18)	2.0% (0.5-3.5)
Illiteracy of household head	1.09 (1.05-1.15)	1.5% (0.1-2.9)
Rural residence	1.08 (1.01-1.15)	1.3% (-0.6-3.2)
No family support	1.08 (1.01-1.15)	1.3% (-1.0-3.4)

3. Risk of still birth and death soon after birth

Variables that increase the risk of still birth and death soon after birth separately were considered together. A logistic regression was performed with 12 variables, as shown in the box.

Variables include in combined analysis of risk of perinatal death:

1. Literacy of mother (risk=illiterate)
2. Literacy of household head (risk=illiterate)
3. Smoking in pregnancy (risk=smoking)
4. Satisfaction with care during labour (risk=not satisfied)
5. Health problems in labour (risk=problem)
6. Duration of labour (risk=more than 12 hours)
7. Family support (risk=no support)
8. Birth weight (risk=small or very small)
9. Instrument for cutting cord (risk=non-clean instrument)
10. Mother's age (risk=age <19 or >35 yrs)
11. Health problems in pregnancy (risk=with problem)
12. Area of residence (risk=rural)

In the final model of the logistic regression, seven variables remained, as shown in Table 98.

Table 98. Combined Odds Ratios and Risk Differences of variables affecting the risk of still birth or death soon after birth, from logistic regression analysis

Variable	Combined OR (95% CI)	Combined Risk Difference
Problems during labour	2.04 (1.63-2.54)	3.4% (0.8-6.1)
Not satisfied with labour care	1.86 (1.55-2.23)	2.9% (1.4-4.4)
Baby small or very small	1.56 (1.34-1.81)	1.9% (0.9-2.9)
Rural residence	1.55 (1.06-2.28)	1.9% (0.6-3.1)
Illiterate mother	1.42 (1.10-1.81)	1.4% (0.5-2.4)
Problems in pregnancy	1.21 (0.97-1.50)	0.70% (-0.7-2.1)

Cord cut with non-clean instrument	1.20 (1.03-1.39)	0.70% (-0.1-1.4)

Action analysis

Using the results of the logistic regression analyses, it is possible to estimate the potential benefits of different actions that could be taken to increase the proportion of women attending for antenatal care, to reduce the proportion of low birth weight babies and to reduce the proportion of babies still born or dying soon after birth.

Increase the proportion of women attending for antenatal care

The first question that arises here is whether it is a useful thing to increase the proportion of women attending for antenatal care. The data from this cycle of the NMIS provide little evidence that antenatal care, of the quality currently received by women in Nepal, has benefits for the mother or baby. The number receiving the recommended 4 visits was too small to analyse separately. The fact of receiving at least one visit did not of itself make any difference to the outcome of the pregnancy. The apparent benefit in terms of reducing the proportion of low birth weight babies disappeared when other variables were taken into account. It seems that it is the other variables associated with antenatal care, rather than the antenatal care itself, that are associated with an improved pregnancy outcome.

However, this is not to say that there can never be any benefit of antenatal care. The outcome measures in this survey did not include maternal mortality. It is possible that adequate antenatal care, in conjunction with good delivery care, would reduce maternal mortality in Nepal. Also, good antenatal care could identify pregnancies where there was a risk to the baby, ensuring remedial actions and arranging for delivery in a properly equipped health facility.

It is important to improve the quality of antenatal care and the access to good quality care as well as embarking on a campaign to educate and encourage women to attend for antenatal care. Some possible ways to increase the uptake of antenatal care are suggested by the results of this survey. Table 99 indicates the possible effects on uptake of antenatal care of interventions aimed at different issues. The possible change in the likelihood of an individual woman attending antenatal care is derived from the Odds Ratio; the possible increase in the proportion of women attending is derived from the Risk Difference (see Table 96).

Increase literacy of women of childbearing age

As found repeatedly in different cycles of the NMIS,

improving women's literacy, by interventions such as increasing school enrolment of girls and providing literacy classes for adult women, could have important benefits. One benefit, shown here, would be to increase the uptake of antenatal care services. Perhaps literate women would be more likely to press for better quality of such services, so the benefits of attending for antenatal care may be increased.

Improve access to and knowledge of antenatal care in rural areas

The difference in attendance for antenatal care between urban and rural areas may be explained by a number of factors, but access and knowledge seem likely to be key factors. The provision of adequate antenatal care services for rural areas is a big undertaking and may need to be shared between government and other providers. As mentioned above, there is little point in an education campaign about antenatal care aimed at rural women without an improvement in the accessibility and quality of antenatal care in rural areas.

Discourage women from working beyond seven months of pregnancy

Action here needs to be taken at household and community level. Women already have an awareness of the need to reduce their workload during pregnancy, as shown by their responses in focus groups. Men and community leaders need also to be convinced of the need to allow women adequate rest during pregnancy, to allow them to stop their heavy physical work well before their delivery is due, and to allow and encourage them to attend antenatal care. The benefits are on the pregnancy outcome for the baby as well as on increasing the proportion of women attending antenatal care (see below).

Prevent pregnant women smoking

Women who smoke during pregnancy are less likely to attend for antenatal care. They are also more likely to give birth to underweight babies (see below). It is probable that smoking and non-attendance for antenatal care both reflect an underlying behaviour pattern. Tackling this could improve both smoking behaviour and attendance at antenatal care. However, it may not be a straightforward matter to convince Nepali women not to smoke during pregnancy. In Western countries it has proved quite effective to explain to women the possible adverse consequences of smoking on their unborn babies. In Nepal, telling women that if they smoke their babies will be smaller could actually encourage them to smoke, since women fear large babies and the more difficult birth this may entail. They may not be unjustified in this concern, since care for obstetric emergencies (such as obstructed labour) may be hard to find in some areas of Nepal. Any educational programme to stop women smoking in pregnancy should be accompanied by efforts to improve the quality of antenatal care and access to emergency obstetric care. The campaign could be accompanied by education about beneficial actions during pregnancy, including a good diet and adequate rest (see above).

Increase adult literacy

Literacy of the household head has a beneficial effect on the chance of attending for antenatal care and on the risk of low birth weight, over and above the effect of literacy of the pregnant woman herself. This is probably mainly because of better socio-economic status of those households with a literate head. Nevertheless, since decisions about a woman attending for antenatal care are often made by the household head (or at least require the endorsement of the household head), the education level of the household head and his understanding of the benefits of proper care for a pregnant woman are important for a good pregnancy outcome. Programmes of adult literacy for men could include information about antenatal care for their wives and education of

boys in school could include this information in the curriculum.

Reduce number of pregnancies per woman

Women with more than 4 pregnancies in this survey are less likely to attend for antenatal care, when other effects are taken into account. This might be because mothers with more children have less time to look after themselves, or they might think that pregnancy and delivery is just a 'normal' routine. It seems sensible to encourage women (and men) to limit the number of pregnancies for each woman to no more than four, as recommended in the National Maternity Care Guidelines. This might be expected to increase the number of pregnant women who actually attend for antenatal care and experience benefits if that care is of good quality.

Increase family support for pregnant women

Convincing families (especially husbands and mothers-in-law) to support and help women during pregnancy could be expected to increase the proportion of women who are allowed and encouraged to attend for antenatal care. It would also have benefits for pregnancy outcome (see below). It is related to the benefits of women stopping heavy physical work before term. Lack of family support for pregnant women reflects their low status in some communities.

Table 99. Possible benefits of different interventions to increase the proportion of women attending for antenatal care

Intervention	Potential individual benefit (from OR)	Potential population benefit (from RD)	Proptn of population who could benefit	Relative cost of possible interventions
Ensure literacy of women of child bearing age	Double the chance of ANC	18% more women to attend ANC	Three quarters of pregnant women	Moderate
Improve access and knowledge in rural areas	Double the chance of ANC	17% more women to attend ANC	Nine out of ten pregnant women	High
Discourage women from working up to end of pregnancy	Nearly double the chance of ANC	14% more women to attend ANC	Nine out of ten pregnant women	Low
Stop-smoking campaign for pregnant women	Increase chance of ANC by half	8% more women to attend ANC	About a third of pregnant women	Low/moderate
Ensure adult literacy (for household head)	Increase chance of ANC by a fifth	5% more women to attend ANC	About half of pregnant women	Moderate
Encourage limit of 4 pregnancies	Increase chance of ANC by a fifth	4% more women to attend ANC	Over a third of pregnant women	Low/moderate
Ensure family support for pregnant women	Increase chance of ANC by 10%	3% more women to attend ANC	About one out of ten women	Low

Note: The proportion of the population who could benefit is that proportion not currently having the favourable level of the variable. For example, the proportion of pregnant women currently illiterate.

Reduce low birth weight

The potential benefits of different interventions to reduce the problem of low birth weight babies are shown in Table 100.

Increase literacy of women of childbearing age
As well as increasing the number of women attending for antenatal care, programmes to increase adult female literacy could be expected to improve the outcome of pregnancy, reducing the problem of low birth weight babies. This indicates the importance of empowerment of women.

Identify and manage health problems during pregnancy
Although it is impossible to avoid health problems during pregnancy, recognition and proper management can avoid most of their adverse consequences for mother and baby. The low rate of reported problems in this survey and the low rate of seeking help for recognised problems suggest there is a need for better education about health during pregnancy. At the same time it is necessary to ensure that accessible and adequate quality help for reported problems is available.

Prevent pregnant women smoking
As mentioned above, pointing out the relationship between smoking during pregnancy and low birth weight babies may not help to stop women smoking during pregnancy and may even have the opposite effect as they favour small, easy-to-deliver babies. But stressing the adverse consequences of low birth weight for the baby may help to convince them (see below).

Increase adult literacy
The effect of literacy of the household head on low birth weight is probably mainly because of better socio-economic status of those households with a literate head. Nevertheless, there can be direct benefits of better educated and more knowledgeable men in a household who can ensure that women have good support and care during pregnancy and labour.

Improve situation in rural areas
The difference in risk of low birth weight babies between urban and rural areas could be explained by differing socio-economic status and by differing levels of access to services. The improvement of access to adequate services for rural areas will be a big undertaking.

Increase family support for pregnant women
Increasing family support for pregnant women could be expected to reduce the problem of low birth weight babies. This need not cost much, but families need to be convinced of the benefits of supporting women, in a society where women often have low status. It may be that the expected benefit of increasing the weight (and overall health) of babies may help to encourage men to give more support to their women, during pregnancy as well as at other times.

Table 100. Possible benefits of different interventions to decrease the risk of low birth weight babies

Intervention	Potential individual benefit (from OR)	Potential population benefit (from RD)	Proptn of population who could benefit	Relative cost of possible interventions
Ensure literacy of women of child bearing age	Decrease risk of LBW by a quarter	4% less LBW babies	Three quarters of pregnant women	Moderate
Identify and manage pregnancy problems	Decrease risk of LBW by a quarter	4% less LBW babies	A tenth of pregnant women	High
Stop-smoking campaign for pregnant women	Decrease risk of LBW by 13%	2% less LBW babies	About a third of pregnant women	Low/moderate
Ensure adult literacy (for household head)	Reduce risk of LBW by 10%	2% less LBW babies	About half of pregnant women	Moderate
Improve access and knowledge in rural areas	Reduce risk of LBW by 8%	1% less LBW babies	Nine out of ten pregnant women	High
Ensure family support for pregnant women	Reduce risk of LBW by 8%	1% less LBW babies	About one out of ten women	Low

Note: The proportion of the population who could benefit is that proportion not currently having the favourable level of the variable.

Reduce the risk of still birth and death soon after birth

The potential benefits of interventions to reduce the risk of still birth or death soon after birth are shown in Table 101. Most of these interventions would be relatively high-cost.

Managing problems during labour
It is not surprising that health problems during labour have an important effect on the risk of still birth and death of the baby soon after birth. In order to improve this situation, it will be necessary to find a way to give timely access to emergency obstetric care, even for women in remote rural communities. One way forward is to place more emphasis on arranging hospital delivery for women with health problems during pregnancy, as these are strongly related to problems during labour. At present, most hospital deliveries are as a result of urgent transfers once problems during labour have developed, often too late to save the baby.

Improve quality of delivery care
The index of quality of delivery care used here is satisfaction with delivery care. This is a crude measure. Nevertheless, there is clearly much room for improvement in the current care for women during delivery, most of which is currently provided by untrained people. There is some evidence in this survey that trained TBAs provide better pregnancy and delivery care than untrained TBAs. There is no real possibility of providing delivery care from doctors for all women. But delivery care from trained TBAs or other trained health workers, who know how to manage straightforward deliveries and some complications and when to refer for further help, could feasibly be provided and could improve the current situation.

Reduce problem of low birth weight
The relationship between low birth weight and high perinatal mortality is well known and is confirmed in this survey. Giving pregnant women and other family members information about this relationship could help to explain to them why it is better to avoid babies who are small or very small (for example, by avoiding smoking during pregnancy). All the actions that help to reduce the problem of low birth weight would be expected also to help to reduce the rate of still birth and death soon after delivery, via their effect on low birth weight.

Improve situation in rural areas
The poorer access and quality of services in rural areas are reflected in a higher rate of still births and deaths of babies soon after birth. Measures to improve rural services, while expensive, would be expected to reduce deaths of babies for the majority of the population. They may also, of course, help to reduce maternal mortality.

Increase literacy of women of childbearing age
The findings of this survey indicate that increasing female literacy could have benefits for all three of the outcome measures considered, including reducing the rate of still birth and death soon after birth. Thus the benefits of improving female literacy are the combined benefits on all three outcomes.

Identify and respond to health problems during pregnancy
The relationship between health problems during pregnancy and still birth or death soon after birth emphasizes the importance of arranging delivery with access to emergency obstetric care services (usually in hospital) for women who have health problems in pregnancy. At present this does not happen (only 16% of women with health problems in pregnancy deliver in a health facility).

Ensure that the cord is cut with a clean instrument
This intervention is simple and cheap, affordable by every family in Nepal. It requires informing families of the benefits of using a clean instrument, either as part of an HDK or as a separate item. The relationship with death of the baby indicates that perinatal infection (including neonatal tetanus) remains an important cause of death of babies in Nepal.

Table 101. Possible benefits of different interventions to reduce risk of still birth and death soon after birth

Intervention	Potential individual benefit (from OR)	Potential population benefit (from RD)	Proportion of population who could benefit	Relative cost of possible interventions
Identify and manage labour problems	Reduce risk of death twofold	3% less babies dying	One in twenty pregnant women	High
Improve quality of delivery care	Reduce risk of death twofold	3% less babies dying	One in twenty women	High
Actions to prevent LBW (Table 100)	Reduce risk of death by two thirds	2% less babies dying	A fifth of pregnant women	High
Improve access and knowledge in rural areas	Reduce risk of death by more than half	2% less babies dying	Nine out of ten pregnant women	High
Ensure literacy of women of child bearing age	Reduce risk of death by 40%	1% less babies dying	Three quarters of pregnant women	Moderate
Identify and manage pregnancy problems	Reduce risk of death by a fifth	1% less babies dying	A tenth of pregnant women	High
Ensure cord cut with clean instrument	Reduce risk of death by a fifth	1% less babies dying	Four out of ten pregnant women	Low

Note: The proportion of the population who could benefit is that proportion not currently having the favourable level of the variable.

Priority interventions

Several interventions will have effects on more than one of the outcomes in the survey. They are shown in Table 102.

Table 102. Interventions affecting several outcomes

Intervention	Outcomes		
	ANC	LBW	Death of baby
Reduce illiteracy of pregnant women	+	+	+
Manage pregnancy problems		+	+
Prevent smoking in pregnancy	+	+	
Improve rural antenatal and delivery services	+	+	+
Reduce illiteracy of household heads	+	+	
Ensure more family support in pregnancy	+	+	

The multiple potential benefits of these interventions suggest that they should be given some priority.

Another way of deciding the priority of different interventions is on the basis of the magnitude of the potential benefits (either for individual women or for the whole population of pregnant women) in relation to their costs. The magnitude of benefits of different interventions is indicated in Tables 99, 100 and 101, together with an indication of their likely relative cost to the government and other service providers. Clearly, many of the interventions, to be successful, will require actions at several levels. They will need support from central government, and action at local level. Local actions will include those from NGOs as well as from government bodies.

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ANNEX 1. SITES IN THE NMIS SAMPLE

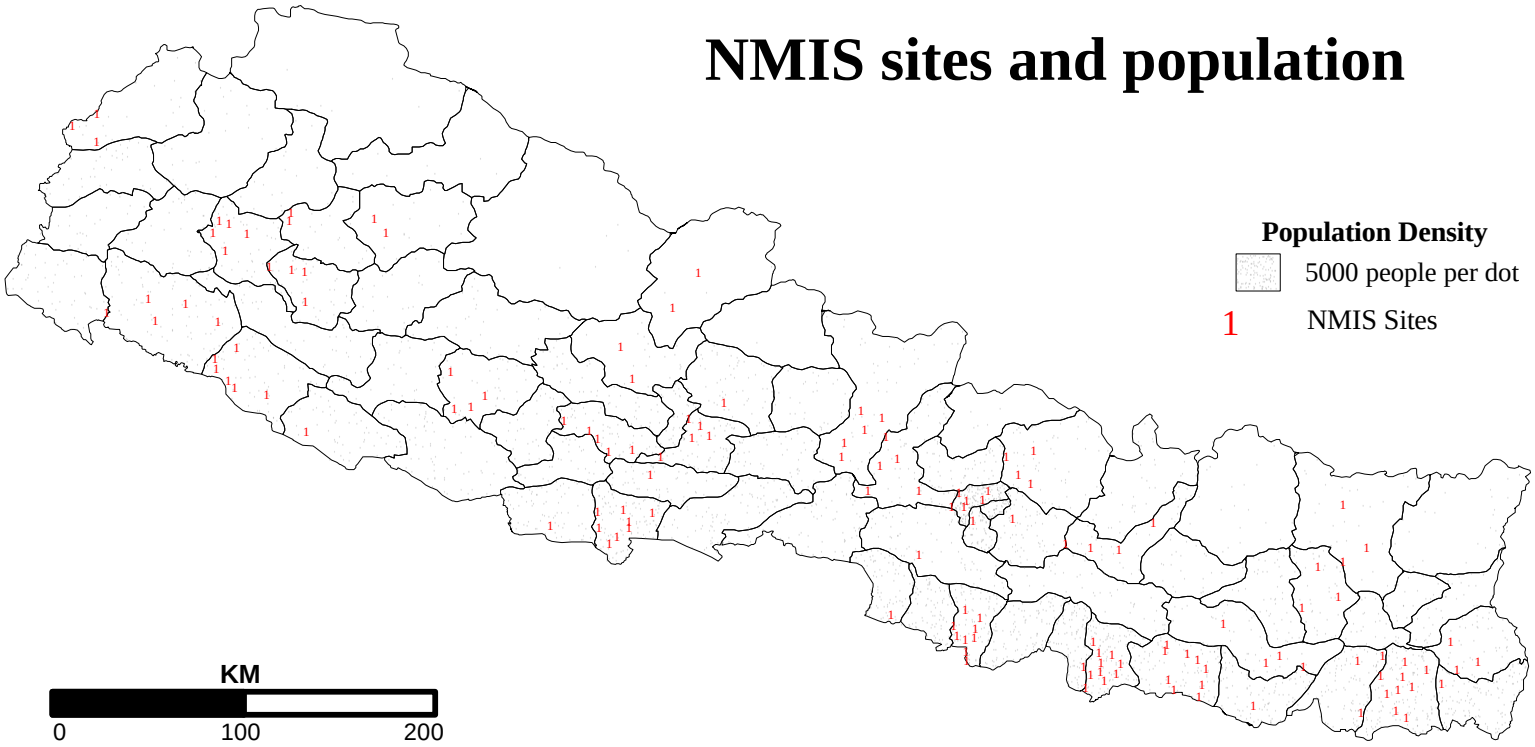
Table A1.1 Districts in the NMIS sample, with number of sites.

Eco-region	District	Rural sites	Urban sites
Eastern - Hills	Ilam	3	
	Bhojpur	3	
	Udayapur	4	
Eastern -Terai	Morang	10	1
	Siraha	8	1
	Saptari		1
	Jhapa		1
	Sunsari		1
Eastern - Mountains	Sankhuwasabha	3	
Central - Hills	Kathmandu	5	4
	Dhading	5	
	Lalitpur		1
	Kavrepalanchok		1
	Makwanpur		1
	Ramenchhap	4	
Central - Terai	Dhanusha	11	
	Parsa		1
	Rautahat	9	
Central - Mountains	Sindhupalchok	4	
Western - Hills	Gorkha	5	
	Syangja	5	
	Myagdi	2	
	Gulmi	5	
	Kaski		1
	Palpa		1
Western -Terai	Rupandehi	8	
	Kapilvastu		1
Western - Mountains	Mustang	2	
Mid West - Hills	Dailekh	4	
	Rolpa	4	
Mid West - Terai	Bardiya	6	
	Banke		1
Mid West - Mountains	Jumla	2	
	Kalikot	2	
Far West - Hills	Achham	5	
Far West - Terai	Kailali	4	1
Far West - Mountains	Darchula	3	

Table A1.2 Districts in Nepal by ecozones and eco-development regions

Region	Terai		Hills		Mountains
Eastern	**Jhapa**	**Morang**	**Ilam**	Panchthar	Taplejung
(16 districts)	**Sunsari**	**Saptari**	Tehrathum	Dhankuta	**Sankhuwasabha**
	Siraha		**Bhojpur**	**Udayapur**	Solukhumbu
			Khotang	Okhaldhunga	
Central	**Dhanusha**	Sarlahi	Sindhuli	**Ramenchhap**	Dolakha
(19 districts)	Mahottari	Bara	**Kavrepalanchok**	**Kathmandu**	**Sindhupalchok**
	Rautahat	Chitwan	**Makwanpur**	Bhaktapur	Rasuwa
	Parsa		**Lalitpur**	**Dhading**	
			Nuwakot		
Western	Nawalparasi		**Gorkha**	Lamjung	Manang
(16 districts)	**Rupandehi**		Tanahu	**Kaski**	**Mustang**
	Kapilvastu		**Syangja**	**Palpa**	
			Parbat	Argakhachi	
			Gulmi	Baglung	
			Myagdi		
Mid West	Dang		Pyuthan	**Rolpa**	Dolpa
(15 districts)	**Banke**		Salyan	Surkhet	Humla
	Bardiya		**Dailekh**	Jajarkot	**Kalikot**
			Rukum		Mugu
					Jumla
Far West	**Kailali**		**Achham**	Doti	**Darchula**
(9 districts)	Kanchanpur		Dadeldhura	Baitadi	Bajhang
					Bajura

NMIS districts are shown in **bold type**.


NMIS sites and population
Population Density
5000 people per dot
1
NMIS Sites
KM
0
100
200

Annex 2: Instruments used in NMIS Cycle 5

1. Household questionnaire
2. Focus group discussion guide for cycle
3. Check list for review of health facilities
4. Questionnaire for interview of Traditional Birth Attendant
5. Check list of interviewing community leaders
6. Focus group guide for feedback of cycle 4 key findings

1. Household Questionnaire - cycle 5

1. What is the age and sex of the household head?
2. What is the relationship of the respondent to the household head?
3. What is the literacy of the household head? [Ability to read and write a simple letter]
4. What is the occupation of the household head? [Note the ethnicity of household]
5. How many people are there in this household altogether?

   (Write age and sex of each one, starting with the youngest)

   [For each child 5 years and under, write how many doses of polio vaccine s/he received in the recent National Immunisation Days (Marg 21 and Magha 4)]

   [For each person 6 years and above, write whether literate or not and source of literacy]

   Ask the remainder of questionnaire for each ever-married woman of childbearing age in the household (age 15-49 years) [If none, go to next house]

6. What is your age?
7. Are you able to read and write a simple letter in any language?
8. How many times have you been pregnant? (Including miscarriages)

   [If none, go to next eligible woman]

   Ask Q9-Q46 for the last pregnancy of each eligible woman (or present pregnancy if pregnant now)

9. When was your last pregnancy? (How many months/years ago)

   [If pregnant now, note how many weeks pregnant]
10. How many antenatal care visits did you have? [If none, skip to Q17]
11. After how many months of pregnancy did you have your first antenatal visit?
12. Where were the antenatal visits? [Home, SHP,HP,PHC,private facility,hospital]
13. Who provided the care at the antenatal visits? [TBA, MCHW, ANM, doctor etc]
14. Was the place of delivery discussed with you during the antenatal visits?
15. Was breastfeeding discussed with you during the antenatal visits?
16. How much did you have to pay (including cash and kind) for each visit? [Rs]
17. If you did not have any antenatal care visits, why not?
18. How many doses of TT did you receive during this pregnancy?
19. For how many months did you take iron/folate tablets during this pregnancy?
20. How many cigarettes/beedi/tobacco per day did you smoke during this pregnancy?
21. What health problems, if any, did you have during the pregnancy?
22. Where did you seek help for this problem? [0=did not seek help]
23. If you did not seek help, why not?

24. How satisfied are you with the antenatal care you received?

    [not at all, somewhat, very]

25. What do you think are the main problems with the antenatal care service?

26. How long did you continue working during your pregnancy?

27. How much help and support did you have from your family during this pregnancy?
    [none at all, some, very much]

28. What do you think that services could do to improve care for pregnant women?

29. What could communities themselves do to help women during pregnancy?

30. Where did you deliver the baby? [In the house, in a shed, in hospital, in nursing home]
    [If delivered in hospital, nursing home etc, skip to Q35]

31. Who assisted with the birth of the baby? [Family only, trained TBA, untrained TBA, MCHW, ANM etc]

32. Did you use a Home Delivery Kit for the birth?

33. If not, why not?

34. With what was the cord - cut? - treated?

35. How many hours or days was the labour? [hours/days]

36. What problems, if any, occurred during the labour or delivery?

37. Where did you seek help for this problem? [0=did not seek help]

38. How soon did you seek help after the problem started? [hours]

39. If you did not seek help anywhere, why not?

40. How big was the baby? [very small, small, normal, big]

41. Was the baby a boy or a girl?

42. What happened to the baby? [stillbirth, lived short time, survived and well, survived but apparently disabled]

43. How much did you have to pay (including cash and kind) for the delivery of the baby [may need to ask someone else as well as mother]

    for the HDK or other materials?
    for the attendance of the TBA/MCHW/ANM etc?
    for transport to get emergency help if needed?
    for additional costs at PHCC or hospital?
    any other costs?

44. How satisfied are you with the care you received during your labour and delivery?
    [not at all, somewhat, very]

Post-natal period

45. How soon after the birth of the child were you given anything to eat?[hours]

46. After the birth, what health problems, if any, did you or the baby have?

47. Where did you seek help for this problem? [0=did not seek help]

48. If you not seek help, why not?

2. NMIS Cycle 5 - Focus Group Guide

Focus group of 8-10 women who have given birth within the last three years.

Introduction

Namaste. We are here in your community to ask about the care women receive during pregnancy and childbirth and to discuss with you any problems you have with the care that is available and how you think this could be improved.

1. Do women in this community usually go for antenatal care visits? Where do they go?
   - [Probe] If pregnant women do not go for antenatal care, why is this?
   - [Probe] What problems are there with the present antenatal care services available in this community? How could the services be improved?
   - [Probe] How much help do pregnant women get from their families and the community? What else could families and the community do to help?
2. Where do women in this community usually deliver their babies?
   - [Probe] What happens if there is an emergency health problem during pregnancy or childbirth? Where are women taken for emergency help if this happens?
   - [Probe] Who decides when to seek help for an emergency health problem during pregnancy or delivery?
   - [Probe] Does the community have any ways of assisting women to get help if there is an emergency problem during pregnancy or delivery? How well does this work?
3. Are there any special feeding practices in this community for women during pregnancy and after delivery?
   - [Probe] Are there certain foods that should and should not be eaten?
4. Do you know of any women in this community who have died during pregnancy or delivery or within 6 weeks of delivery in the last three years?
   - [Probe] What happened?
   - [Probe] How do you think this could have been prevented?

3. NMIS Cycle 5 - Review of Govt Health Facility

This review is of the facility most used by the community for antenatal care; usually it will be the nearest SHP, HP or PHC.

Speak to the Health Worker in charge and observe the facilities.

1. Note what type of health facility [SHP, HP, PHC]
2. What staff are actually available in this facility? [List titles]
3. Which staff are most concerned with care of women during pregnancy and delivery? [Talk to this person if available, otherwise speak to whoever available]
4. Do you have scales for weighing adults? [Observe if in working order]
5. Do you have a sphygmomanometer for measuring blood pressure? [Observe if working]
6. Do you have a foetal stethoscope? [Check if present]
7. Do you supply pregnant women with iron/folate tablets? [Check if supply]
8. Do you give pregnant women injections of TT as required? [Check supply, equipment]
   - Do you have sterile syringes supplied with the vaccine?
   - Do you have money to purchase kerosene to sterilise syringes? [observe arrangements]
9. What do you advise pregnant women about nutrition during pregnancy and breastfeeding?
10. What do you advise pregnant women about the place to deliver their babies?
11. What do you advise pregnant women about breast feeding?
12. What do you advise pregnant women about Home Delivery Kits?
13. How much do you charge women for registration - initially?
    -for subsequent visits?
14. How many pregnant women have you attended in the last 12 months? [check records if necessary]
15. What health problems during pregnancy have you seen in the last 12 months? [Number with each problem]
16. How many deliveries have you attended in the last 12 months?
17. What do you use to cut the cord of newborn babies?
18. What do you apply to the stump of the cord after cutting it?
19. What emergency health problems have you seen during pregnancy or delivery in the last 12 months? [Number with each problem]
20. How many of these were referred to your facility because of problems: - by the TBA/FCHV
    -by the family of the woman
21. Which of these problems did you manage here?
22. Where did you refer the others for help? [Note type of health facility]
23. Have you seen any women who have died during pregnancy or delivery or within 6 weeks of delivery in the last 3 years? [Give number]
24. What was the cause of death in each case? Could any of the deaths have been prevented?
25. What do you think could be done to improve services for women during pregnancy and delivery?
26. Do you visit/ provide care for mothers and babies after the child is born?
27. What advice/service do you offer women after the birth of a child?

NMIS Cycle 5 - Interview with TBA

[This interview with up to three TBAs per site]

1. What is your age?
2. Note caste/ethnicity
3. Are you able to read and write a simple letter in any language?
4. How many years have you been working as a TBA?
5. From whom did you learn your traditional skills?
6. Have you had any training in antenatal and delivery care?
7. If yes, who provided this training?
8. What do you advise pregnant women about the place to deliver their babies?
9. What do you advise pregnant women about breast feeding?
10. What else do you do during antenatal visits?
11. How many pregnant women have you attended in the last 12 months?
12. What health problems during pregnancy have you seen in the last 12 months? [Number with each problem]
13. How many deliveries have you attended in the last 12 months?
14. How much do you normally receive (in cash/ kind) for attending a delivery? For a boy? For a girl?
15. What do you use to wash your hands before assisting a delivery?
16. Do you use Home Delivery Kits?
17. What do you use to cut the cord of newborn babies?
18. What do you apply to the stump of the cord after cutting it?
19. What signs during delivery would lead you to refer a woman for further help? [Write all signs mentioned]
20. What health problems (including emergencies) have you seen during delivery or just after delivery in the last 12 months? [Number with each problem]
21. To which health facility did you refer the woman for further help in each case?
22. Have you seen any women who have died during pregnancy or delivery or within 6 weeks of delivery in the last 3 years? [Give number]
23. What was the cause of death in each case? Could any of the deaths have been prevented?

NMIS Cycle 5 - Interview with Community Leader

1. How far is it to the nearest health facility from the centre of the community? [Time to reach]
2. How do people travel there? How much does the travel cost?
3. What type of facility is it? Government (SHP, HP, PHC), NGO, private?
4. In this community/settlement, where do most women get their antenatal care?
5. In this community/settlement, who attends most of the women during delivery?
6. What arrangements does this community/settlement have for taking a woman with emergency health problems during pregnancy or delivery for help?
7. Where are women with emergency problems during pregnancy or delivery taken for care? How long does the journey take?
8. How many times in the last 12 months has a woman from this community/settlement had to be taken for emergency help because of problems during delivery?
9. Have any women from this community/settlement died during pregnancy or delivery or within 6 weeks of delivery in the last 3 years? [give number]

Annex 3 Frequencies of qualitative survey information

1. Review of health facilities

2. Focus group discussion

3. TBA interview

1. Review of Govt Health Facility

Note: some questions allowed multiple responses.

1. Type of health facility

1 Sub Health Post	70	53.0%
2 Health Post	35	26.5%
3 Primary Health Care Center	7	5.3%
4 District hospital	14	10.6%
5 Family Planning clinic 2	1.5%	
9 Missing	4	3.0%

2. Proportion of health facilities with certain types of staff

1 Untrained TBAs	0%
2 Trained TBAs	0%
3 FCHV	6.1%
4 AHW	87.1%
5 VHW	75.0%
6 MCHW	48.5%
7 ANW	37.1%
8 Nurse	14.4%
9 Doctor	15.2%

3. Which staff are concerned with pregnancy and delivery?

1 Trained TBAs	0.8%
2 FCHVs	43.0%
3 AHW	35.9%
4 VHW	6.3%
5 ANM	35.9%
6 Doctor	8.6%

4. Do you have scales for weighing adults? And if the scales work?

	Scales	***Scales work***
Yes	98(74.2%)	85 (64.4%)
No	31 (23.5%)	14 (10.6%)
Missing	3 (2.3%)	33(25.0%)

5. Do you have a sphygmomanometer? And does the sphygmomanometer work?

	Sphygmo	***Work***
Yes	117 (88.6%)	85 (78.8%)
No	12(9.1%)	14 (6.8%)
Missing	3 (2.3%)	33 (4.1%)

6. Do you have a foetal stethoscope?

Yes	79 (59.8%)
No	50 (37.9%)
Missing	3 (2.3%)

7. Do you supply pregnant women with iron/folate tablets?

Yes	115 (87.1%)
No	14 (10.6%)
Missing	3(2.3%)

8. Do you give pregnant women injections of TT as required?

Yes	122 (92.4%)
No	7 (5.3%)
Missing	3 (2.3%)

8.1 Are sterile syringes supplied with the vaccine?

Yes	119(90.2%)
No	10 (7.6%)
Missing	3 (2.3%)

8.2 Do you have money for kerosene to sterilize syringes?

Yes	77 (58.3%)
No	52 (39.4%)
Missing	3 (2.3%)

9. What advise about nutrition during pregnancy and breast-feeding?

1 eat beans	99 (79.2%)
2 eat vegetables/fruit	117 (93.6%)
3 eat eggs/protein	88 (70.4%)
4 drink milk	62 (49.6%)
5 take liquid foods	22 (17.6%)
6 eat more	13 (10.4%)

10. What advise about the place to deliver babies?

1 Clean/dry place	94 (75.2%)
2 well ventilated/open	90 (72.0%)
3 well lit place	54 (43.2%)
4 no dust/smoke	15 (12.0%)
5 lined with cowdung	7 (5.6%)
6 go to a health facility	28 (22.4%)
7 Missing	1 (0.8%)

11. What advise pregnant women about breast feeding?

1 use colostrum	91 (72.8%)
2 prepare nipples	13 (10.4%)
3 clean nipples	64 (51.2%)
4 feed frequently	46 (36.8%)
5 start BF immediately	43(34.4%)

12. What advise pregnant women about Home Delivery Kits?

Use HDK	124 (99.2%)
Keep HDK Safe	30 (24.0%)
Keep HDK clean	7 (5.6%)

13. How much do you charge women:

	Median Rupees
for initial registration:	2.0
for subsequent visits:	0

14. How many pregnant women attended in the last 12 months?

Median 35 pregnancies

15. What health problems during pregnancy have you seen in the last 12 months?

Problems	***Cases (%)***
1 Vomiting	17 (4.0%)
2 High blood pressure	30 (7.2%)
3 Urine infection	9 (2.1%)
4 Pain in stomach	25 (5.9%)
5 Weakness	55 (13.0%)
6 Fever	3 (0.7%)
7 Pain in body	40 (9.5%)
8 Foetal death	1 (0.2%)
9 Oedema	34 (8.1%)
10 Bleeding	41 (9.7%)
11 Infection	40 (9.5%)
12 Difficulty in breathing	16 (3.8%)
13 Loss appetite	8 (1.9%)
14 Anemia	102 (24.2%)
15 Missing	1 (0.2%)
Total	422 (100%)

16. How many deliveries attended in the last 12 months? Median 9.5 deliveries

17. What do you use to cut the cord of newborn babies?

Instrument	***% of facilities***
1 New blade	96 (72.7%)
2 Old blade boiled	2 (1.5%)
3 Scissors boiled	19 (14.4%)
4 Missing	15 (11.4%)

18. What do you apply to the stump of the cord after cutting it?

Materials	***% of facilities***
Nothing	24 (18.2%)
Antiseptic	94 (71.2%)
Missing	14 (10.6%)

19. Emergency health problems during pregnancy/delivery in the last 12 months?

Problems	Cases (%)
Eclampsia	10 (10.8%)
High blood pressure	7 (7.5%)
Bleeding	53 (57%)
Obstructed/ prolonged labour	20 (21.5%)
Miscarriage	2 (2.2%)
Infection	27 (29.0%)
Baby upside down	16 (17.2%)
Retained placenta	28 (30.1%)

20. How many of these emergency cases were referred by family members and TBAs?

By family members:	597 cases
By TBAs:	478 cases

21. Which of these problems did you manage here?

Problem	***% managed***
1 Eclampsia	6.0%
2 High blood pressure	7.1%
3 Bleeding	45.2%
4 Obstructed/prolonged labour	14.3%
5 Miscarriage	1.2%
6 Infection	17.9%
7 Baby upside down	14.3%
8 Retained placenta	27.4%
9 Missing	14.3%

22. Where did you refer the others for help?

1 Nowhere	11 (8.3%)
2 SHP	1(0.8%)
3 HP	4 (3.0%)
4 PHCC	1 (0.8%)
5 District hospital	74 (56.1%)
6 Nursing home	1(0.8%)
7 Private clinic	2 (1.5%)
8 Missing	38 (28.8%)

23. How many pregnancy or postpartum deaths in the last 3 years?

256 cases of deaths were reported by the facilities visited.

Death reported	No. Of facility (%)
yes	43.2%
No	49.2%
Missing	7.6%

24. What was the cause of death in each case?

Causes	Cases	Case could have been prevented (%)
Bleeding	49	28
Eclampsia	11	2
Obstructed/ prolonged labour	38	17
Infection	50	15
Missing	5	4
Total	**153**	**66**

25. What could be done to improve services of pregnancy/delivery?

Suggestions	***% facilities***
1 More funds	11 (9.0%)
2 More facilities	72 (59.0%)
3 More hospitals	35 (28.7%)
4 More drug	41 (33.6%)
5 More staff	29 (23.8%)
6 Staff training	55 (45.1%)
7 Better home care	19 (15.6%)
8 Early referral	6 (4.9%)
9 Regular check up	21 (17.2%)
10 TT immunization	5 (4.1%)

2. Results of Focus Group Discussion

Note: some questions allowed more than one answer.

1. Do women in this community usually go for antenatal visits?

1 Yes	58	40.8%
2 No	39	27.5%
3 Sometimes	40	28.2%
9 Missing	5	3.5%

2. Where do they go for antenatal visits?

1 Sub Health Post	24	23.3%
2 Health Post	37	35.9%
3 PHCC	8	7.8%
4 District Hospital	59	57.3%
5 Nursing home	5	4.9%
6 Private clinic	9	8.7%
9 Missing	7	6.8%

3. If they do not go for antenatal care, why not?

1 Too far away	29	20.4%
2 Too expensive	39	27.5%
3 No medicine	3	2.1%
4 No staff	6	4.2%
5 Bad attitude	13	9.2%
6 Poor condition	12	8.5%
7 Old tradition	112	78.9%
8 Not allowed	18	12.7%
9 10 Missing	15	10.5%

4. What problems are there with the available antenatal care here?

1 Too far away	35	24.6%
2 Lack of staff	41	28.9%
3 Lack of medicine	54	38.0%
4 Poor service	62	43.7%
5 Too expensive	20	14.1%
6 Wait for long time	13	9.2%
7 Poor facility	27	19.0%
8 No health education	8	5.6%
9 Missing	6	4.2%

5. How could the antenatal care services be improved?

1 Set up mobile clinics	17	12.0%
2 Make doctors available	31	21.8%
3 Provide female doctor	42	29.6%
4 Provide free medicine	58	40.8%
5 Set up more clinic	38	26.8%
6 Train TBAs	14	9.9%
7 Free medical care	28	19.7%
9 Missing	32	22.5%

6. How much help do pregnant women here get from their families and the community?

0 No help	4	2.8%
1 Help emergency	3	2.1%
2 Help household work	22	15.5%
3 Help transport	5	3.5%
4 Help finance	8	5.6%
9 Missing	100	70.4%

7. What else could families and the community do to help?

1 Help with household work	47	33.1%
2 Help to arrange transport	17	12.0%
3 Help financial arrangement	35	24.6%
4 Balanced diet	35	24.6%
5 Create awareness	46	32.4%
6 Train TBAs	3	2.1%
9 Missing	12	8.4%

8. Where do women here usually deliver their babies?

1 Home	134	94.4%
2 Health and Sub-health post	5	3.5%
3 District hospital	48	33.8%
5 Private hospital	2	1.4%
7 Missing	2	1.4%

9. What happens if there is an emergency health problem during pregnancy or delivery or after delivery?

1 Spiritual healing	29	20.4%
2 Call a health worker	49	34.5%
3 Call an experienced woman	27	19.0%
4 Arrange transport	42	29.6%
5 Herbal/local medicine	9	6.3%
6 Oil massage	12	8.5%
7 Raise feet level	2	1.4%
9 Missing	12	8.4%

10. Where are women with these emergency health problems taken for help?

1 Sub health post	5	3.8%
2 Health post	17	13.1%
3 PHCC	4	3.1%
4 Private clinic	18	13.8%
5 Nursing home	2	1.5%
6 District hospital	104	80.0%
9 Missing	4	3.1%

11. Who decides when to seek help for such emergency health problems?

1 Household head	118	83.1%
2 TBAs	20	14.1%
3 Educated persons	41	28.9%
4 Other family members	25	17.8%
5 Women herself	3	2.1%
9 Missing	1	0.7%

12. In what ways does the community assist women with these emergency health problems?

1 Transport	51	52.6%
2 Finance	13	13.4%
3 Stretcher	42	43.3%
4 Traditional healer	6	6.2%
9 Missing	8	8.2%

13. How well does this help work?

1 Effective	27	19.0%
2 Somehow working	25	17.6%
3 Not effective	41	28.5%
9 Missing	49	34.5%

14. Have any women in this community died in pregnancy, delivery or within 6 weeks of delivery in last 3 years?

1 Yes	50.0%
2 No	47.9%
9 Missing	2.1%

15. What happened to the women who died?

1 Obstructed/prolonged labour	31	47.0%
2 Excessive bleeding	24	36.4%
3 Convulsion	2	3.0%
4 Infection/fever	10	15.2%
5 Other diseases	6	9.1%
6 Too weak	8	12.1%
9 Missing	17	25.7%

16. How do you think the deaths could have been prevented?

1 Early recognition	26	26.3%
2 Improve transport	18	23.8%
3 More health facility	20	31.7%
4 Public awareness	2	3.2%
5 Early referral	32	50.8%
9 Missing	10	15.8%

3. Interview with TBA

Some questions allowed multiple responses.

1. What is your age? Mean age = 44.5

2. Note caste / ethnicity

Brahmin	17 (9.7%)
Chhetri	28 (15.9%)
Newar	11 (6.3%)
Gurung/Ghale	5 (2.8%)
Magar	7 (4.0%)
Rai/Limbu	7 (4.0%)
Tamang/Sherpa	1 (0.6%)
Muslim	1 (0.6%)
Occupational	5 (2.8%)
Tharu	19 (10.8%)
Yadav	2 (1.1%)
Others in Terai	63 (35.8%)
Others in Hills	9 (5.1%)

3. Are you able to read and write a simple letter in any language?

Yes	54 (30.5%)
No	123 (69.5%)
Total	177 (100%)

4. How many years have you been working as a TBA?

Mean:	13 years
Median:	10 years

5. From whom did you learn your traditional skills?

1 Mothers	90 (50.8%)
2 Other family members	27 (15.3%)
3 HMG TBA programme	45 (25.4%)
4 NGO TBA programme	7 (4.0%)
5 Private sector	5 (2.8%)
9 Missing	3 (1.8%)

6. Have you had any training in antenatal and delivery care?

Yes	96 (54.2%)
No	80 (45.2%)
Missing	1 (0.6%)

7. If yes, who provided this training?

1 Government	75 (42.4%)
2 NGOS	6 (3.4%)
3 Private clinic	1 (0.6%)
4 Nurses/midwives	11 (6.2%)
5 Trained TBAs	1 (0.6%)
9 Missing	83 (47%)

8. What do you advise about the place to deliver babies?

1 Clean/dry	156 (90.2%)
2 well ventilated/open	102 (59.0%)
3 well lit	93 (53.8%)
4 no dust/smoke	8 (4.6%)
5 lined with cowdung	4 (2.3%)
6 go to a health facility	12 (6.9%)
9 missing	17 (9.8%)

9. What do you advise pregnant women about breast feeding?

1 use colostrum	105 (60.7%)
2 prepare nipples	49 (28.3%)
3 clean nipples	87 (50.3%)
4 feed frequently	65 (37.6%)
5 start immediately	10 (5.8%)
6 excl to six months	22 (12.7%)
9 missing	5 (2.9%)

10. What else do you do during antenatal visits?

1 Advice on TT immunization	30 (18.3%)
2 Advice on nutrition	125 (76.2%)
3 Advise on rest	66 (40.2%)
4 Advice on anemia/iron	4 (2.4%)
5 Advice on birth spacing	7 (4.3%)
9 Missing	28 (17.0%)

11. How many pregnant women have you attended in the last 12 months?

Mean:	15.5
Median:	10

12. What health problems during pregnancy in the last 12 months? [No. with each problem]

Problem	Number	%
1 Vomiting	25	4.8
2 High blood pressure	6	1.2
3 Urinary infection	3	0.6
4 Pain in stomach	88	17.0
5 Weakness	67	12.9
6 Fever	16	3.1
7 Pain in body	76	12.9
8 Foetal death	19	3.7
9 Oedema	49	9.4
10 bleeding	68	13.1
11 infection	44	8.5
12 difficulty breathing	13	2.5

13 loss appetite	5	1.0
14 anaemia	39	7.5

13. How many deliveries have you attended in the last 12 months?

Mean: 13 deliveries
Median: 7 deliveries

14. How much do you normally receive for attending a delivery?

Rupees	Boy	Girl
Mean	128	111
Median	100	50

15. What do you use to wash your hands before assisting a delivery?

0 Nothing	7 (4.0%)
1 Water only	18 (10.2%)
2 Water and soap	148 (83.6%)
3 Ash/clay	1(0.6%)
9 Missing	3 (1.7%)

16. Do you use Home Delivery Kits?

Yes	41 (23.2%)
No	106 (59%)
Sometimes	28 (15.8%)
Missing	2 (1.2%)

17. What do you use to cut the cord of newborn babies?

1 New blade	131 (74.0%)
2 Old blade	4 (2.3%)
3 Old blade boiled	17 (9.6%)
4 Scissors boiled	1 (0.6%)
5 Scissors un-boiled	5 (2.8%)
6 Other instrument boiled	3 (1.7%)
7 Other instrument un-boiled	13 (7.3%)
8 Missing	3 (1.7%)

18. What do you apply to the stump of the cord after cutting it?

0 Nothing	62 (35%)
1 Antiseptic	88 (49.7%)
2 Ash	24 (13.6%)
9 Missing	3 (1.7%)

19. **What signs during delivery would lead you to refer a woman?** [Write all signs mentioned]

1 Excessive bleeding	89 (57.4%)
2 Convulsion	62 (40.0%)
3 Obstructed/prolonged labour	95 (61.3%)
4 Too much pain	97 (62.6%)

20. What health problems (including emergencies) during delivery or just after delivery in the last 12 months? [Number with each problem]

Problem	***No.***	***Per cent***
Eclampsia	28	7.5
High blood pressure	2	0.5
Bleeding	97	26.0
Obstructed/prolonged labour	90	24.1
Miscarriage	5	1.3
Infection	75	20.1
Baby upside down	36	9.7
Retained placenta	39	10.5
Missing	1	0.3

21. To which health facility did you refer the woman in each case?

0 Nowhere	21 (11.9%)
1 SHP	8 (4.5%)
2 HP	28 (15.8%)
3 PHCC	2 (1.1%)
4 District hospital	59 (33.3%)
5 Nursing home	2 (1.1%)
6 Private clinic	20 (11.3%)
7 FPA clinic	8 (4.5%)
9 Missing	37 (20.9%)

22. Have you seen any women who have {died} during pregnancy or delivery or within 6 weeks of delivery in the last 3 years? [Give number]

Yes	114 (64.4%)
No	48 (27.1%)
Missing	15 (8.5%)

23. What was the cause of death in each case?

(Cause, number of that cause, number of that cause preventable)

Cause	***Cases***	***Could have been prevented***
1 Excessive Bleeding	26	20
2.Eclampsia	5	2
3.Obstructed/ prolonged labour	33	24
4.Infection	24	15
Missing	3	1

Total	**91**	**62**

ANNEX 4: WEIGHTED AND UNWEIGHTED VALUES OF KEY INDICATORS

The derivation of the weights applied is given in the report of NMIS cycle 1 and in an Annex to that report. In this cycle, the same weights were used. They were applied using the EpiInfo CSAMPLE programme.

Table A4.1 Weights applied to each District (actually each group of rural or urban sites).

Rural sites		Urban sites	
District	Weight	District	Weight
1. Udayapur	1.50	27. Lalitpur	0.48
2. Morang (r)	0.94	28. Kavrepalanchok	0.29
3. Siraha (r)	1.24	29. Makwanpur	0.46
4. Sindhupalchok	0.55	30. Saptari	0.21
5. Kathmandu (r)	1.50	31. Parsa	0.27
6. Dhading	1.59	32. Kaski	0.48
7. Ramenchhap	1.92	33. Palpa	0.34
8. Dhanusha	1.04	34. Kapilvastu	0.19
9. Rautahat	1.26	35. Banke	0.32
10. Gorkha	1.71	36. Jhapa	0.27
11. Syangja	0.34	37. Sunsari	0.51
12. Gulmi	1.51	38. Kathmandu (u)	0.48
13. Rupandehi	0.54	39. Kailali (u)	0.33
14. Rolpa	1.27	40. Morang (u)	0.26
15. Dialekh	1.26	41. Siraha (u)	0.35
16. Bardiya	0.44		
17. Achham	0.51		
18. Kailali (r)	0.44		
19. Sankhuwasabha	0.53		
20. Ilam	1.93		
21. Bhojpur	2.06		
22. Mustang	0.006		
23. Myagdi	4.03		
24. Jumla	0.53		
25. Kalikot	0.45		
26. Darchula	0.46		

(r)= rural sites within the district; (u)=urban sites within the district

Table A4.2 Unweighted and weighted values of key national indicators

Indicator	Unweighted value	Weighted value	95% CI of weighted value
Any antenatal visit	23.7	20.5	17.5-23.5
Smoking during pregnancy	30.1	33.7	30.7-36.7
Pregnancy women working more than 7 months	95.2	95.2	94.5-95.7
Satisfied with antenatal care service	95.1	94.1	93.1-96.1
Health problems during pregnancy	7.9	7.6	6.58-8.62
Receiving TT during pregnancy	43.8	42.1	39.6-44.7
Receiving iron/folate during pregnancy	12.6	10.5	8.67-12.31
Home delivery	88.4	91.4	89.5-93.4
Use HDK for delivery	2.6	2.6	2.01-3.22
Cut cord with clean instrument	61.9	58.6	54.5-62.7
Safe treatment of cord	48.8	52.38	48.5-56.2
Health problems during labour	4.2	4.3	3.67-4.89
Reported Low birth weight	19.4	18.6	17.2-20.1
Reported perinatal death	2.3	2.3	1.87-2.80
Home delivery attended by trained health workers	5.7	5.1	3.7-6.5

The weighted values are close to the unweighted values for all the key indicators. The weighted values of indicators at national level are used in the Results section unless specified otherwise.

ANNEX 5: RESULTS BY GEOGRAPHIC LOCATION AND ETHNIC GROUPS

List of tables and maps

Tables

Figures (Maps)

Table A5.1 Key indicators regarding antenatal care by ethnic groups

Ethnic Group	% having at least one antenatal visit (n)	% women smoking in pregnancy (n)	% women working >7 mths. in pregnancy	% women "very satisfied" with antenatal care (n)*
Brahmins	42 (1237)	8 (236)	95 (2766)	41 (516)
Chettri	23 (754)	36 (1181)	95 (3100)	37 (295)
Newar	47 (373)	19 (154)	96 (767)	43 (166)
Gurung/Ghale	20 (87)	52 (227)	97 (420)	29 (30)
Magar	20 (160)	47 (372)	96 (756)	39 (67)
Rai/Limbu	18 (130)	49 (353)	97 (697)	35 (50)
Tamang/Sherpa	16 (104)	47 (296)	97 (614)	37 (42)
Muslim	21 (140)	28 (183)	96 (640)	25 (37)
Occupational	17 (394)	45 (1039	95 (2199)	31 (130)
Tharu	9 (137)	29 (440)	98 (1490)	30 (48)
Yadav	15 (128)	22 (193)	93 (818)	45 (66)
Other (Terai)	22 (415)	15 (276)	94 (1739)	39 (179)
Other (Hills)	11 (72)	47 (308)	94 (614)	26 (20)

*The denominator is women who had any antenatal care

Table A5.2 Indicators on receiving Iron supplementation, TT immunization, home delivery, health problems during pregnancy by ethnic groups

Ethnic Group	% women having any health problems during pregnancy (n)	% women having any TT in pregnancy (n)	% women taking any iron/folate tablets (n)	% women delivering at home (n)
Brahmins	9 (270)	56 (1622)	23 (660)	78 (2257)
Chettri	9 (285)	37 (1194)	13 (408)	89 (2878)
Newar	7 (51)	52 (411)	31 (238)	61 (483)
Gurung/Ghale	6 (25)	32 (140)	9 (40)	93 (397)
Magar	6 (48)	38 (297)	10 (76)	92 (710)
Rai/Limbu	5 (35)	26 (191)	7 (47)	93 (663)
Tamang/Sherpa	4 (27)	26 (166)	9 (53)	91 (571)
Muslim	5 (33)	53 (352)	8 (55)	95 (625)
Occupational	9 (203)	36 (842)	8 (183)	94 (2151)
Tharu	6 (93)	41 (620)	5 (74)	97 (1477)
Yadav	9 (80)	52 (463)	8 (67)	94 (815)
Other (Terai)	9 (158)	63 (1157)	13 (238)	87 (1598)
Other (Hills)	9 (58)	32 (206)	5 (28)	97 (621)

Table A5.3 Delivery related key indicators by ethnic groups

Ethnic Group	% women using home delivery kits (n)	% women cutting cord cleanly (n)	% women treating cord safely (n)	% women with problems during labour (n)
Brahmins	3 (68)	64 (1429)	52 (1124)	4 (108)
Chettri	2 (44)	45 (1281)	57 (1590)	5 (169)
Newar	2 (11)	67 (317)	54 (244)	4 (29)
Gurung/Ghale	1 (2)	31 (125)	64 (243)	5 (22)
Magar	2 (12)	40 (282)	62 (430)	2 (15)
Rai/Limbu	2 (13)	53 (346)	84 (550)	3 (19)
Tamang/Sherpa	1 (6)	43 (246)	61 (306)	2 (12)
Muslim	6 (35)	93 (573)	43 (265)	4 (28)
Occupational	2 (38)	56 (1194)	44 (927)	4 (90)
Tharu	3 (46)	83 (1211)	35 (503)	2 (31)
Yadav	5 (38)	85 (684)	21 (166)	7 (62)
Other (Terai)	5 (73)	87 (1371)	38 (591)	5 (85)
Other (Hills)	1 (6)	49 (306)	39 (243)	7 (44)

Table A5.4 Delivery outcome related key indicators by ethnic groups

Ethnic Group	Proportion of women with small/very small baby (n)	Proportion of women with baby that was still born, died soon after birth (n)
Brahmins	15 (441)	1.7 (48)
Chettri	24 (759)	2.5 (82)
Newar	16 (126)	1.7 (13)
Gurung/Ghale	28 (121)	2.1 (9)
Magar	15 (114)	2.2 (17)
Rai/Limbu	14 (100)	1.0 (7)
Tamang/Sherpa	19 (120)	1.1 (7)
Muslim	15 (99)	2.1 (14)
Occupational	24 (556)	3.0 (69)
Tharu	25 (384)	1.3 (20)
Yadav	16 (142)	3.7 (32)
Other (Terai)	11 (200)	3.2 (58)
Other (Hills)	27 (170)	2.0 (13)

Table A5.5 Key indicators regarding antenatal visit by geographic location

Location	% having at least one antenatal visit (n)	% women smoking in pregnancy (n)	% women working >7 mths. in pregnancy	% women "very satisfied" with antenatal care (n)
Development regions				
Eastern	8 (111)	30 (427)	94 (1347)	36 (59)
Central	6 (127)	46 (940)	97 (2004)	28 (42)
Western	34 (1109)	28 (895)	96 (3112)	30 (340)
Mid-Western	16 (785)	28 (895)	94 (4565)	50 (435)
Far-Western	18 (628)	38 (1333)	95 (3335)	31 (209)
Eco-zones				
Terai	21 (1326)	40 (2481)	95 (5926)	34 (472)
Hills	18 (1309)	24 (1775)	95 (7047)	39 (562)
Mountains	9 (125)	47 (671)	97 (1390)	35 (51)
Urban / rural split				
Urban	57 (1385)	14 (341)	95 (2299)	40 (569)
Rural	18 (2760)	33 (4927)	95 (14363)	36 (1085)
Eco-development regions				
Eastern Hill	20 (219)	42 (460)	95 (1037)	32 (76)
Eastern Terai	18 (386)	34 (738)	95 (2053)	32 (133)
Eastern Mountain	9 (23)	54 (135)	98 (245)	0 (0)
Central Hill	24 (394)	40 (645)	95 (1547)	39 (157)
Central Terai	13 (351)	18 (498)	94 (2627)	62 (257)
Central Mountain	10 (40)	48 (189)	99 (391)	41 (21)
Western Hill	31 (665)	37 (807)	96 (2071)	31 (210)
Western Terai	43 (428)	8 (81)	97 (965)	28 (123)
Western Mountain	21 (16)	9 (7)	99 (76)	44 (7)
Mid-Western Hill	3 (20)	51 (385)	97 (735)	31 (8)
Mid-Western Terai	9 (87)	35 (324)	98 (922)	31 (32)
Mid-Western Mountain	6 (20)	64 (231)	97 (347)	9 (2)
Far-Western Hill	5 (28)	32 (184)	95 (536)	46 (21)
Far-Western Terai	11 (57)	25 (134)	91 (480)	21 (17)
Far-Western Mountain	8 (26)	31 (109)	96 (331)	62 (21)
All Nepal	**20.5(4146)**	**33.7 (5268)**	**95.2 (16662)**	**35.8 (1654)**

Fig. A5.1 Percentage of women having at least one antenatal visit

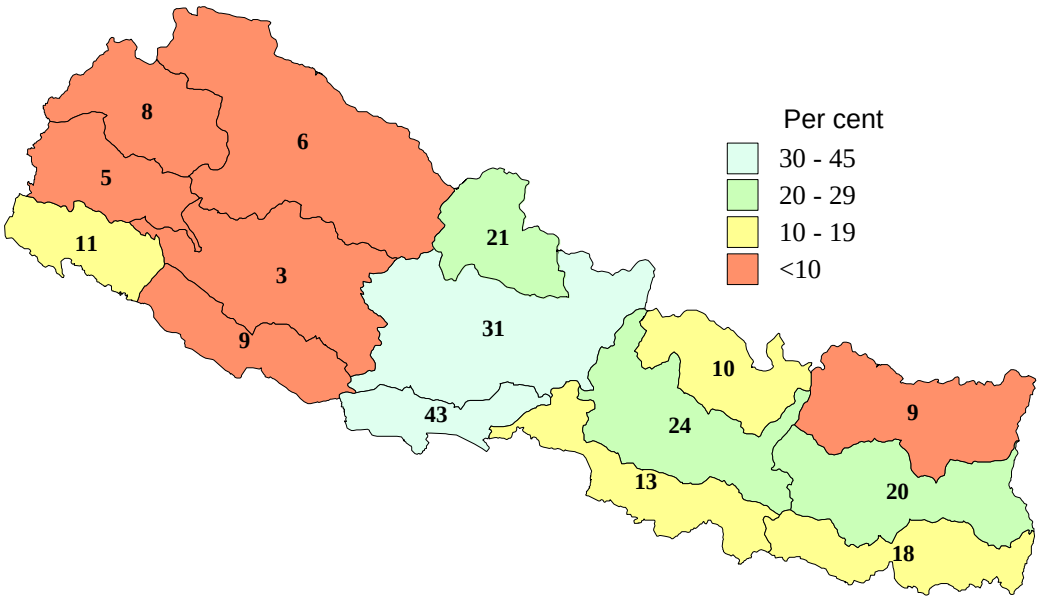


Fig. A5.2 Proportion of women smoking during pregnancy

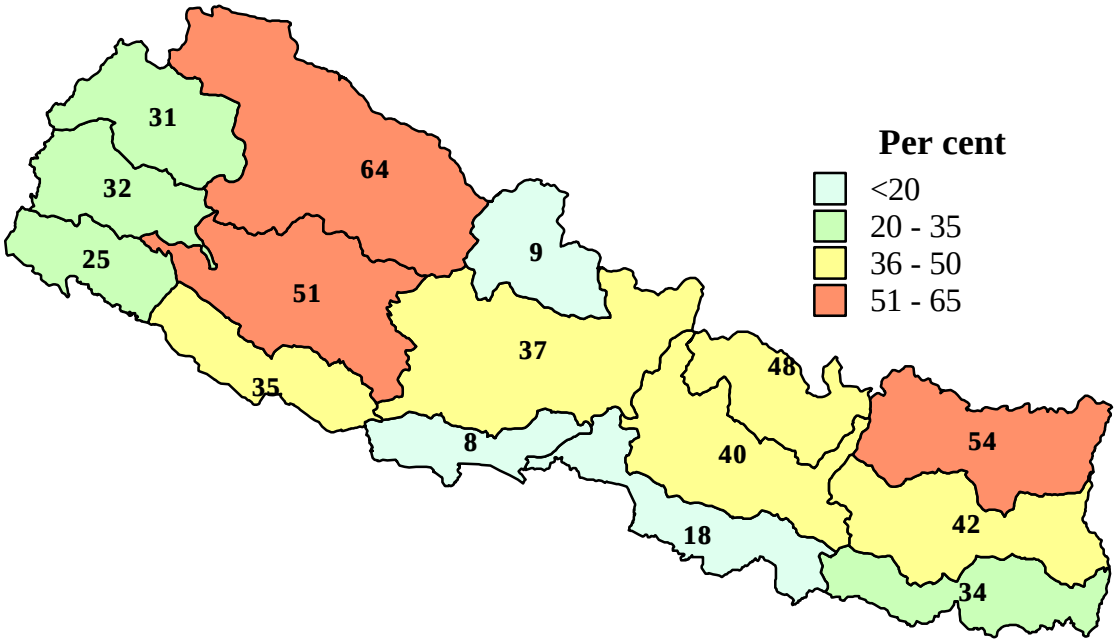


Fig. A5.3 Proportion of women working more than 7 months during pregnancy

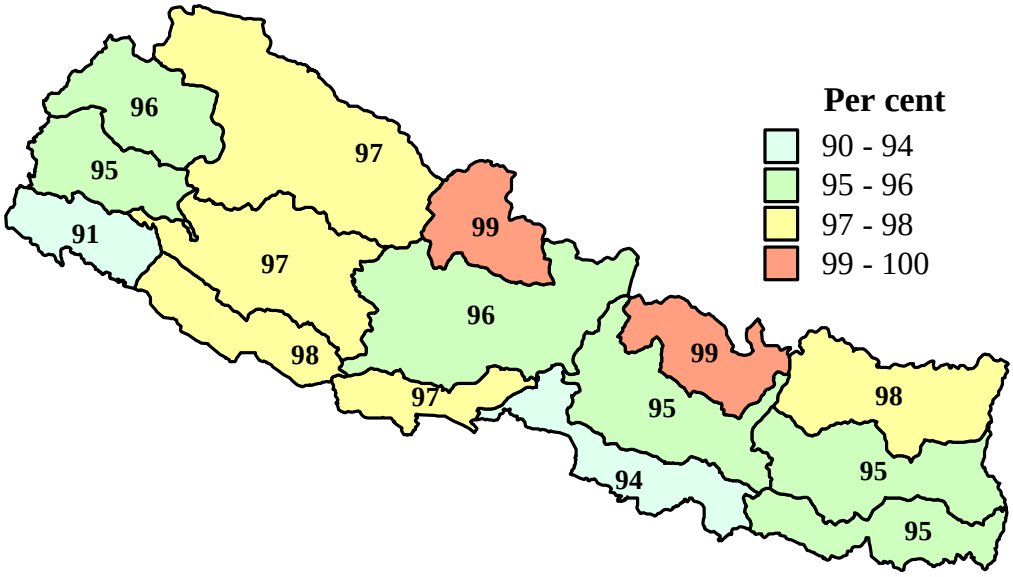


Fig. A5.4 Proportion of women who were "very satisfied" with antenatal care service

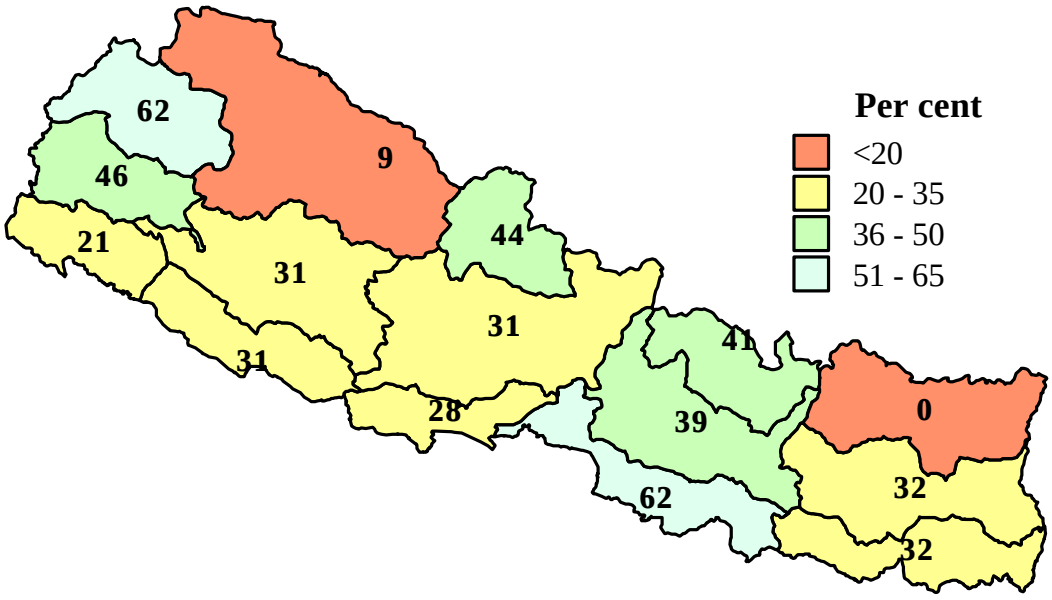


Table A5.6 Indicators on receiving Iron supplementation, TT immunization, home delivery, health problems during pregnancy by geographic location

Location	% women having any health problems during pregnancy (n)	% women having any TT in pregnancy (n)	% women taking any iron/folate tablets (n)	% women delivering at home (n)
Development regions				
Eastern	10 (149)	21 (308)	4 (55)	95 (1372)
Central	7 (150)	30 (623)	3 (53)	98 (2011)
Western	9 (279)	50 (1622)	16 (514)	90 (2851)
Mid-Western	8 (357)	49 (2379)	9 (442)	90 (4298)
Far-Western	8 (268)	63 (2203)	7 (246)	96 (3318)
Eco-zones				
Hills	9 (554)	34 (2112)	11 (666)	93 (5667)
Terai	8 (564)	52 (3897)	8 (602)	93 (6803)
Mountains	6 (85)	16 (222)	3 (42)	97 (1380)
Urban/rural split				
Urban	7 (164)	60 (1452)	36 (862)	59 (1429)
Rural	8 (1203)	41 (6231)	9 (1310)	93 (13850)
Eco-development regions				
Eastern Hill	11 (113)	66 (722)	5 (54)	97 (1047)
Eastern Terai	7 (138)	58 (1254)	9 (191)	96 (2024)
Eastern Mountain	7 (17)	91 (227)	0.5 (1)	100 (247)
Central Hill	8 (123)	67 (1097)	15 (251)	87 (1390)
Central Terai	9 (234)	38 (1050)	7 (180)	91 (2518)
Central Mountain	0 (0)	78 (311)	3 (11)	98 (390)
Western Hill	9 (197)	52 (1127)	16 (336)	92 (1936)
Western Terai	8 (80)	42 (423)	17 (169)	85 (844)
Western Mountain	3 (2)	86 (66)	12 (9)	92 (71)
Mid-Western Hill	4 (28)	89 (681)	1 (10)	99 (748)
Mid-Western Terai	7 (63)	46 (434)	4 (41)	96 (905)
Mid-Western Mountain	17 (59)	90 (322)	1 (2)	100 (358)
Far-Western Hill	17 (93)	85 (491)	3 (15)	96 (546)
Far-Western Terai	9 (49)	71 (374)	4 (21)	97 (512)
Far-Western Mountain	2 (7)	81 (283)	6 (19)	92 (314)
All Nepal	**7.6 (1367)**	**42.1 (7683)**	**10.5 (2172)**	**91.4 (15279)**

Fig. A5.5 Proportion of women with health problems during pregnancy

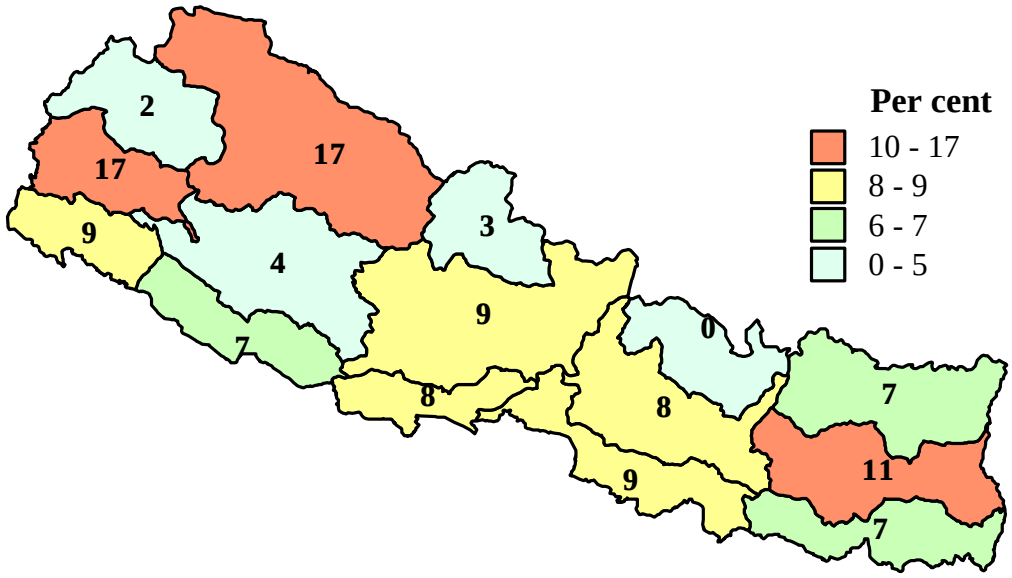


Fig. A5.6 Proportion of women having TT immunization during pregnancy

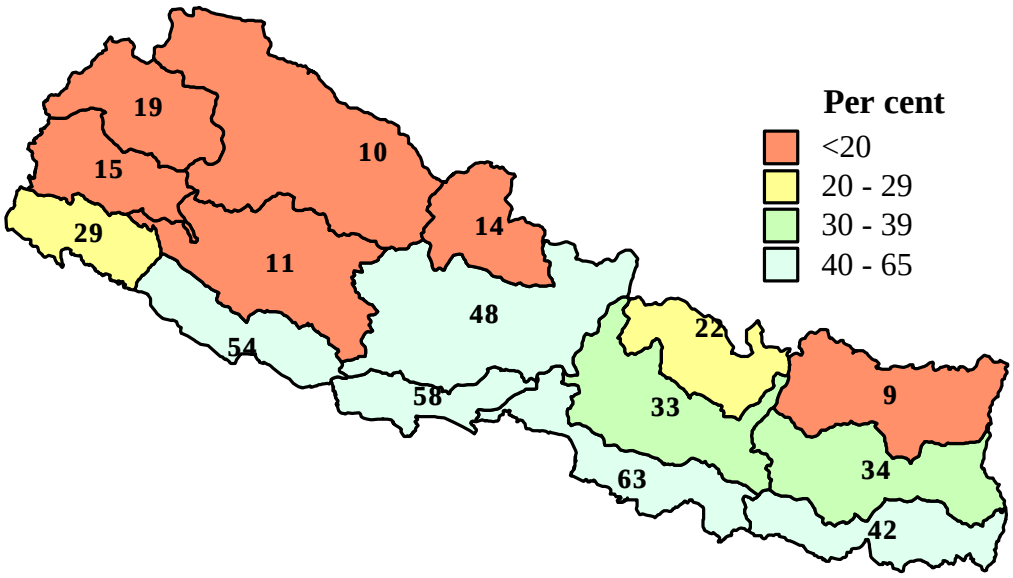


Fig A5.7 Proportion of women receiving iron/folate supplementation during pregnancy

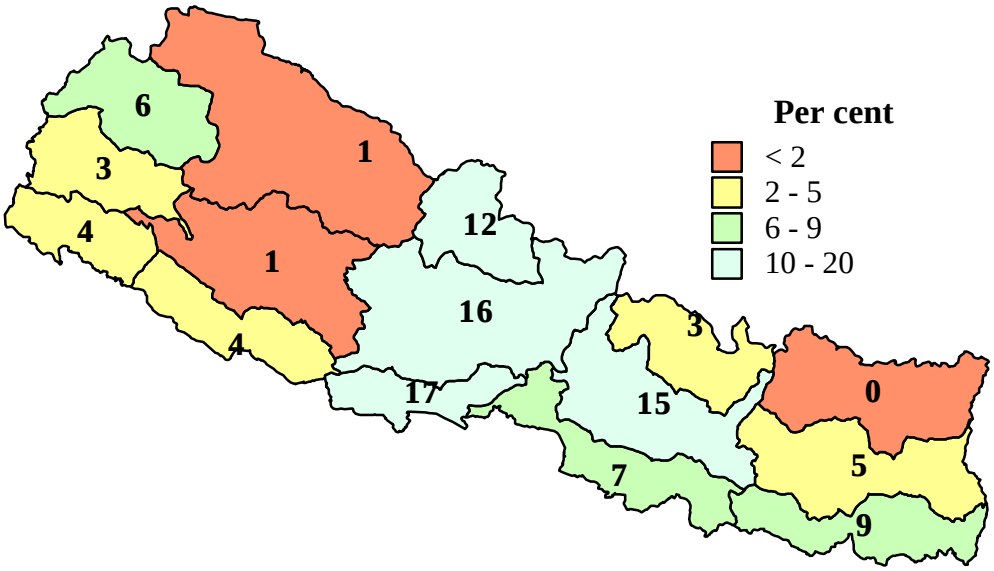


Fig. A5.8 Proportion of women who deliver at home

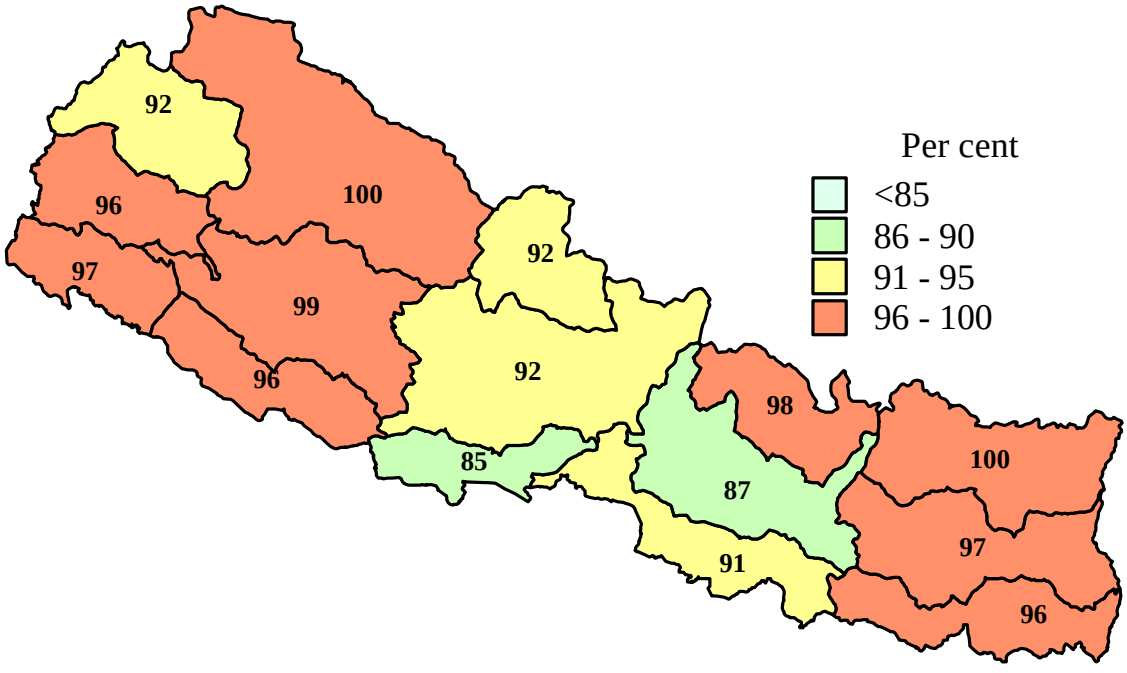


Table A5.7 Delivery related key indicators by geographic location

Location	% women using home delivery kits (n)	% women cutting cord cleanly (n)	% women treating cord safely (n)	% women with problems during labour (n)
Development regions				
Eastern	2 (28)	32 (438)	56 (742)	4 (55)
Central	1 (25)	49 (973)	34 (665)	4 (86)
Western	2 (63)	53 (1507)	51 (1434)	3 (95)
Mid-Western	3 (137)	71 (3025)	46 (1836)	5 (234)
Far-Western	3 (97)	71 (2331)	60 (1947)	4 (143)
Eco-zones				
Hills	2 (102)	40 (2250)	59 (3269)	4 (237)
Terai	4 (235)	81 (5440)	39 (2602)	4 (316)
Mountains	1 (13)	42 (584)	60 (753)	4 (60)
Urban / rural split				
Urban	3 (42)	80 (1120)	42 (573)	4 (101)
Rural	3 (350)	60 (8274)	50 (6624)	4 (613)
Eco-development regions				
Eastern Hill	3 (27)	65 (680)	78 (805)	4 (43)
Eastern Terai	4 (70)	74 (1492)	49 (978)	4 (92)
Eastern Mountain	0 (0)	64 (159)	66 (164)	3 (8)
Central Hill	1 (13)	48 (664)	60 (773)	4 (70)
Central Terai	5 (114)	86 (2160)	38 (939)	6 (161)
Central Mountain	3 (10)	52 (201)	43 (124)	1 (2)
Western Hill	3 (48)	38 (729)	57 (1076)	3 (56)
Western Terai	2 (15)	92 (760)	37 (305)	4 (35)
Western Mountain	0 (0)	25 (18)	76 (53)	5 (4)
Mid-Western Hill	1 (8)	19 (144)	48 (353)	4 (29)
Mid-Western Terai	2 (17)	86 (771)	17 (149)	2 (15)
Mid-Western Mountain	0 (0)	16 (58)	46 (163)	12 (42)
Far-Western Hill	1 (10)	6 (33)	49 (262)	7 (39)
Far-Western Terai	4 (19)	50 (257)	46 (231)	2 (12)
Far-Western Mountain	1 (3)	47 (148)	87 (249)	1 (4)
All Nepal	**2.6 (392)**	**58.6 (9394)**	**52.4 (7197)**	**4.3 (714)**

Fig. A5.9 Proportion of women who use home delivery kits

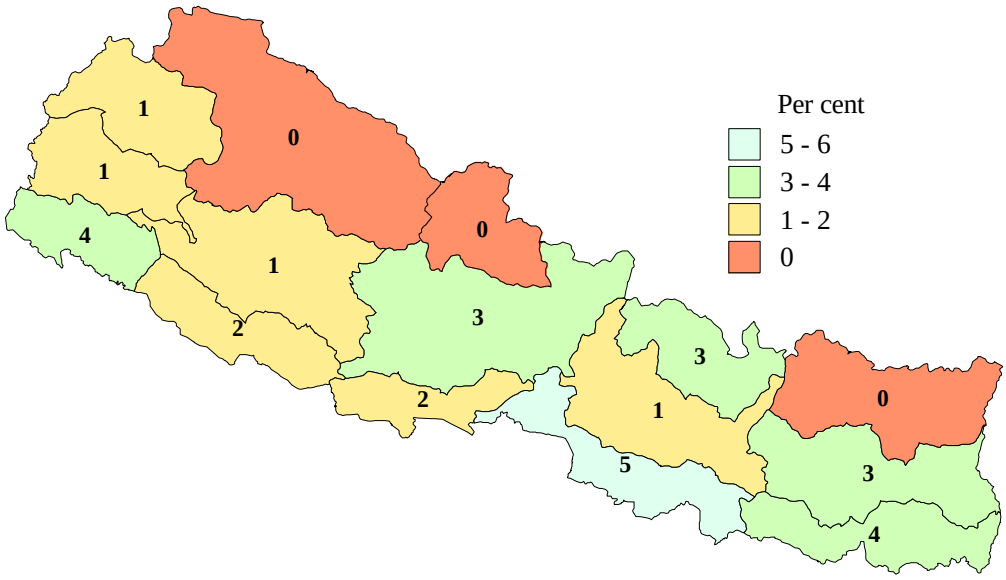


Fig. A5.10 Proportion of women cutting umbilical cord with clean instruments

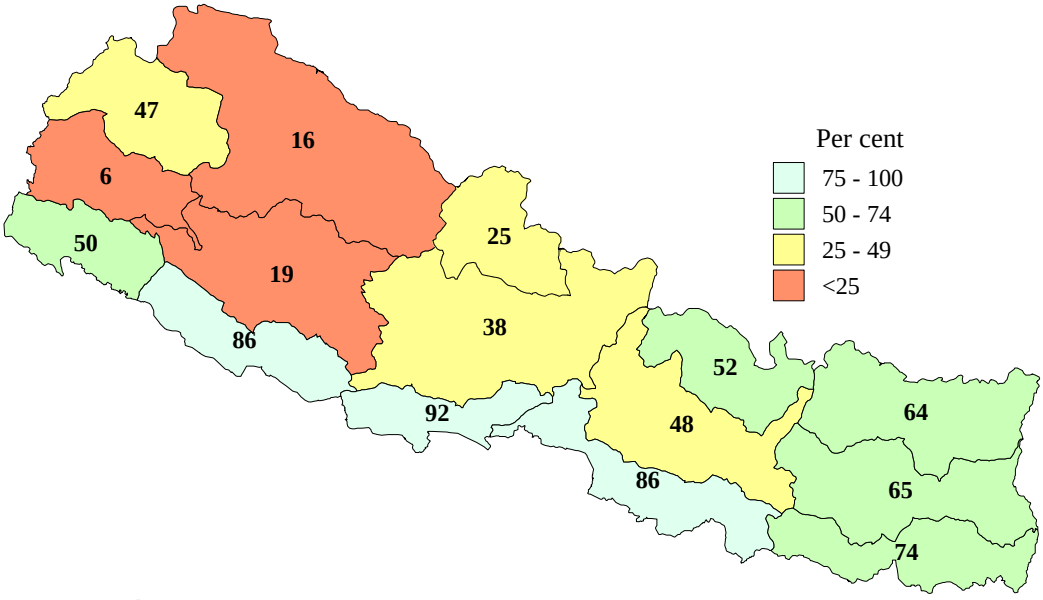


Fig. A5.11 Proportion of women safe treating umbilical cord

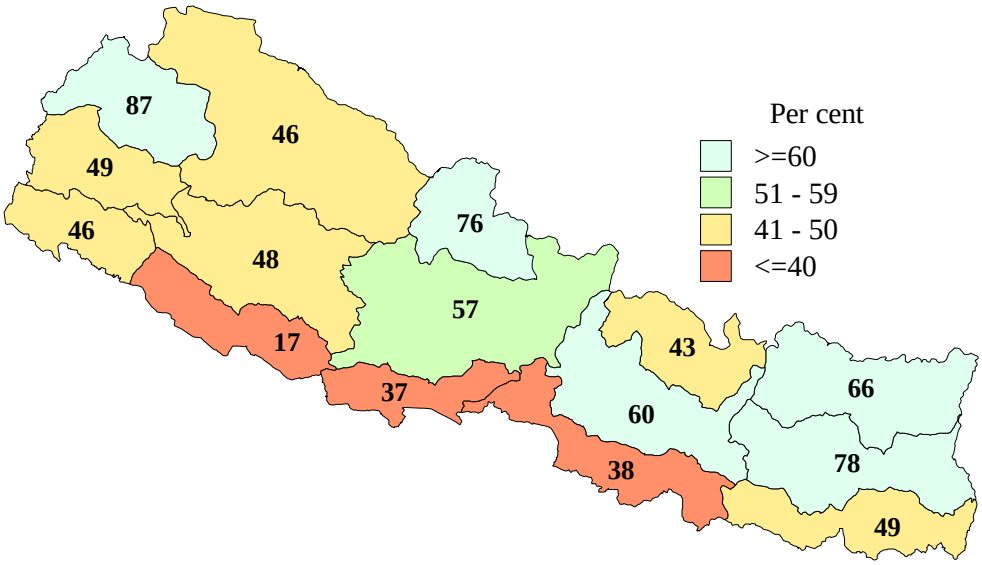


Fig. A5.12 Proportion of women with health problems during labour

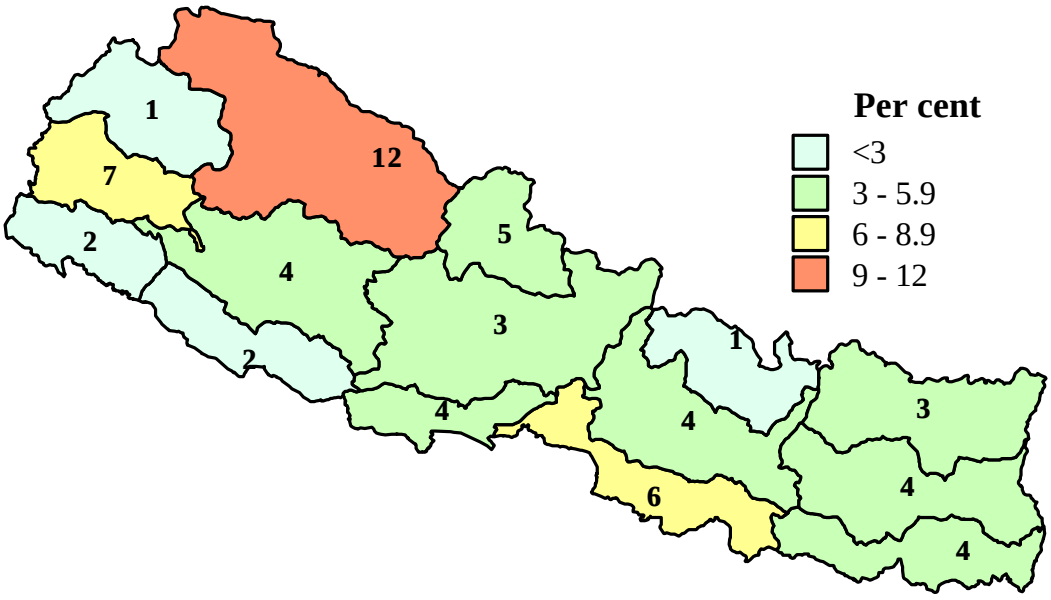


Table A5.8 Key indicators on delivery outcome by geographic location

Location	Proportion of women with small/very small baby	Proportion of women with baby that was still born, died soon after birth
Development regions		
Eastern	42 (607)	2.8 (40)
Central	26 (540)	2.9 (60)
Western	16 (491)	2.3 (72)
Mid-Western	15 (696)	2.5 (117)
Far-Western	19 (638)	1.7 (59)
Eco-zones		
Hills	22 (1332)	2.5 (151)
Terai	17 (1243)	2.3 (165)
Mountains	28 (397)	2.3 (32)
Urban / Rural split		
Urban	15 (367)	1.7 (41)
Rural	20 (2972)	2.3 (348)
Eco-development regions		
Eastern Hill	20 (214)	1.4 (15)
Eastern Terai	20 (411)	2.0 (43)
Eastern Mountain	5 (13)	0.4 (1)
Central Hill	21 (338)	2.0 (32)
Central Terai	10 (284)	2.9 (80)
Central Mountain	19 (74)	1.3 (5)
Western Hill	17 (353)	1.9 (40)
Western Terai	12 (114)	2.8 (28)
Western Mountain	31 (24)	5.2 (4)
Mid-Western Hill	21 (154)	4.1 (31)
Mid-Western Terai	25 (233)	1.3 (12)
Mid-Western Mountain	43 (153)	4.7 (17)
Far-Western Hill	48 (273)	5.8 (33)
Far-Western Terai	38 (201)	0.4 (2)
Far-Western Mountain	39 (133)	1.5 (5)
All Nepal	**18.6 (3339)**	**2.3 (389)**

Fig. A5.13 Proportion of low birth weight

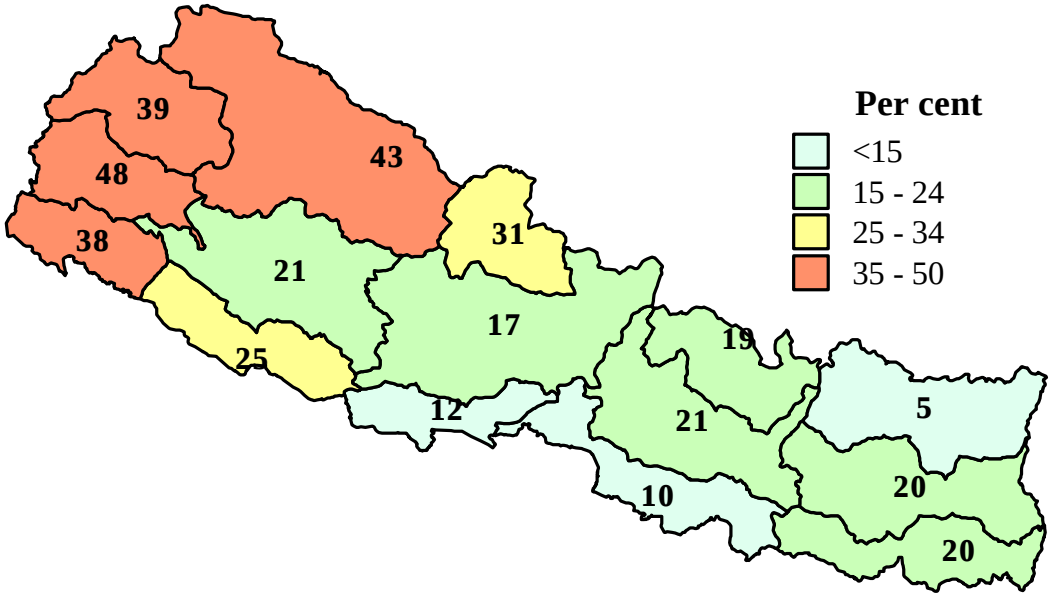
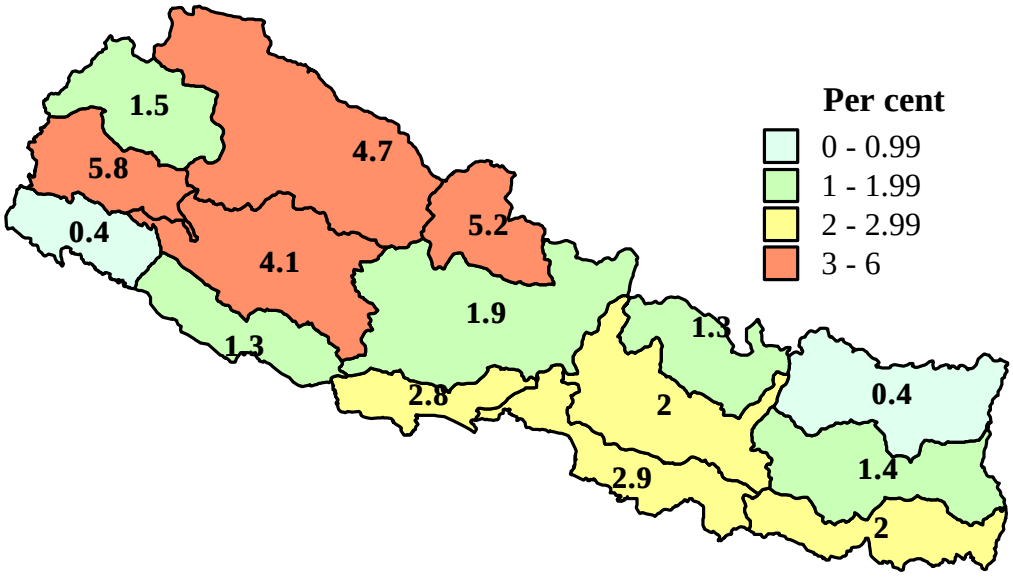
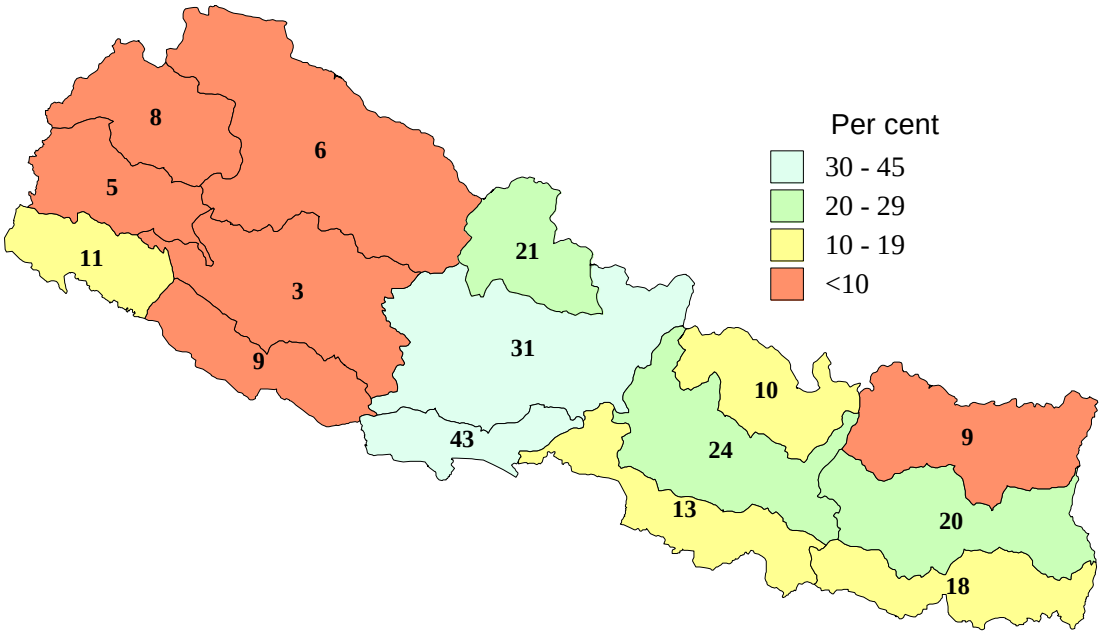


Fig. A5.14 Reported still birth and death soon after birth by ecoregion





Proportion of women having at least one antenatal visit