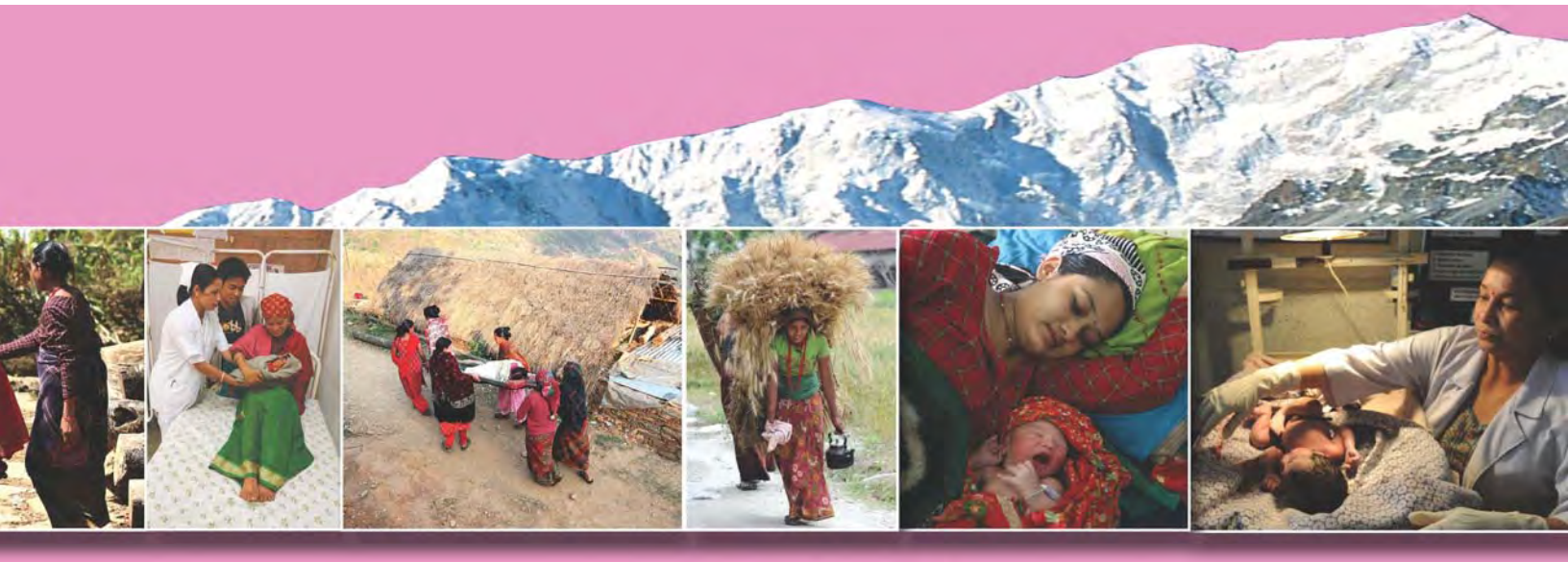

NEPAL

Maternal Mortality and Morbidity Study

2008/09

Summary of Preliminary Findings

This report summarizes preliminary key findings of the 2008/2009 Nepal Maternal Mortality and Morbidity Study (MMMS) which was implemented under the management of Family Health Division (FHD) of the Department of Health Services (DoHS), with technical support from Options UK, field implementation by New ERA, and research inputs from Centre for Research in Education Health and Population Activities (CREHPA). The study was funded by the United States Agency for International Development (USAID), through their partners Macro International and JHPIEGO, with additional support from the UK Department for International Development (DFID) through the Support to the Safe Motherhood Programme (SSMP). The opinions expressed herein are those of the authors and do not necessarily reflect the views of the donors.

Additional information about the MMMS may be obtained from:

Family Health Division, Department of Health Services, Government of Nepal; Teku, Kathmandu, Nepal.
Telephone: (977-1) 4262273, 4262155, Email: info@fhd.gov.np

Options Consultancy Services Ltd., 20-23 Grenville Street, London ECIN 855, United Kingdom.
Telephone: 44(0) 20-7430-1900; Email: info@options.co.uk

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KEY FINDINGS

- The overall **Maternal Mortality Ratio** (MMR) for the eight study districts is **229 per 100,000** live births, ranging from 153 to 301 by district. This is consistent with the 2006 Nepal Demographic and Health survey (NDHS) estimate of 281 per 100,000 live births.

- **MMR variations:** The MMR was lowest amongst women in their twenties, with increased risk for those aged under 20 and between 30-34. The figure for those aged over 35 was considerably higher (962 per 100,000 live births). There were also differences between ethnic groups, with higher rates among Muslims, Terai /Madhesi and Dalits.

- Maternal causes accounted for 93% of pregnancy related deaths, giving an overall **pregnancy related mortality ratio** of 247 per 100,000 live births and making this a good proxy indicator for maternal mortality.

- **Maternal causes** accounted for **11% of all deaths** of women of reproductive age, in third place by ICD-X chapter; down from 21% in 1998, when it was the leading cause by ICD-X chapter.

- There has been a dramatic increase in the contribution of **suicide (16%)** to deaths of women of reproductive age, compared with 10% in 1998. This makes it the leading single cause of death, whereas in 1998 it was third.

- **Direct causes accounted for 69%** of all maternal deaths and 31% were due to indirect causes. The proportion of direct deaths is considerably higher when only hospital deaths are considered (89% direct; 11% indirect).

- The percentage contribution of **haemorrhage (24%)** to maternal causes has been dramatically reduced, down from 41% in 1998. However, it remains the leading cause of maternal death, and the decline reflects a reduction in postpartum (from 37% to 19%), rather than antepartum.

- The **percentage contributions** of eclampsia, abortion related complications, gastroenteritis and anaemia to maternal causes have increased, while those from obstructed labour and puerperal sepsis have more than halved since 1998. Heart disease did not even feature in 1998, but now accounts for 7%.

- **Place:** There was an increase in the proportion of pregnancy related deaths occurring in a health facility, to 41%; with 40% occurring at home; and 14% in transit. In 1998 just 21% of deaths occurred in facilities and 67% at home.

- **Timing:** All non-maternal pregnancy related deaths occurred during the antepartum period. Many were unwanted pregnancies, suggesting the pregnancy status of the women may have placed them at greater risk. Of the maternal deaths, 39% occurred during the intrapartum period and up to 48 hours afterwards and 61% in the antepartum and postpartum periods suggest that interventions should focus more on this period.

- Over 80% of women who died from maternal causes were emergency admissions and in a **critical state on admission**: 18% died within four hours of arrival, 39% within the first twelve hours and 53% within the first 24 hours.

- **Supply side** factors contributing to poor maternal outcomes included continued use of practices which are not evidence based, lack of appropriate staff; lack of essential drugs; weak referral systems and lack of blood.

- **Community factors** contributing to poor maternal outcomes included delays in recognising the problem and deciding to seek care; long distances to a health facility; lack of finance and/or transport or time taken to make arrangements; seeking care from the informal sector; not being able to or not wanting to seek care alone or needing permission to seek care.

1. INTRODUCTION

This Maternal Mortality and Morbidity (MMM) study was carried out over the one-year period, 13 April 2008 to 13 April 2009, during which all deaths of women of reproductive age who were usual residents of eight districts of Nepal were identified and verbal autopsies carried out to determine the cause of death and contributory factors. All live births in these districts during the same period were also identified, enabling the calculation of a Maternal Mortality Ratio (MMR). In this summary report we share the main findings of the study from the data collected. Further details of methodologies, analysis and results can be found in the full report.

The authors would like to wholeheartedly acknowledge the contribution of all verbal autopsy respondents who, despite their profound grief after a death in the family, gave generously of their time. We would also like to thank all the district based staff, health workers and female community health volunteers who assisted so ably with the field work. The names that appear in the case studies are pseudonyms to protect their privacy.

1.1 Rationale for the Study

In 1998, as part of the determined focus on maternal mortality, the first MMM study was conducted in Nepal, to gain a better understanding of the causes of death of women of reproductive age, in particular those dying from maternal causes. At that time the MMR was estimated at 539 maternal deaths per 100,000 live births[1], and the report formed the basis of national safe motherhood programme interventions, planned and implemented by the Nepal government and national and international partners, aimed at reducing this unacceptably high figure.

The 2006 Nepal Demographic and Health Survey (NDHS, 2006) indicated a substantial reduction in the MMR, to 281 deaths per 100,000 live births, indicating a degree of success in safe motherhood efforts, but also generating a good deal of discussion and debate regarding levels of and factors affecting maternal mortality in Nepal. This 2008/09 MMM study was therefore initiated to further investigate the story behind the maternal mortality changes seen over the past 10 years, and to explore and identify contributory factors and their relative importance in different parts of the country. The study will inform policy makers and programme managers to help bolster and refocus the national effort to avert maternal deaths.

Mothers with their babies

[1] Nepal Family Health Survey, 1996

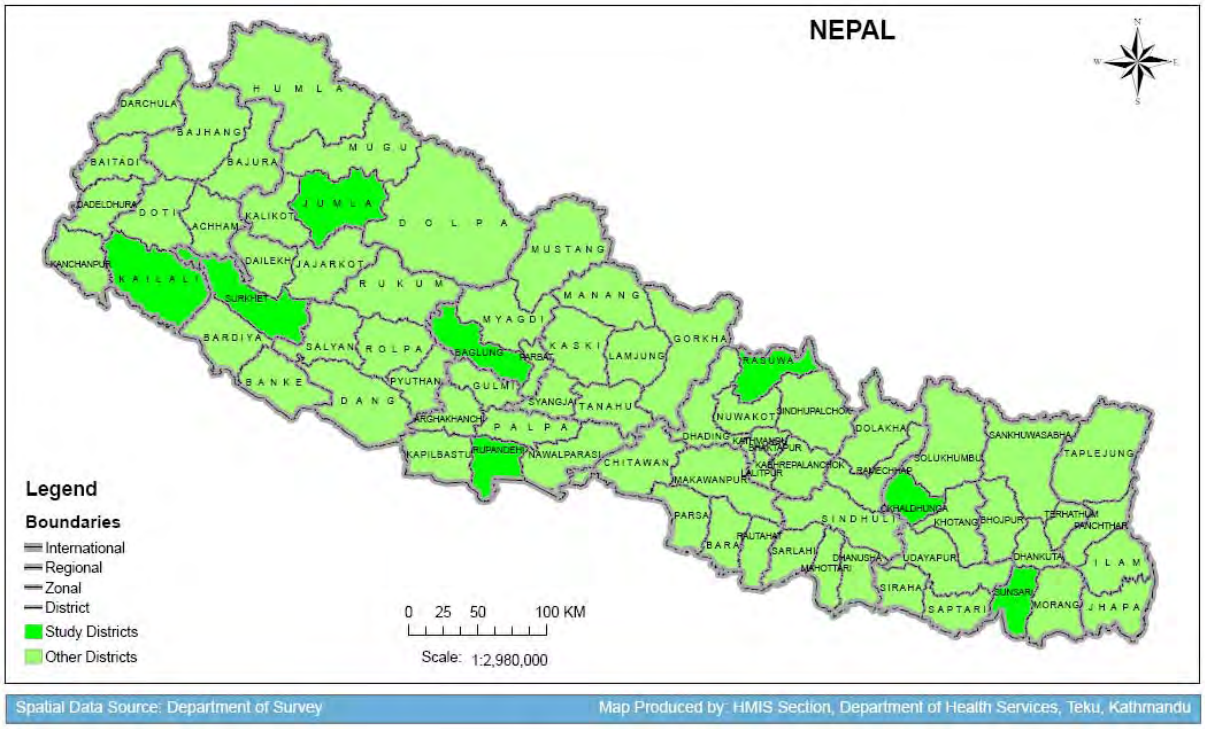
1.2 Study Objectives

- To increase the evidence base available on maternal mortality in Nepal to inform estimates of current levels of maternal mortality.
- To gain a better understanding of why women are dying during pregnancy, childbirth and the postpartum period, including social and clinical contributing factors.
- To identify factors that may have influenced levels of maternal mortality and morbidity in the past.
- To provide information to help identify interventions that may be successful at improving maternal mortality and morbidity in the future.

1.3 Study Area

The eight study districts were selected to ensure a balance of mountain, hill and Terai districts (minimum two from each), with representation from all five development regions (Figure 1). Three of the districts were included in the 1998 MMM study (Kailali; Rupandehi; Okhaldhunga) and the additional five were Surkhet; Jumla; Baglung; Rasuwa; Sunsari. The total population of the eight study districts is 3,298,319, comprising 12% of Nepal's population. All the selected districts have a high proportion of rural population (between 74% and 100%), and there is considerable ethnic variation within and between the districts.

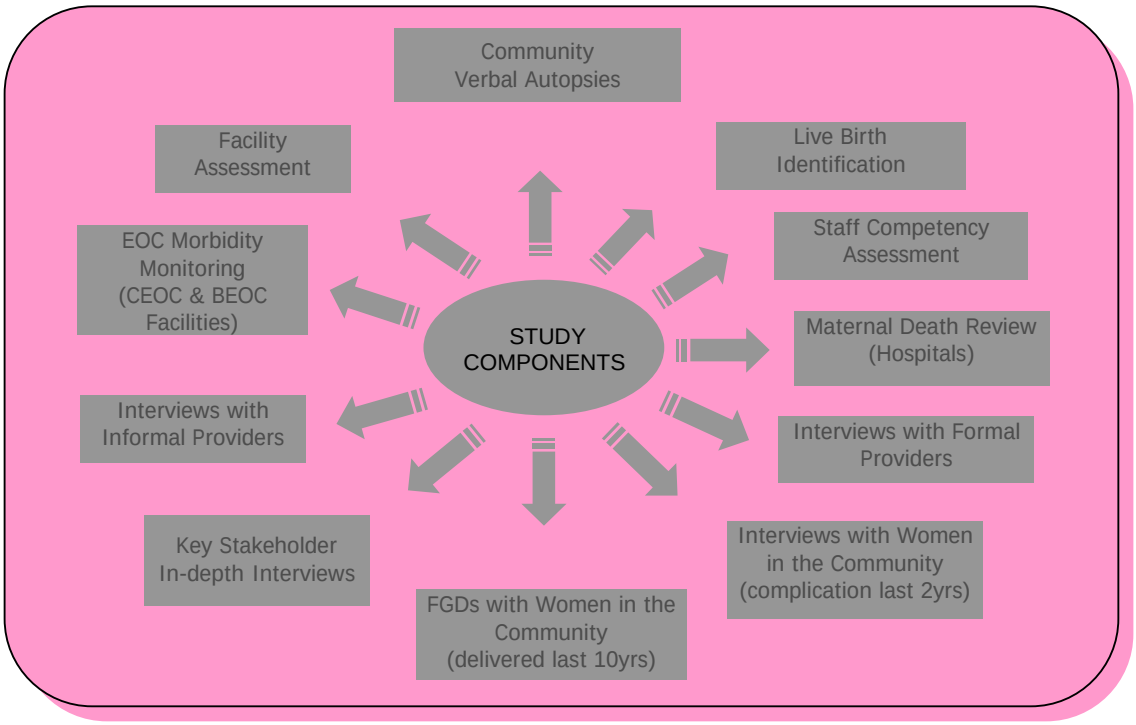
Figure 1: Map showing the location of the eight study districts



1.4 Methodology

Figure 2 shows the components of the study methodology, which covered both qualitative and quantitative aspects. Only three of these were used in 1998 study (community verbal autopsy; hospital maternal death review and Emergency Obstetric Care (EOC) morbidity recording).

Figure 2: Study components



1. A **community surveillance system** was used to identify all live births and all deaths during the study period, for women of reproductive age who were 'usual resident' in the study districts[2]. Pregnancy-related[3] deaths were verified in the districts, and required completion of a different verbal autopsy to non-pregnancy related deaths. Maternal deaths[4] were ascertained on the basis of cause of death, assigned in Kathmandu.

2. **Maternal Death Reviews** (MDR) were carried out for all maternal deaths that occurred in the hospitals in the study districts, to better understand contributory factors. These also included deaths of women not usually resident in the study districts, who might have been temporarily resident or referred in. The Family Health Division (FHD) had already introduced the standard MDR process in three of the hospitals and this study extended it into a further ten.

3. Rapid **facility and staff competency assessments** were carried out by three obstetricians and two midwives in 43 selected facilities (public, private and NGO) to examine the capacity of facilities, staff availability, quality of services and the knowledge, competencies and practice of providers. The competency of 83 staff was assessed, including both trained staff and those who were not trained but were providing maternal and child health services in the community.

[2] Classified as having lived there for the last six months.
[3] The Tenth Revision of the International Classification of Diseases (ICD-X) defines a pregnancy-related death as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death".
[4] ICD-X defines a maternal death as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes".

4. **EOC monitoring** was carried out using a maternity register aggregated into a monthly tally sheet, enabling calculation of UN process indicators (proportion of births in EOC facilities; met need for treatment of direct life-threatening obstetric complications; caesarean section rates; case fatality rates) and levels of maternal morbidities. FHD had already introduced EOC monitoring in four CEOC and three BEOC sites in the study districts and the study added a further 23 facilities, providing training for staff.

5. Five **qualitative components** were included, using in-depth interviews and focus group discussions to gather information on care seeking behaviour during pregnancy, delivery and postpartum period; socio-cultural practices; quality of care; barriers and challenges in providing and seeking care; and changes over the past ten years. In-depth interviews were carried out with: (1) formal health service providers from selected facilities; (2) informal birth attendants (attended at least five deliveries in last ten years); (3) key stakeholders at district and central level; (4) women who had complications during antepartum, intrapartum or postpartum periods in the last two years. The fifth component was focus group discussions carried out with women who had delivered in the last 10 years.

Service provider recording obstetric morbidity

District coordinator, Surkhet, taking verbal autopsy

2. FINDINGS

2.1 Number of Deaths among Women of Reproductive Age

2.1.1 Current levels of all-cause mortality

This study identified 1,496 deaths in a total population of 861,312 Women of Reproductive Age (WRA), giving a total death rate of 174 per 100,000 WRA. The death rate varied by district, as shown in Table 1, with the lowest recorded in Baglung (120) and Okhaldhunga (138) and the highest in Kailali (219) and Jumla (310). The non-pregnancy related death rate was 154 per 100,000 WRA, with variation between districts similar to that for all deaths.

Table 1: Levels of all-cause mortality among women of reproductive age

District	Number of WRA (15-49 yrs)	Number of WRA deaths	Number of non-pregnancy related deaths of WRA	Total death rate per 100,000 WRA	Non-pregnancy related death rate per 100,000 WRA
Sunsari	199,080	327	300	164	151
Rupandehi	216,795	340	290	157	134
Kailali	190,635	417	370	219	194
Okhaldhunga	44,360	61	56	138	126
Baglung	82,993	100	89	120	107
Surkhet	89,161	153	134	172	150
Rasuwa	12,451	18	15	145	120
Jumla	25,837	80	70	310	271
Total	**861,312**	**1,496**	**1,324**	**174**	**154**

2.1.2 Current levels of maternal mortality

The overall MMR for the eight districts was found to be **229 per 100,000** live births, ranging from 153 in Okhaldhunga to 301 in Rasuwa (Table 2). Maternal deaths accounted for 93% of pregnancy related deaths, so that the pregnancy related mortality ratio only slightly higher at 247 per 100,000 live births, making this a good proxy indicator for maternal mortality. Just over one in ten deaths (11%) among women of reproductive age were due to maternal causes, making it the third major cause of death, an improvement on the 1998 study, in which maternal deaths were the leading cause of WRA deaths, accounting for one in five (21%).

This MMR result is consistent with the 2006 NDHS figure of 281 deaths per 100,000 live births. Although this MMM study only covered eight districts, they were chosen to reflect the diversity across Nepal and it is anticipated that a national estimate modelled using these data[5] would fall within a similar range to the NDHS, although the NDHS was based on an earlier reference period (1999-2005); had a smaller sample size; was a national estimate; used the direct sisterhood method; and measured pregnancy related rather than maternal deaths. The 2008/09 MMM study results for pregnancy related mortality ratio (247) and MMR (229) both fall within the NDHS 95% confidence interval of 178-384, supporting the NDHS estimates. The findings are in stark contrast to the much higher revised and unpublished 2005 World Health Organisation figure of 670 per 100,000 live births.

[5] Planned for 2010

Table 2: Maternal mortality by district

District	Number of deaths of WRA (15-49 yrs)	Number of pregnancy related deaths	Number of maternal deaths	Number of live births	% of deaths of WRA that are maternal	% of pregnancy related deaths that are maternal	MMR (per 100,000 live births)
Sunsari	327	27	25	13,826	7.6	92.6	181
Rupandehi	340	50	47	17,165	13.8	94.0	274
Kailali	417	47	43	16,331	10.3	91.5	263
Okhaldhunga	61	5	5	3,268	8.2	100.0	153
Baglung	100	11	11	6,075	11.0	100.0	181
Surkhet	153	19	17	8,839	11.1	89.5	192
Rasuwa	18	3	3	996	16.7	100.0	301
Jumla	80	10	9	3,275	11.3	90.0	275
Total	**1,496**	**172**	**160**	**69,775**	**10.7**	**93.0**	**229**

2.1.3 Maternal mortality ratio by age and ethnicity

The MMR was found to vary considerably by age, with the lowest risk amongst women in their twenties, an increased risk for those aged under 20 and between 30-34, and a dramatically increased risk for those aged over 35 (962 per 100,000 live births). There were also differences between ethnic groups, with higher rates among Muslims, Terai/Madhesi and Dalits.

Table 3: Variation in MMR by age and ethnicity

	Number of maternal deaths	Number of live births	MMR
Age group			
< 20	23	7,744	297
20-24	37	30,996	119
25-29	38	19,851	191
30-34	23	7,128	323
35+	39	4,056	962
Caste / Ethnicity			
Muslim	14	4,405	318
Terai / Madhesi / Other Caste	29	9,455	307
Dalits	34	12,475	273
Janjati	43	20,823	207
Brahman / Chhetri	39	21,424	182
Newar	1	954	105
Other	0	239	0
Total	**160**	**69,775**	**229**

2.2 Causes of Deaths of Women of Reproductive Age

2.2.1 All causes

There have been substantial changes in categories of deaths by ICD-X chapter since the 1998 study. Among the 1,496 women of reproductive age who died in the study districts during the study period, the leading cause of death by ICD-X chapter was "External causes of morbidity and

mortality"[6] (25%), which in 1998 was ranked second (13%). This change was largely due to the increase in suicides. The second largest cause was "Symptoms signs and abnormal clinical and laboratory findings not elsewhere classified"[7] (12%), which in 1998 was ranked twelfth. Pregnancy, childbirth and the puerperium was third (11%), which in 1998 was the leading cause at 21%. There was some variation between the districts, with higher levels of respiratory system related deaths in Rasuwa and Jumla (mountain districts with very cold winters) and those due to disease of the nervous system higher in Okhaldhunga. Injury, poisoning and other consequences were found to be very high in Baglung.

Table 4: Cause of death by ICD-X chapter for all deaths of women of reproductive age: Comparison between 1998 and 2008/09

ICD-X Chapter	ICD-X Chapter Heading	1998		2008 / 09	
		(%)	Rank	(%)	Rank
I	Certain infectious and parasitic diseases	9.1	4	10.4	5
II	Neoplasms	5.9	6	10.6	4
III	Disease of the blood and blood forming organ	2.7	11	1.0	14
IV	Endocrine, nutritional and metabolic diseases	0.3	13	1.3	12
V	Mental and behaviour disorders	-	-	1.2	13
VI	Diseases of the nervous system	8.9	5	3.9	8
IX	Diseases of circulatory system	2.8	9	8.0	6
X	Diseases of the respiratory system	4.7	8	6.1	7
XI	Diseases of the digestive system	10.3	3	2.9	10
XII	Diseases of the skin and sub-cetaceous tissue	0.3	13	0.5	15
XIII	Diseases of the musculoskeletal system and connective tissue	0.2	15	0.3	16
XIV	Diseases of the genitourinary System	2.8	9	2.3	11
XV	Pregnancy, childbirth and puerperium	20.6	1	10.7	3
XVIII	Symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified	1.9	12	11.9	2
XIX	Injury, poisoning and certain other consequences of external causes	4.8	7	3.9	8
XX	External causes of morbidity and mortality	13.0	2	25.1	1
Unknown		11.7	-	-	-
Total (n)		**640**		**1,496**	

Table 5 shows the top twenty single causes of WRA deaths during the study period. Suicide was far in the lead, accounting for 16% of deaths, with the second leading cause, accident, accounting for 9%. Haemorrhage and eclampsia were the only maternal causes featuring, at 2.5% and 2.3% respectively, ranked eleventh and twelfth. This suggests that, despite improvements over the last decade, at least in management of post-partum haemorrhage, these complications still need focused attention.

[6] Includes intentional self harm (suicide) and motor accidents, falls, injury by projectile or explosion.
[7] Includes abnormalities of unknown origin, such as abdominal pain, abnormal heartbeat, blood pressure, nausea, fever.

Table 5: Top twenty leading single causes of death of women of reproductive age

Ranking	ICD-X three digit Code	ICD-X Code heading	Number	Percent
1	X68, X70, X71, X76, X84	Suicide	240	16.0
2	S09, S39, T14, V89, W13, W14, W17, W19, W29, W74, W86, X00, X08, X33, X36, X44	Accidents	135	9.0
3	A15, A16, A18 A19	Tuberculosis	76	5.1
4	C55	Malignant neoplasm of uterus, part unspecified	59	3.9
5	R50	Fever of unknown origin	58	3.9
6	J44	Other chronic obstructive pulmonary disease	57	3.8
7	I64	Stroke, not specified as haemorrhage or infarction	50	3.3
8	R10	Abdominal and pelvic pain	42	2.8
9	A09	Diarrhoea & gastroenteritis of presumed infectious origin	41	2.7
9	I09, I10, I50, I51	Heart disease	41	2.7
11	O46, O72	Haemorrhage (antepartum and postpartum)	37	2.5
12	O15	Eclampsia	35	2.3
12	R17	Unspecified Jaundice	34	2.3
14	N19	Unspecified renal failure	31	2.1
15	O99	Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the peurperium	28	1.9
16	T63	Toxic effect of contact with venomous animals	27	1.8
17	K74	Fibrosis and cirrhosis of liver	25	1.7
18	I27	Other pulmonary heart diseases	23	1.5
18	J18	Pneumonia, organism unspecified	23	1.5
18	O98	Maternal infectious & parasitic diseases	23	1.5

2.2.2 Suicide

The shocking finding that suicide was reported as the leading cause of WRA deaths (16%), a steep increase from 1998, when it was ranked third (10%), highlights the urgent need to address this issue, which has received little attention since its significance was first noted in 1998. Research is needed to improve understanding of the circumstances and contributory factors of these tragic events, to guide interventions. Analysis of verbal autopsy data indicates mental health problems, relationships, marriage and family issues are key factors. It is also noteworthy that 21% of the suicides were young women, aged 18 years and under, indicating that youth is a factor to be investigated.

Case study: Suicide of a pregnant woman

Sanju was a 21 years old, illiterate and mother of two children. By her third pregnancy she was anaemic and malnourished, feeling dizzy and weak, but she received no antenatal care. In her third month of pregnancy she was about to travel to her maternal home with her husband, but her relatives stopped her as there was a flood. She went to her room to rest, but when her mother-in-law went to her room an hour later she said she had eaten some medicine for killing lice. Her husband, mother-in-law and neighbour took her to the local medicine shop in their cart, and the pharmacist immediately referred her to the district hospital. The family borrowed money and took her to hospital in a private van, a 25 minute journey. She was admitted to the emergency ward and attended to by the doctor immediately, but died within a few hours.

The above account was given by her mother-in-law. However, the female community health volunteer said Sanju suffered from hysteria and was being forced to have an illicit relationship with her father-in-law. She was treated for her hysteria but forced to continue the relationship, and therefore was tense. The FCHV and VHW felt this may have been the reason she committed suicide.

2.2.3 Maternal causes

Ranking of maternal causes of death varied among the districts: they were the second leading cause by ICD-X chapter in Rasuwa (17%); third in three districts (Rupandehi, 14%; Baglung, 11%; Surkhet, 11%); fourth in Okhaldhunga (8%); fifth in Kailali and Jumla (10% and 11%); and sixth in Sunsari (8%).

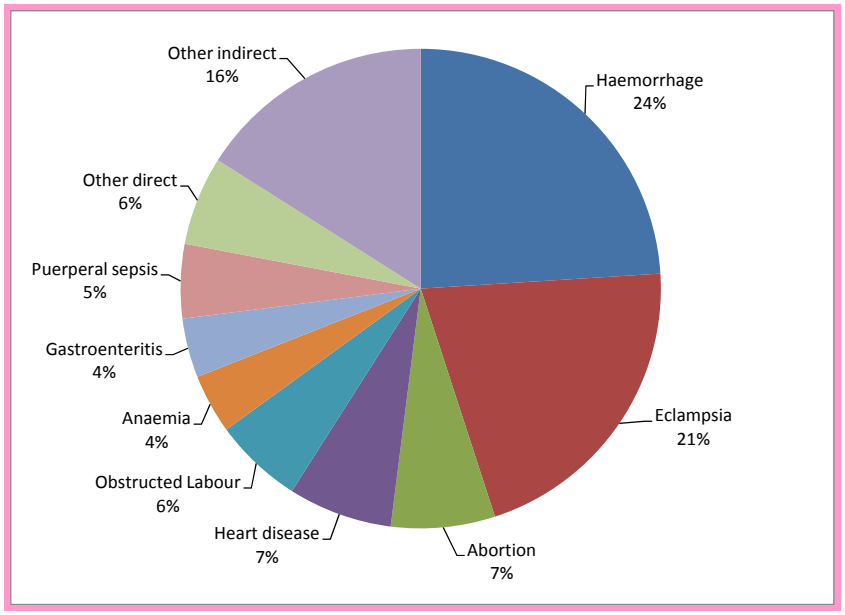
Overall, 69% of maternal deaths were due to direct causes and 31% to indirect, compared with 80% and 20% respectively in 1998. Omitting Rasuwa, Jumla and Okhaldhunga, where sample sizes were very small, the percentage of direct causes of death ranged from 63% in Kailali to 73% in Baglung.

Table 6: Comparison of direct and indirect maternal causes of death

	Direct		Indirect		Total Number
	No.	%	No.	%	
Sunsari	17	68.0	8	32.0	25
Rupandehi	32	68.1	15	31.9	47
Kailali	27	62.8	16	37.2	43
Okhaldhunga	4	80.0	1	20.0	5
Baglung	8	72.7	3	27.3	11
Surkhet	11	64.7	6	35.3	17
Rasuwa	3	100.0	0	0.0	3
Jumla	8	88.9	1	11.1	9
Total	**110**	**68.8**	**50**	**31.3**	**160**

Haemorrhage remains the leading direct cause of maternal deaths, but with a reduced percentage contribution, at 24%, compared with 41% in 1998. This reflects a reduction in postpartum (PPH), down to 19% from 37%, rather than antepartum (APH). Eclampsia was the second leading direct cause (21%, increased from 11% in 1998); complications related to abortion third (7%, increased from 4% in 1998), with half due to induced and half to spontaneous abortions. Other direct causes included obstructed labour (6%, down from 13% in 1998), puerperal sepsis (5%, down from 11% in 1998).

Figure 3: Causes of maternal deaths



The leading indirect maternal cause of death was heart disease, at 7%, which did not feature at all in 1998; followed by anaemia (4%, up from 3% in 1998) and gastroenteritis (4%, up from 2% in 1998). Others were hepatitis; pneumonia; septicaemia; typhoid; epilepsy; malaria; renal failure; HIV/AIDS; tetanus; tuberculosis; severe dehydration; rabies; and pulmonary oedema.

2.3 Timing of Pregnancy Related Deaths

All non-maternal pregnancy related deaths occurred during, rather than immediately after, pregnancy. Although these are technically not included in maternal causes, with the exception of snake bite and lightening, the pregnancy status of the women may have placed them at greater risk of dying from suicide, homicide, and accidental fall, especially if the pregnancy was unwanted. In four cases the verbal autopsy respondents stated the pregnancy was unwanted (homicide by husband and three suicide) and in two they were uncertain (homicide by parents and accidental fall).

More of the maternal deaths occurred in the antepartum period (34%); compared with the intrapartum period and up to 48 hours afterwards (39%, with 32% occurring in the first 24 hours); and postpartum period (28%). A previous estimate that two-thirds of maternal deaths occur in the intrapartum period through to 48 hours after delivery and in late pregnancy (Berhane et al, 2000) was evidence for focusing the skilled birth attendance policy on this period. However, these MMM study data indicate that in fact 61% of deaths occurred in the antepartum and postpartum (48 hrs. to 42 days) periods, suggesting that current policies and interventions need refocusing to address these periods adequately.

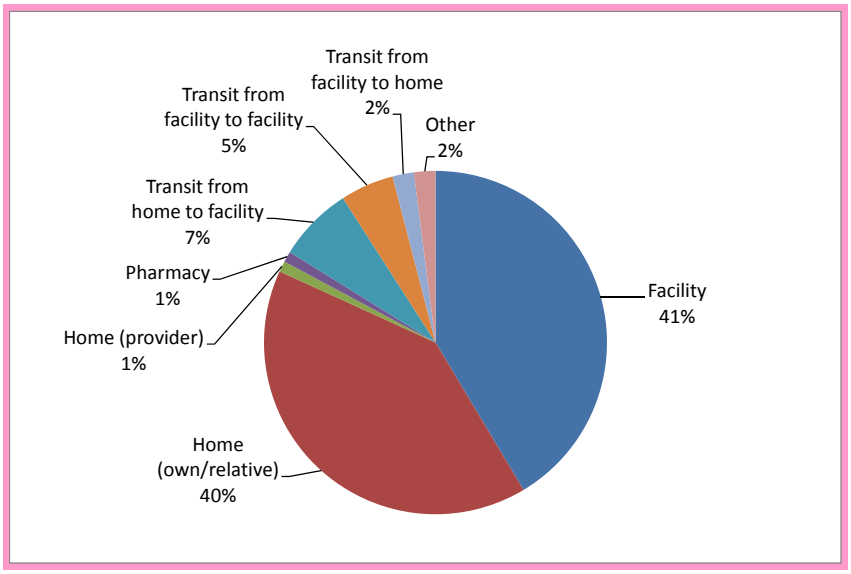
Table 7: Timing of pregnancy related deaths by district

	Maternal Deaths						
	Ante-partum	Intrapartum (up to 24hrs postpartum)	Early postpartum (24- 48 hrs postpartum)	Postpartum (> 48 hrs – 42 days)	Total	Un-known*	Accidental/ Incidental *
Sunsari	8	6	1	10	25		2
Rupandehi	18	15	3	11	47	1	2
Kailali	17	13	3	10	43		4
Okhaldhunga	2	1	0	2	5		
Baglung	4	3	1	3	11		
Surkhet	3	6	1	7	17		2
Rasuwa	1	2	0	0	3		
Jumla	1	6	1	1	9		1
TOTAL	**54**	**52**	**10**	**44**	**160**	**1**	**11**
% maternal	33.8	32.5	6.2	27.5	100.0		
* All Unknown and Accidental/ Incidental deaths occurred during the antepartum period.							

2.4 Place of Pregnancy Related Deaths

Figure 4 shows that 41% of the pregnancy related deaths occurred in a facility (increased from 21% in 1998); 40% at the home of the deceased or a relative (compared with 67% in 1998); and 14% in transit to or from a facility (compared with 11% in 1998). Of those who died in a facility, 46% were in a public facility. This shows that more women are going to a facility when they have complications, but often too late.

Figure 4: Place of pregnancy related deaths



2.4.1 Hospital deaths

A total of 57 maternal deaths were identified in hospitals (through the MDR process) within the study catchment area, giving an overall hospital based MMR of 267 per 100,000 live births. In the EOC facilities the overall MMR was 218 per 100,000 live births (calculated from EOC monitoring data). For direct causes only, the MMR was 14 per 100,000 live births. There is a good deal of district variation, but the sample sizes are too small to make robust district level comparisons.

Table 8: Hospital maternal deaths by district

	Number of maternal deaths	Number of live births	MMR (per 100,000 live births)
Sunsari	18	6,948	259
Rupandehi	21	8,246	255
Kailali	13	2,802	464
Okhaldhunga	2	248	806
Baglung	0	934	0
Surkhet	3	1,794	167
Rasuwa	0	36	0
Jumla	0	337	0
N	**57**	**21,345**	**267**

2.5 Supply Side Factors

2.5.1 Delays at the facility

Communities and providers agreed on the three main delays at facilities that may lead to maternal death, although the order differed slightly. These were (1) inability to treat the problem at the facility where she died; (2) inability to treat the problem at the previous (referring) facility; (3) inadequate clinical expertise. Lack of transport from the referring facility and lack of blood were perceived delay by providers. In 1998 providers identified lack of blood as an avoidable factor in 19% of facility based deaths, but this had dropped to 12% in 2008/09. Table 9 shows the perceptions of communities about delays at facilities contributing to maternal deaths, based on verbal autopsies, compared with perceptions of service providers, based on hospital MDRs. It should be noted that this means provider perspectives are based on hospitals included in the MDR process only, but community perceptions cover all deaths in facilities.

Table 9: Perceptions of facility delays related to hospital maternal deaths

Delays	Verbal autopsy respondents' perception of delays faced at facilities for all maternal deaths		Providers' perception of delays faced at facilities for hospital based maternal deaths	
	Number	%	Number	%
Inability to treat problem at previous facility	9	12.7	11	19.3
Inability to treat problem at this facility	13	18.3	14	24.6
Lack of blood	3	4.4	7	12.3
Inadequate clinical expertise	7	9.9	8	14.0
Delay in receiving treatment on admission	2	2.8	5	8.8
Lack of transport from referring facility	1	1.4	11	19.3
Shortage of personnel	4	5.6	3	5.3
Poor communication between facilities	1	1.4	3	5.3
Inadequate equipment	1	1.4	5	8.8
Shortage of female personnel	1	1.4	1	1.8
Lack of essential drugs	1	1.4	3	5.3
N	**71**		**57**	

"… She could have been saved if doctors had attended and treated her immediately when she was taken to the emergency ward. It's a shame that such a big hospital had no doctors in the emergency ward. My wife died of facility's negligence. I will never recommend anyone to go to the medical college again…". - Verbal autopsy respondent

"… She had obstructed labour, we arranged blood as advised by the doctor and she delivered a healthy baby by caesarean section. But she developed chest pain, restlessness and started taking out all the stitches which led to bleeding from the operation site. We could not get additional blood as there was no electricity and the generator was not working. The oxygen supply also did not work properly. We could manage blood only after about four hours. She could have been saved if blood transfusion was done on time…". - Verbal autopsy respondent

2.5.2 Referral

Significant shortcomings were identified in the referral system. Service providers acknowledged that sometimes patients were not referred quickly enough to an appropriate facility and there is insufficient communication between facilities to ensure prompt and appropriate treatment at the referral facility, or to provide capacity building feedback to referring facilities. Other major factors included lack of transport, lack of support and awareness of the patient's needs, not using a referral slip or providing incomplete information on the slip. Providers specifically identified lack of transport and poor communication with the referral centre as a key contributory factor in 19% of maternal deaths.

"…..When a case is referred to the regional hospital, they should give feedback to the referring institution about what happened to the patient. However, it is not done in practice. There is only one way referral system, but it should be a two way system. This is very important. …..." - Service provider, Surkhet

The facility assessments show that 93% of the assessed hospitals have a telephone and 50% have a telephone in the delivery ward. This was lower in government hospitals (88% and 38% respectively). Ambulances were more likely to be available at government hospitals; 88% have one compared with only 67% of non-government hospitals and 13% of Primary Health Care Centres (PHCC).

A pregnant woman being taken to a facility

A few instances were found where referral systems seemed to be working well, with doctors informed by phone before referral, transport arranged and staff accompanying the woman to the referral centre.

From the verbal autopsies it was reported that delays were often due to women being taken to an inappropriate facility first, with time lost in referring her to a higher facility, and that higher facilities often lacked rapid response mechanisms to ensure effective management of cases that arrive late and in a serious condition.

2.5.3 Analysis of hospital deaths

According to MDR data, the leading cause of maternal death at hospitals was eclampsia, accounting for nearly a third (30%). Haemorrhage was the second leading cause (19%, of which 9% were APH and 11% PPH). Complications of induced abortion accounted for 12% of hospital deaths.

Over 80% of the women who died were emergency admissions and in a critical state on arrival: 18% died within four hours of admission, 39%within 12 hours and 53% within 24 hours. This indicates that delays in deciding to seek care and/ or getting to the facility were important contributory factors.

Table 10: Causes of hospital maternal deaths

	Number	%
Direct Cause	*51*	89.5
Eclampsia	17	29.8
Haemorrhage	11	19.3
Ante partum Haemorrhage	*5*	8.8
Postpartum Haemorrhage	*6*	10.5
Complications related to induced abortion	7	12.3
Puerperal Sepsis	4	7.0
Ruptured Uterus	3	5.3
Inversion of uterus	1	1.8
Obstructed Labour	2	3.5
Retained Placenta	1	1.8
Pulmonary Embolism	1	1.8
Disruption of caesarean section wound	1	1.8
Molar tissue embolism	1	1.8
Hydatiform mole	2	3.5
Indirect Cause	*6*	10.5
Anaemia	1	1.8
Heart disease	3	5.3
Pulmonary oedema	1	1.8
Septicaemia	1	1.8
N	**57**	

Eclampsia

The contribution of eclampsia as a direct cause of maternal death in facilities has increased to 30%. However, according to EOC monitoring data, it accounts for a relatively small proportion of complications (6%) in the EOC facilities, indicating shortcomings in management of these cases. During the staff competency assessments, it was noted that only 57% of providers were confident of managing pre-eclampsia and slightly fewer (51%) eclampsia. In the facility assessments, 75% of government and 83% of non-government hospitals reported routinely using magnesium sulphate for managing eclampsia, but 12% of government and 17% of non-government hospitals reported never having used it. It should be noted that the incidence of eclampsia was found to be much higher in the Terai, while it was quite rare in the hill and mountain districts, so service providers in these districts may not have been exposed to many cases.

All the government hospitals, 83% of non-government hospitals and 31% of PHCCs assessed had magnesium sulphate in stock at the time of the survey, but a quarter of government hospitals, 17% of non-government hospitals and 31% of PHCCs reported having been out of stock for periods of more than two weeks in the last 12 months.

Haemorrhage

Despite a decline in the percentage of deaths due to haemorrhage, it remains a leading cause of hospital deaths, accounting for the largest percentage of hospital complications (27%, up from 25% in 1998). Almost all facilities report routinely giving oxytocic drugs to the mother after delivery and 55% of staff had received training in management of PPH. However, overall only 40% of providers were assessed as having correct knowledge about management of PPH, with first line providers, medical officers, staff nurses and Auxiliary Nurse Midwives (ANM), scoring 64%, 41% and 31% respectively. This suggests that all cadres need refresher training or additional support, and improvements are needed in the training to ensure they are able to manage this critical condition effectively.

Retained Placenta

The overall case rate for retained placenta in the EOC facilities (from EOC monitoring data) was 13 per 1,000 births, with huge variation between the districts, from Rasuwa (108 per 1,000) and Jumla (102 per 1,000) to Sunsari and Surkhet, at two and five per 1,000 births respectively.

Manual removal of placenta was carried out in all the hospitals and PHCCs assessed in Kailali, Okhaldhunga, Surkhet, Rasuwa and Jumla, but in only one third of those in Sunsari, two thirds in Baglung and 87% in Rupandehi. Overall 53% of staff assessed had received training for this procedure and performed the steps confidently, but 66% of staffs were not able to perform manual vacuum aspiration for retained products which is a key skill.

Obstructed Labour

Despite accounting for 40% of complications in EOC facilities, the contribution of obstructed labour to hospital maternal deaths was lower in this study than in 1998 (4% compared with 13%). The highest rates were in Rasuwa at 189 per 1,000 births, Surkhet (131) and Rupandehi (126), and the lowest in Baglung (15).

During facility assessments, most government hospitals reported routinely using the partograph for management of labour, compared with half of PHCCs and only a third of non-government hospitals. Staff knowledge and competency assessments indicated over 70% of providers had correct knowledge of foetal and maternal monitoring, but only 27% performed correctly on progress of labour and 29% on appropriate decision making when the partograph indicates problems with the progress of labour.

Case study: Maternal death due to obstructed labour

Man Rupa Thapa, aged 31, had five live births, of which two died immediately after birth. All her labours were prolonged but the deliveries were normal. She was quiet natured and never complained of any health problems.

She went for one antenatal check up with a maternal and child health worker at an outreach clinic in the third month. Despite her being anaemic and malnourished, the pregnancy progressed normally. Her labour started at about 11 in the morning but after 12 hours she had not delivered. Her husband wanted to take her to the nearby sub health post, but she herself and her maternal parents objected saying "all previous deliveries were prolonged so there was no problem and it would cost much". Her husband says "I had enough money and tried to convince them but no one listened to me so I could not force them". He called the traditional birth attendant to help. He added "she discharged only a little water and nothing else but she cried a lot complaining of severe pain". One of the relatives attending her says "by abdominal palpation, I felt the baby had moved to the right side". She died at about five in the morning. When the baby was taken out of her womb before she was buried, it was big and healthy but the position was not normal. The transverse position had caused obstructed labour.

Abortion

As the third highest direct cause of maternal death, the percentage contribution of abortion (induced and spontaneous) to hospital deaths was also higher (14%, up from 10% in 1998). The majority were from induced abortion (12%) compared with 2% spontaneous. However the percentage of complications which were abortion related was significantly lower, at 28%, compared with 54% in 1998. This indicates that fewer abortion complications are presenting at facilities, but they are more serious, and/or their management needs to be improved.

A total of 1,515 abortion complication cases (spontaneous and induced) were recorded in the EOC facilities, 54% managed by Manual Vacuum Aspiration (MVA) and 46% by Dilation and Curettage (D&C). On average, 38% of all government hospitals reported routinely managing abortion complications by D&C, but at non-government hospitals this figure was 67%. All the government hospitals assessed had MVA sets in stock but only 67% of non-government hospitals and 50% of PHCCs did. Since MVA is the method of first choice[8], these results highlight important gaps in provision of evidence based care.

Case study: Maternal death due to induced abortion

Sumitra was a 36 year old, literate, mother of five. This was her tenth pregnancy, four of which she had terminated. In the third month of this pregnancy she went to an ANM at a local medicine shop for an induced abortion, without informing her family. Later she developed severe abdominal pain and began losing weight. Four days after her attempted termination her daughter took her to a family planning clinic. The scan did not show any complications so the doctor advised her to rest at home.

After 17 days she developed severe abdominal pain. Since it was midnight, and an ambulance would charge more, her relatives waited, arranging for an ambulance to take her to a nursing home at 8.00 am. She was admitted to the emergency ward, but the doctor said her condition was not serious. However a blood test report at about 3pm showed she had septicaemia. She was operated for removal of uterus. After the operation she regained consciousness but was unable to speak. She died of septic shock at around 4pm, 24 days after her termination attempt.

Puerperal sepsis

Although the percentage of maternal deaths due to sepsis was lower than in 1998, the contribution to all (not just direct maternal) hospital deaths was higher (9%) than in 1998 (3%). The overall rate for puerperal sepsis in the EOC facilities was 3 per 1,000 births, with no cases in Rasuwa or Baglung and the highest rate in Jumla, at 11 per 1,000 births. During competency assessments, only 54% of providers reported they were confident in managing shock from sepsis.

2.5.4 Availability of services

It was found that in practice many of the EOC sites assessed do not offer all the designated services. Of 10 sites supposed to provide CEOC services, only nine were fully functional (one regional hospital (Surkhet), three zonal hospitals (Baglung; Rupandehi; Kailali) and five of the non-government facilities). Neither of the two mountain districts (Rasuwa and Jumla) had CEOC services. Thirteen facilities were supposed to provide BEOC services, but only seven were fully functional.

[8] WHO, 2003. *Safe abortion: Technical and policy guidance for health systems.* WHO: Geneva, Switzerland.

In general the availability of obstetric services varied considerably among the study districts, with a larger proportion of facilities in the Terai districts providing obstetric services than in hill and mountain districts. Rupandehi was found to be the best served and Rasuwa the worst. None of the facilities assessed in Rasuwa provided post abortion care (MVA) services and in other districts the proportion of facilities providing this service ranged from 33% in Baglung to 100% in Kailali and Surkhet.

There was an operating theatre in 79% of the hospitals assessed, but caesarean section was only available in 71% and blood transfusion in 64%, so that not all facilities with operating theatres were carrying out caesarean sections and not all of these had blood transfusion services. For instance, the district hospital in Jumla, had a well equipped operating theatre but was not providing caesarean sections due to lack of a surgically skilled doctor.

Availability of 24-hour delivery services was also limited, especially in mountain/hill districts.

"… According to the government rule health workers are there only from 10 to 4. For the remaining time there isn't anything. In Terai region people can get ambulance and even go to India for delivery but it is not the same in mountains…." -District stakeholder, Jumla

Where 24-hour services have been initiated at health posts, service utilisation has increased.

"… In the past, we used to work 10am to 2pm at the health post. Now we provide 24-hour delivery services. Definitely this is difficult for us, we have to be in duty even at night. Because of this, utilisation of service from our health post has been increasing. …." -Service provider, Surkhet

2.5.5 Human resources

Staff availability

Service providers reported lack of availability of staff who had been posted to their facilities as an important challenge, particularly in remote districts. Key issues included unfilled sanctioned posts, frequent transfer of staff, staff on leave, deputation, training and high patient load.

A few service providers, especially those in remote districts, such as Jumla, reported lacking confidence in carrying out some procedures because they had not received training on new developments and there were no senior or appropriately skilled staff to support them in managing complicated cases. Service providers also highlighted issues such as disparity of training opportunities, inadequate pay and benefits, lack of staff quarters, unsupportive management and lack of cooperation from other staff as constraints to providing quality service.

A nurse taking care of a new born baby

"…A nurse has to do everything for ANC, including registration. Doctors do not do anything except checking the patient …. In ANC we sometimes fail to look after the patients properly. We don't even get to talk to them nicely due to overload. It creates difficulties when the nurse has to do everything…." - Service provider, Surkhet

The assessment found a shortfall in gynaecologist/obstetricians, staff nurses and health assistants in facilities compared with number of sanctioned posts (data not shown). Again the mountain and hill districts are the worst, with no obstetrician/gynaecologists, general practitioners or

anaesthesiologists in Jumla and Rasuwa, and no obstetrician/gynaecologists in Baglung and Okhaldhunga. PHCCs were short of staff nurses, health assistants and Auxiliary Health Workers (AHW). There were more general practitioners, AHWs and ANMs in place than the numbers of sanctioned posts because some were additionally recruited using local resources. In many cases there were insufficient numbers of key grassroots health workers for 24-hour services.

Staff knowledge and competence

Assessment of facilities and staff competency revealed important gaps in knowledge of evidence based care and competence in managing some of the leading causes of maternal death. It was found that use of evidence based care was largely determined by the availability of staff trained as Skilled Birth Attendants (SBA), rather than the geographical region or district. When asked about routine practices during labour and delivery, health workers reported:

- Supine delivery (which is not evidence based) as routine in over 73% of facilities (although with a wide variation between the districts).
- Withholding of oral fluids during labour in a quarter of government hospitals and PHCCs.
- Perineal shaving (not considered best practice) 17% non-government hospitals. No government hospitals or PHCCs reported routinely using perineal shaving.
- Respecting the right to privacy in the place of delivery viewed as important (95%); 87% also said allowing a woman to have companion during labour was helpful (considered good practice). However, it was noted that in fact companions were more often not allowed to stay, as only 38% of government hospitals reported allowing a companion to be with a woman in labour, 44% of PHCCs and 54% of health posts, but only 17% of non-government facilities.
- A third of the service providers believed rectal examination was useful during labour and some were even using dangerous practices such as rectal examination before crowning, and rotating the head with fingers in the rectum.
- Routine administration of oxytocin before delivery (harmful practice) was reported by 19% of personnel.

It should be noted that medical officers and staff nurses/ANMs working at PHCC and health posts are prioritised for SBA training, in recognition of their role as front line service providers. To date a total of 1,082 providers across the country have received the national SBA training.

2.5.6 Infrastructure

The infrastructure and physical resources at a facility are key to provision of quality maternity services, including size of buildings and essential support services such as water, electricity and transport. Regular drug and equipment supplies, timely maintenance of equipment and laboratory facilities are also of the utmost importance.

Testimonies revealed that physical resources and supplies at government health facilities were not perceived to be satisfactory. Almost all service providers, specially those at health posts and PHCCs, considered the condition of the building was poor, beds were insufficient and basic amenities, such as staff quarters, toilet and washroom, were lacking. Many service providers said it was difficult to provide quality services because of the small and congested space and in particular they were concerned that lack of a separate space made it difficult to maintain privacy and confidentiality.

Lack of 24-hour laboratory facilities was reported, even in zonal hospitals, making it difficult to quickly diagnose high risk conditions such as eclampsia or low haemoglobin, thus delaying treatment.

"…Sometimes there are caesarean cases at midnight. At that time we carry out the operation blindly and it is so risky. We are unaware of haemoglobin level, HIV and other things ..." - Service provider, Kailali

2.5.7 Drug supplies and equipment

Many service providers said supply of basic medicines, such as Albendazole, iron tablets, and tetanus toxoid injections was adequate, but for some essential emergency drugs, it was irregular and insufficient. This meant that in an emergency these drugs had to be purchased from a local pharmacy, wasting valuable time and increasing client costs. There was no significant variation in the availability of essential drugs in the eight study districts, although there appeared to be more shortages in the Terai districts, due to the high number of strikes and road blockades.

Stocks of essential drugs varied considerably by type of drugs and type of facility:

- Overall, 70% of the hospitals and PHCCs had Ampicillin, 87% had Gentamycin and 93% had Metronidazole at the time of survey, although about a quarter had been out of stock of Ampicillin for longer than two weeks in the preceding 12 months. Only a quarter of health posts had Ampicillin at the time of survey.
- Oxytocin was available in stock at almost all the hospitals and PHCCs and none reported having been out of stock for longer than two weeks in the preceding 12 months.
- 73% of the hospitals and PHCCs had Ergometrine and 17 percent had Misoprostol in stock at the time of survey.
- Magnesium sulphate was available in 60% of the hospitals and PHCCs (all government hospitals, 83% non-government hospitals and 31% PHCCs). Just over a quarter had been out of stock for longer than two weeks in the preceding 12 months.
- Adrenaline and Atropine were available in 80% and 93% of the hospitals and PHCCs respectively.
- Less than half the facilities had calcium gluconate injection in stock at the time of survey.

There was no significant variation by district in terms of availability of essential equipment in the health facilities assessed, although a lower percentage of facilities in Rasuwa and Jumla reported having a vacuum set, steamer and MVA set compared with other study districts. Women identified lack of equipment as an issue from their experience of health facilities.

2.6 Demand Side Factors

2.6.1 Health seeking behaviour among pregnant and postpartum women

Care during pregnancy

Qualitative data confirm increased recognition of the importance of professional antenatal and delivery care, as reported in the 2006 NDHS and in a recent Knowledge Attitude and Practice Study[9]. There was strong evidence that more women are conscious about their well-being during pregnancy and are taking better care of their health, for example consuming nutritious foods

[9] End-line Survey of Knowledge Attitudes and Practices in safe Motherhood and Neonatal care, carried out by Valley Research Group for SSMP/ActionAid Equity and Access Programme, 2009.

(green vegetables, fish, meat, eggs, fruit) during pregnancy and not doing heavy work. However, this was not universal and some focus group participants in hill and mountain areas reported being obliged to carry out heavy work and not getting sufficient good food.

"….Things are not like before. Pregnant women do not carry heavy loads these days, they only do light work and they take vitamins and eat vegetables and milk. When they reach the seventh month, they take more rest……."

- Informal provider, Baglung

"…….How will pregnant women take care of themselves? They have to do the household chores. If we don't bring firewood today we have to strive more the next day. There is no nutritious food available here in Jumla even when you are pregnant. There is no medicine, iron pills, vaccination. We have to work, holding the plough or spade (bauso) or carrying stones, wherever the men go. ... " - Focus group participants, Jumla

Qualitative evidence also indicates traditional practices, such as not allowing pregnant women to worship, visit temples or participate in funeral ceremonies, still exist in some communities, although somewhat reduced. Some respondents reported a traditional belief that pregnant women should not go out of the house after labour begins and women in Jumla mentioned the belief that pregnant women should not cross a river, as this carried a risk of "devil spirits" taking over their body. Hence some women were not able to go for antenatal check-ups.

Place of delivery

There was broad consensus that most women (and their families) still preferred a home delivery as it was traditional practice in their community. Women reported mainly being assisted by Traditional Birth Attendants (TBA) because they had attended many deliveries and were readily available in their neighbourhood, and said they would seek care from health facilities only if there were complications that the TBA or primary carer could not handle.

"…Women deliver at home. They are not taken to the hospital unless they are likely to die…"

- Focus group participants, Kailali

Reasons for opting for home delivery, perceived by focus group participants and informal providers were: safety at home, convenience, shyness, availability of clothes and food, and lower cost. Service providers working in mountain districts reported that lack of electricity and heating in the facility was also a factor.

"….Nowhere compares to home. It's safer. Those who understand this and know the value of money deliver at home….." - Informal Provider, Surkhet

However, providers reported increased numbers of women delivering at health facilities, at least partly as a result of the government policy of providing safe delivery incentives. The experiences reported by women who had delivered at a health facility were overwhelmingly positive. They were impressed by the politeness of service providers, promptness of services, helpful suggestions and medicines provided, good arrangements for mother and baby and regular examinations.

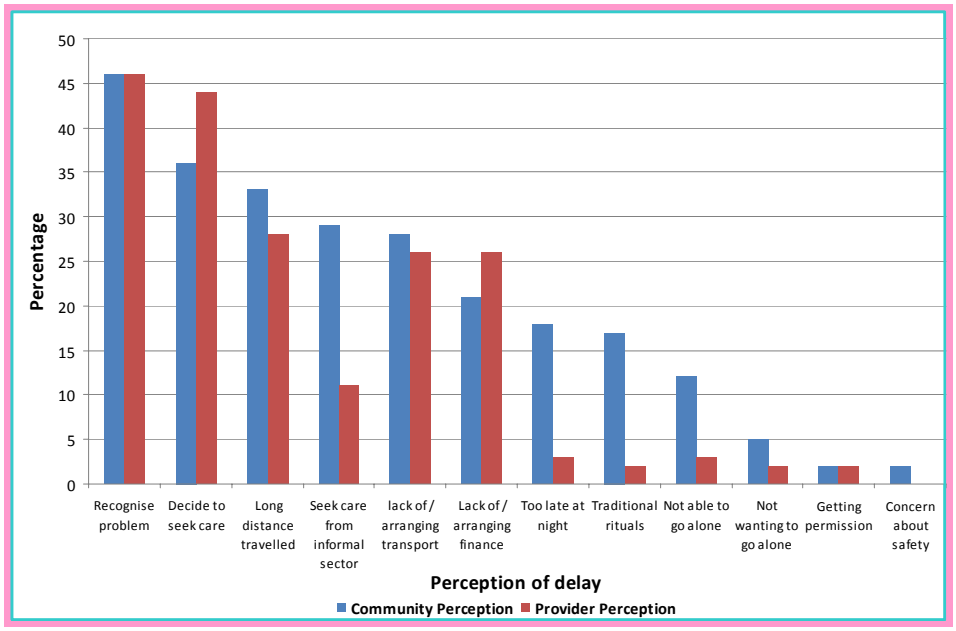
There was very clear evidence of the low priority placed on postnatal care, both by women and service providers. There was general agreement that care is only sought after the baby is born if a complication arises. Reasons for not seeking postnatal care included lack of awareness among women and communities, no provision of information by providers and lack of services.

2.6.2 Delays at community level

In 1998, failure to recognise danger signs and delays in making the decision to seek care, often compounded by seeking advice from traditional healers, were important contributing factors to delayed care seeking and consequent poor outcomes in the event of a complication. These factors were again explored in the 2008/09 study, through qualitative components, analysis of verbal autopsies and the facility maternal death reviews (representing provider perspectives), giving a picture of the balance of primary delays and insights into what has changed since 1998, as shown in Figure 5.

There was broad agreement between communities and providers about the main delays at community level contributing to maternal deaths, at least on ranking of the three most frequently identified delays (recognising there was a problem; deciding to seek care and the long distance between communities and facilities). Lack of finance (21%, 26%) and transport (28%, 26%) were also similarly ranked by both groups. Interestingly, members of the community were far more likely to recognise first seeking care from the informal sector as a problem (29% of communities, 11% of providers) and traditional rituals (17% of communities, 2% of providers). They were also more likely to highlight the delays caused by needing care at night (18%; 3%); not being able or not wanting to seek care alone or needing permission to seek care.

Figure 5: Perceptions of delays faced in the community for maternal deaths



"We know that we should go to hospital (PHCC) during pregnancy. However, we have belief that we should go to jhankri (traditional healer) to know whether something is wrong. In case of bleeding during pregnancy, we go to jhankri to let him see if something is wrong." - Magar woman, Baglung

Case study: Maternal death due to eclampsia

Rammaya was 20 years old, from a poor family and educated to grade six at school. She was married to her elder sister's husband, as his second wife. Almost eight months into her first pregnancy her hands and feet became swollen, and she had persistent headaches and giddiness and gradually lost her appetite. She received no treatment or antenatal care.

One morning her father-in-law found her lying on the floor, semiconscious, with her tongue bitten and a small cut on her forehead. She opened and closed her eyes but did not respond when spoken to. A traditional faith healer treated her and she became conscious at times, complaining of headache and giddiness. The family said they had money for treatment but it was difficult to get transport to the health facility. Eclampsia led to cerebral haemorrhage and she died later that day. The family recognised that she might have been saved if they had taken her to a health facility.

2.6.3 Factors influencing community decisions to seek care

Health facility is too far and too inconvenient

The location of and long distance to health care facilities, particularly PHCCs and district hospitals, and the lack of readily available and affordable means of transport constitute the major physical obstacles for pregnant women wishing to access health care, particularly in rural and mountain areas. Lack of motorable roads or vehicles in these areas means relying on slower forms of transport such as *doko* (bamboo basket), *jholungo* (hammock), ox cart and stretcher, which require help from other people and are particularly problematic at night.

"*…Another problem is the geographical remoteness of this area. It is difficult to receive health services for delivery and other cases too due to lack of roads. We don't have even a stretcher in our village…People still have to carry women in a jholungo (sort of cradle). You can imagine the condition.*" - Rai women, Sunsari

Health care is too costly

Studies have long established the cost of care as a significant constraint to women seeking maternal health services. The financial barrier includes costs incurred at the health facility for treatment[10]; transport costs; expenses of those accompanying the woman and opportunity costs for income earning. Affordability was still a major barrier to accessing care, particularly among the poor, and it significantly affected decision-making. On occasions they were obliged to sell assets or borrow money (putting their home or farm as collateral) to cover medical expenses for childbirth.

"*The foremost is the financial problem. Well-to-do people immediately take women to different places for treatment. Poor people think many times and finally decide to take her for treatment. Then only they start to search for money.*
-Muslim woman, Rupendehi

All categories of participant were of the opinion that fear of expenses led many women to deliver at home without skilled assistance. The focus group discussions with women also revealed a fear of further expenses at a referral facility, including having to stay at a distant place for several days with an accompanying person, transport and the treatment cost, which made them even more reluctant to visit higher level referral centres.

"*…It costs us money so that is also a problem. They tell us to go to places far away such as Surkhet... We have financial problem. ... Therefore, we feel that if it is better to die rather than visiting that place….*" - Dalit women, Surkhet

[10] Since the free delivery care policy had not been initiated for most of the data collection period, the impact of this cannot be assessed.

Shyness and Shame

Laaj or shyness/shame was confirmed as a major reason why women do not go to a health facility, especially if the service provider was male. All participants, including women, service providers and traditional birth attendants, highlighted the importance of having female staff at the health facilities. Participants mentioned that women may return without receiving a check-up or may not go to health facility at all if there are only male providers.

"It is said here that they (older women) have not lifted their skirts above their knees till date but women these days go to hospitals and everything is seen by the doctors." - Dalit woman, Baglung

Services are not available when needed

Inadequate numbers of staff and lack of physical resources and facilities were reported, leading to service users waiting long periods, some services not being available and provision of services only at certain hours or on some days, all of which discourage women from seeking care in the future.

"There's a possibility of not receiving the service on time due to the presence of very few doctors. It's a small health centre, that's why we have to wait." - Dalit woman, Baglung

Health care workers are sometimes rude and uncaring

Women reported both positive and negative experiences with service providers. Some, especially those who had been treated for complications, said that, compared with the past, the behaviour of health facility staff had improved, and they provided emotional support and were helpful and friendly.

"….The sister who provides the service is very nice, whatever we tell she replies it nicely, doesn't get angry and make us clearly understand….." - Focus group with Brahmin women, Rasuwa

"…..I liked the service very much. They showed love and respect towards me. They were conscious if I had any problem….." - Woman who had PPH, Rupandehi

Others said that negative attitudes and behaviour of health care staff still discourage women from utilising government maternal health care services. A few women with complications mentioned that service providers were rude and unfriendly, scolding them, even over small matters, not showing concern when they were in pain, making them wait and giving priority based on their liking.

"….Nurses scold and do not let us to shout in pain like we shout at home. Because of that women deliver at home." - Brahmin woman, Rasuwa

A few focus group participants and informal providers blamed the service providers for treating some women differently based on their caste or the language they spoke.

"… As we do not understand Nepali language, they behave badly with us. Sometimes they beat us. Therefore, we go to India. They used to complain us for giving birth to too many babies. …." - Muslim women, Rupandehi

"…If a poor person goes then they will treat them very bad and if a rich person goes then they will treat them nicely. They also treat those they know nicely. And if it is a person that they don't know then they get irritated." - A woman who had APH, Sunsari

3. CONCLUSIONS

This study is the outcome of considerable effort by the Government of Nepal, supported by DfID and USAID, to better understand the level and variation of maternal mortality in Nepal and identify the principal contributory factors to maternal deaths. Comparison of the findings with those of a similar study conducted in 1998 indicates areas where previous interventions have worked, where efforts need to be sustained or accelerated and where they need to be refocused. Supported by other sources of information, this suggests significant improvements over the past 10 years in access to routine and life saving care and prevention of maternal deaths. The findings also align with the NDHS 2006 MMR estimate, which indicates Nepal is on track to meet the fifth millennium development goal. This is a major achievement in a resource poor setting that has suffered from political instability over much of this period. However, the stories of the hundreds of women who died during this study period are evidence of many issues that remain to be tackled.

A delivery room

In 1998, maternal causes accounted for one in five deaths of women of reproductive age and were the leading cause of death among these women by ICD-X category. Data from the 2008/09 study indicate a reduction to around one in ten, to only the third leading cause by ICD-X. The MMR, calculated from actual data on live births and maternal deaths in the eight study districts, was 229 per 100,000 live births, a similar result to the estimate from the 2006 NDHS. This validates the NDHS methodology as providing a robust national figure, suggesting real and significant improvements in maternal health over the past 10-15 years, rather than that that used by the World Health Organisation in 2005, which gave a far higher MMR estimate. MMR results for individual districts range from 153 to 301, with further analysis showing older women and some ethnic groups are at significantly greater risk of maternal death.

Less encouraging is the finding that suicide is now the leading single cause of death among women of reproductive age – accounting for 16% of all deaths. This shocking finding calls for immediate action to better understand the causes and contributory factors and develop policies and interventions to address them. In particular a high number (21% of total) of suicides by young women, 18 years and under, indicates a need to target youth.

In 1998, only 21% of maternal deaths occurred in a facility, compared with 67% at home. In contrast, this study found 41% of deaths occurred in facilities, a clear indication of a change in utilisation of facility services, albeit often too late, as it was reported that most women with complications arrived at the facility in a critical state. Evidence from qualitative data supports this conclusion, as communities demonstrated increased recognition of the importance of seeking care quickly from the formal sector in the event of complications. Data from the 2006 NDHS also suggest increased use of facility care, although still with a focus on treatment of complications, often as a last resort, rather than normal delivery care. These findings indicate the balance of the contributory factors to maternal deaths is moving to include more supply side factors, so that efforts to further reduce maternal mortality must focus on improving

quality of care and speed of response within facilities, combined with continued efforts at community level to improve recognition of danger signs, improve planning for emergencies and reduce barriers to access, including cost. The new free delivery care policy (Aama programme, 2009) could have an important impact in this area.

The reduction in percentage of deaths due to haemorrhage (to 24%, from 46% of all maternal deaths in 1998) suggests improvements in recognition and treatment of bleeding (in particular postpartum). Appropriate knowledge and routine use of oxytocics for third stage of labour, plus the relatively good stocks found at most facilities, reflect the success of efforts to improve management of PPH, partly as a result of its recognition as a leading cause of death in the 1998 study. In addition, the number of instances in which lack of access to blood was identified as a major contributory factor to death was found to be significantly lower. While there is still scope for improvement, government commitment through the 2006 revised safe blood policy appears to have made a difference.

Nearly a third of facility deaths were due to eclampsia, despite its forming a relatively small percentage of all complications treated. This finding and supporting evidence highlights important shortcomings in access to life-saving magnesium sulphate, with many facilities reporting periods when it is out of stock. This urgently needs attention.

Despite the widespread introduction of safe abortion services across the country, the percentage of women dying from unsafe or incomplete abortion has almost doubled between the two studies, although this may be partly attributable to increased reporting of cases since abortion was legalised in 2002. The percentage of facility deaths due to abortion also increased, from 10% to 14%, but the percentage of abortion complications at EOC facilities has dropped significantly, to 28%, from 54% of all complications in 1998. This is a significant finding, suggesting that, although fewer abortion complications are presenting at facilities, they are more serious and/or their management is not adequate. Findings indicate that a considerable percentage of providers continue to routinely use D&C rather than the internationally recommended MVA method, and that some non-government facilities do not even have MVA sets in stock. Competency assessments also indicated important gaps in the knowledge and skill of some providers. This highlights a need to maintain and increase support for improving access to safe abortion services and post abortion care.

A mother with her new born at early postpartum period

The voices of women who have been pregnant and accessed services, and their families, neighbours and service providers, highlight important changes in behaviour and attitude over the past decade. These include a very clear (though not universal) increase in uptake of antenatal care and changes in attitudes to care of women during pregnancy, including improved diet and avoidance of heavy work. The use of traditional healers appears less prominent than in 1998, but their status in many communities as an early point of consultation remains an important

contributory delay in accessing formal care. While home delivery remains the preferred option for many women, service providers report increased utilisation of facility services, especially for complications. However, lack of recognition of problems and slow decision-making remain significant delays in many cases. Combined with long distances, lack of transport, cost, and lack of capacity to treat serious complications at the closest facilities, this can mean the decision to deliver at home and only go to a facility in the event of an emergency is risky.

A number of important issues were identified, which compromise access to prompt high quality care and contribute to poor maternal outcomes. Many are similar to those found in 1998 but there are important changes in their magnitude and extent. The practice of evidence based care was found to broadly reflect the availability of skilled birth attendants, indicating a positive impact of government investment in skilled birth attendance training. However, the examples seen of lower than acceptable knowledge and/or competence among providers highlight the need to further increase efforts to train and support providers as skilled birth attendants. The well known issues of staff availability and transfer continue to negatively affect the provision of skilled care, particularly CEOC, at facilities built and equipped to provide this level of service, highlighting the vulnerability of systems even after the required inputs are provided and services established. Jumla district hospital is an example of this, as a newly refurbished CEOC centre had to be downgraded to BEOC due to transfer out of the surgically skilled doctor. Poor referral networks are also identified as a key weakness and contributory factor in many deaths, with women being referred too late, to an inappropriate facility, and further delayed by lack of transport and poor communication between facilities. A complete referral system is needed, with all levels, from community to CEOC site, functioning as part of a whole. This should be a priority for any strategy to further improve maternal health outcomes in Nepal.

A sub-health post, Kailali

Flood victim with her children

LIST OF ACRONYMS

AHW	Auxiliary Health Worker
ANM	Auxiliary Nurse Midwife
ANC	Antenatal Care
APH	Antepartum Haemorrhage
BEOC	Basic Emergency Obstetric Care
CEOC	Comprehensive Emergency Obstetric Care
DFID	Department for International Development
D&C	Dilation and Curettage
EOC	Emergency Obstetric Care
FCHV	Female Community Health Volunteer
FHD	Family Health Division
ICD-X	International Classification of Disease (10th Revision)
MDGP	Medical Doctor General Practitioner
MDR	Maternal Death Review
MMM	Maternal Mortality and Morbidity
MMR	Maternal Mortality Ratio
MVA	Manual Vacuum Aspiration
NDHS	Nepal Demographic and Health Survey
NGO	Non-Government Organisation
PHCC	Primary Health Care Centre
PPH	Postpartum Haemorrhage
SBA	Skilled Birth Attendant(ce)
TBA	Traditional Birth Attendant
USAID	United States Agency for International Aid
VHW	Village Health Worker
WRA	Women of Reproductive Age