

**Second Interim Report on Confidential  
Enquiries into Maternal Deaths in South  
Africa**

**Maternal Deaths for 1999**

By the National Committee for Confidential Enquiries into Maternal Deaths

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## Executive Summary

**Aim:** This interim report summarises the changing pattern of maternal deaths in South Africa between 1998 and 1999. It is not intended to report on avoidable factors, substandard care or missed opportunities. Such a comprehensive report was provided in the first -, and will be given in subsequent triennial reports, under the title of Saving Mothers: Report on Confidential Enquiries into Maternal Deaths in South Africa (1999 – 2001, etc).

**Method:** The report covers the maternal deaths which were reported to the NCCEMD secretariat by 5 April, 2000 and which occurred during 1999. The definitions used in the Saving Mothers report were used in this report.

**Results:** There were 774 maternal deaths reported (98 more than in 1998) and in 597 (77.1%) cases the Maternal Death Notification Form and Assessors Report had been received and were entered on the database. There were 345 direct maternal deaths, 219 indirect maternal deaths, 20 unknown causes of maternal deaths and 13 fortuitous deaths. There has been a significant reduction in the proportion of direct causes of maternal deaths (1998-63.3% down to 1999-59.1%) with a concomitant increase in the proportion of indirect causes of death (1998-33.6% up to 1999-37.5%). This is largely due to the increased proportion of deaths due to non-pregnancy-related sepsis, mainly AIDS and a significant increase in deaths reported due to malaria.

The “big 5” causes of maternal death in 1999 were non-pregnancy related sepsis (29.6%, mainly deaths due to AIDS), complications of hypertension in pregnancy (19.0%), obstetric haemorrhage (15.4%), pregnancy related sepsis (13.9%, includes septic abortions and puerperal sepsis) and pre-existing maternal disease (7.9%, mainly cardiac disease). These five account for 85.8% of maternal deaths.

The most common cause of maternal deaths in all levels of care was non-pregnancy related sepsis, (level 1, 30.9%, level 2, 31.6% and level 3, 27.0%). Complications of hypertension remain the commonest cause of direct maternal deaths in level 2 and 3 hospitals (33.6% and 42.1% respectively) with obstetric haemorrhage being the commonest direct cause in level 1 institutions (32.4%).

Only 35.5% of maternal deaths had HIV testing and 68% of these were positive. In the category non-pregnancy related sepsis 38% of these maternal deaths did not have HIV testing, including those with pneumonia, tuberculosis and meningitis. Thus, the 93 women reported to have died due to AIDS is an underestimation. A woman was only classified as having AIDS if she complied with the standard definitions for AIDS. Sixty-seven percent of women dying due to septic abortion, whose HIV status was tested, were HIV- positive as were 46% of women dying due to puerperal sepsis.

**Conclusion:** There has been improved reporting of maternal deaths during 1999, but the time taken from notification to the NCCEMD receiving the reports is still a point of concern.

The impact of the AIDS epidemic is clearly demonstrated, AIDS being the commonest cause of maternal death at all levels of care in South Africa.

Complications of hypertension, obstetric haemorrhage and pregnancy related sepsis remain the major direct causes of maternal death.

**Recommendations:**

1. Testing for HIV must be expanded to adequately describe the impact of HIV infection on maternal deaths and allow new strategies to be developed. The presence of HIV/AIDS must be considered in all cases of unexplained cardiac failure, in cases of postpartum haemorrhage and convulsions, in addition to the usual indications for testing, namely tuberculosis, pneumonia, meningitis, septic abortion and puerperal sepsis.
2. Guidelines on how and where to manage a pregnant woman with HIV/AIDS and on contraceptive advice are urgently required.
3. Health institutions have an obligation to their staff to ensure that equipment to prevent transmission of HIV to health workers is always available. That is to say: gloves, plastic aprons, glasses or masks with visors, blunt-tipped (dolphin nose) needles on suturing material and skin clips.

## Introduction

The Confidential Enquiries system of recording and analysing maternal deaths has been in operation since 1 October 1997. The first comprehensive report into maternal deaths in South Africa was published in October 1999, and dealt in detail with maternal deaths occurring during 1998. This report was entitled “**Saving Mothers: Report on Confidential Enquiries into Maternal Deaths in South Africa 1998**”. It described the magnitude of the problem of maternal deaths, the pattern of disease causing maternal deaths, the avoidable factors, missed opportunities and substandard care related to these deaths and made recommendations concerning ways of decreasing the number of maternal deaths.

The aim of this **Second Interim Report on Confidential Enquiries into Maternal Deaths** is to track any changes that occurred in the pattern of disease causing maternal deaths. It describes the global pattern of disease for 1999 and then breaks it up into the patterns of maternal death occurring in the various levels of care and in the various Provinces. A comparison is made with the maternal deaths that occurred in 1998.

This report does not attempt to describe the avoidable factors, missed opportunities and substandard care that occurred in 1999. The second “Saving Mothers” report will deal, in detail, with this aspect and cover the years 1999-2001.

The definitions used in this report are the same as those used in the “Saving Mothers” report. Data used for this report consist of the maternal deaths that occurred in 1999 and were reported to the National Committee for Confidential Enquiries into Maternal Deaths (NCCEMD) secretariat before the 5 April 2000. This cut-off date was selected to enable a report to be written for 1999 that could be published in the middle of 2000. The information gleaned could then still have time to impact on any health planning for 2001. Data on deaths occurring in 1999 that are received by the NCCEMD secretariat after the 5 April 2000 will still be entered and analysed and included in the second “Saving Mothers” report.

Essentially, this interim report is a progress report on the functioning of the Confidential Enquiries system and any dramatic epidemiological changes that have occurred between 1998 and 1999.

## Reporting of deaths

A total of 774 maternal deaths that occurred in 1999 were reported to the NCCEMD secretariat before 5 April 2000. This is 98 more than reported for 1998 in the "Saving Mothers" report. The number of deaths reported per Province is shown in Table 1. The estimated population according to Census 96 is also given.

A significant increase in reported deaths occurred in the Eastern Cape, KwaZulu-Natal and Northern Province, when compared with 1998. This probably reflects improved reporting measures in these Provinces rather than a true dramatic increase in maternal deaths. There were 2.94 maternal deaths per 100 000 population in KwaZulu-Natal, 1.33/100 000 population in Eastern Cape Province, 1.61/100 000 in North West Province and 1.26/100 000 population in Northern Province. All four Provinces are mainly rural and one would expect similar maternal death rates in these four Provinces. However, KwaZulu-Natal reported 2.2x, 1.8X and 2.3x more deaths per population than the Eastern Cape, North West and the Northern Province respectively. Similar rates to KwaZulu-Natal are found in Free State Province (3.0/100 000) and Mpumalanga (2.95/100 000). This implies that there is still considerable under-reporting in the Eastern Cape, North West Province and the Northern Province. If the extrapolation holds, only approximately half the maternal deaths are being reported from the Eastern Cape, North West Province and Northern Province. The low rates per population for Gauteng and the Western Cape are probably valid as they do not differ much from 1998 and for that year there was verification of the reporting. There are probably at least 200 maternal deaths that have not been reported in 1999.

**Table 1. The relationship between the population in the Provinces and maternal deaths reported**

Province	Census 96 Population	% of SA Pop.	No. Maternal Deaths 1998	% of MD's 1998	No. Maternal Deaths 1999	% of MD's 1999	Deaths/100000 Pop. 1999
Eastern Cape	6 302 525	15.5	56	8.3	84	10.8	1.33
Free State	2 633 504	6.5	94	13.9	79	10.2	3.0
Gauteng	7 348 423	18.1	131	19.4	123	15.9	1.67
KwaZulu-Natal	8 417 021	20.7	188	27.8	248	32.0	2.95
Mpumalanga	2 800 711	6.9	66	9.8	72	9.3	2.57
North West	3 354 825	8.3	58	8.7	54	7.0	1.61
Northern Cape	840 321	2.1	22	3.3	18	2.3	2.14
Northern Prov.	4 929 368	12.1	27	3.3	62	8.0	1.26
Western Cape	3 956 875	9.7	34	5.0	34	4.4	0.86
<b>Total</b>	<b>40 583 573</b>	<b>100</b>	<b>676</b>	<b>100</b>	<b>774</b>	<b>100</b>	

Pop. – Population, MD – Maternal deaths

Table 2 describes the sites of maternal deaths per Province. The number of deaths being reported from the Private Institutions is still remarkably low and is probably a reflection, again, of under-reporting. In the Private Institutions, the message of having to report all maternal deaths might not have reached the specialists, other than the Obstetricians and Gynaecologists. Pulmonary embolism is the most common cause of maternal death in the United Kingdom. Women with this complication are usually managed by internal medicine specialists or intensive care specialists. It is easy to imagine how these deaths occurring in the Private Institutions fail to be

reported. However, it is a statutory task of the management of these Private Institutions to ensure that all maternal deaths are reported. A simple check with the death certificate could ensure that all deaths are collected and reported. (The death certificate has a section that asks whether the woman was pregnant or pregnant within the last 42 days).

**Table 2. Site of death within the Provinces 1999**

Province	CHC	Level 1	Level 2	Level 3	Private	Outside	Unknown
Eastern Cape	-	2	2	5	-	-	75
Free State	-	14	42	12	2	4	5
Gauteng	1	2	28	48	5	-	39
KZN	2	60	83	68	4	7	24
Mpumalanga	2	39	19	-	1	2	9
North West	2	18	14	4	2	3	11
Northern Cape	-	4	14	-	-	-	-
Northern Prov.	2	28	8	11	-	1	12
Western Cape	1	-	10	19	2	-	2
<b>Total</b>	<b>10</b>	<b>166</b>	<b>220</b>	<b>167</b>	<b>16</b>	<b>17</b>	<b>177</b>

Outside of the health services, e.g. home or motor vehicle accident. KZN – KwaZulu-Natal, CHC – Community Health Centre. Unknown means data not yet received.

On or before 5 April 2000, a total of 597 Maternal Death Notification Forms (MDNFs) and Assessors Reports were received from the Provinces by the NCCEMD secretariat. Details on the global monthly reporting and returning of forms is shown in Appendix 1, Table A1 and that for the Provinces in Table A2. As expected, the returning of the forms slowed towards the end of the year. However, some Provinces, notably KwaZulu-Natal, Northern Cape and Western Cape have done well with less than 10% of reports outstanding. This is especially significant in the case of KwaZulu-Natal where 248 deaths were reported. Unfortunately, two Provinces stand out as problems, namely the Eastern Cape and Gauteng. The slow reporting from Gauteng is because the Province has instituted a system whereby all maternal deaths, where the patient had an anaesthetic, have an extra assessment by an anaesthetist. The results of this new development are awaited with interest.

### **Reliability of data**

There are probably at least 200 maternal deaths that have not been reported, (Eastern Cape, North West, Northern Province, Private Institutions and missed cases in other Provinces). This does not take into account deaths occurring outside the Health Services. Only 17 were reported during 1999. There is no doubt that there is still under-reporting of maternal deaths. Hence it is not possible to reliably calculate a Maternal Mortality Ratio for 1999 from these data.

Nevertheless, there has been considerable improvement in reporting maternal deaths. With the exception of the Eastern Cape, the reporting has been consistent and it is possible to describe the pattern of disease per Province and per level of care. The trends observed are probably a true reflection of the situation on the ground.

## Primary Obstetric Causes of Maternal Death

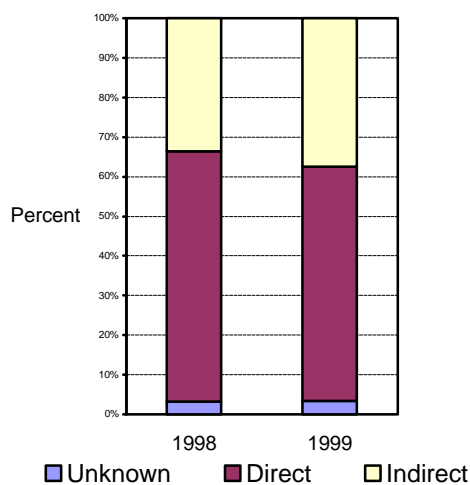
The primary obstetric causes of reported maternal deaths for 1999 are shown in Table 3. There were 345 direct maternal deaths, 219 indirect maternal deaths, 20 unknown causes of maternal deaths and 13 fortuitous deaths. There has been a significant reduction of direct causes of maternal deaths (1998-63.3% down to 1999-59.1%) with a concomitant increase of indirect causes of death (1998-33.6% up to 1999-37.5%). See Figure 1. This is largely due to the increased proportion of deaths due to non-pregnancy related sepsis, mainly AIDS.

**Table 3. Primary obstetric causes of reported Maternal Deaths: 1998 and 1999**

(Note: Data is derived from the MDNFs received by the NCCEMD by 5<sup>th</sup> April 2000)

Primary cause of maternal death	1998 N	1998 %	1999 N	1999 %
<b>Direct deaths</b>	<b>358</b>	<b>63.4</b>	<b>345</b>	<b>59.1</b>
Hypertension in pregnancy	131	23.2	111	19.0
Postpartum haemorrhage	48	8.5	55	9.4
Antepartum haemorrhage	27	4.8	23	3.9
Abortion	32	5.7	32	5.5
Ectopic pregnancies	11	1.9	8	1.4
Pregnancy-related sepsis	41	7.3	55	9.4
Anaesthetic accidents	27	4.8	22	3.8
Acute collapse and embolism	41	7.3	39	6.7
<b>Indirect deaths (n=190)</b>	<b>190</b>	<b>33.6</b>	<b>219</b>	<b>37.5</b>
Non-pregnancy-related infections	130	23.0	173	29.6
<i>AIDS</i>	82	14.5	93	15.9
Pre-existing maternal disease	59	10.4	46	7.9
<i>Cardiacs</i>	28	5.0	23	3.9
<b>Not classifiable</b>	<b>18</b>	<b>3.2</b>	<b>20</b>	<b>3.4</b>
<b>Total maternal deaths</b>	<b>565</b>	<b>100</b>	<b>584</b>	<b>100</b>
<b>Fortuitous deaths</b>	<b>20</b>		<b>13</b>	

**Figure 1. Comparison of the proportions of Direct, Indirect and Unknown causes of maternal death between 1998 and 1999**



The “big 5” causes of maternal death in 1999 were non-pregnancy related sepsis (29.6%, mainly deaths due to AIDS), complications of hypertension in pregnancy (19.0%), obstetric haemorrhage (15.4%), pregnancy related sepsis (13.9%, includes



septic abortions and puerperal sepsis) and pre-existing maternal disease (7.9%, mainly cardiac disease). These five account for 85.8% of maternal deaths.

Only 35.5% of maternal deaths reported had HIV testing and 68% of these were positive. In the category non-pregnancy related sepsis, 38% did not have HIV testing, including those with pneumonia, tuberculosis and meningitis. Thus the 93 women reported to have died due to AIDS is an underestimation. A woman was only classified as having AIDS if she complied with the standard definitions for AIDS. Sixty-seven percent of women dying due to septic abortion, whose HIV status was tested, were HIV-positive, as were 46% of women dying due to puerperal sepsis. These women were not classified as having AIDS because they did not fulfil the criteria.

Table A3 in the Appendix 1, gives details of all the primary obstetric causes of death. It is notable that the number of deaths due to undiagnosed cardiac conditions has increased 3 fold. There are many possible explanations for this. One, which needs to be investigated further, is the possibility that they are due to the myocarditis caused by HIV infections. (Only 17% of maternal deaths that died due to cardiac disease were tested for HIV infection). There has also been a considerable increase (more than 3-fold) in deaths reported due to malaria. This may reflect both the increased incidence of deaths due to malaria and better reporting of malaria from the areas affected by that disease.

There has been a slight reduction in deaths due to the complications of hypertension. This may be a real effect or due to outstanding MDNF and Assessors forms. The number of deaths reported that are due to abortion remains constant. Deaths due to puerperal sepsis have increased. Again, this may be due to better reporting, but may also be an effect of the HIV/AIDS epidemic.

The proportions of maternal deaths due to direct obstetric causes are shown in Table 4. When the effects of indirect causes (mainly AIDS) are removed, there has been little change in the causes of death. However, deaths due to puerperal sepsis and postpartum haemorrhage may have increased. It is too early to say whether this is a true finding. However, with the greater prevalence of HIV infection in the pregnant population, it is conceivable that both are a result of the infection. In deaths due to puerperal sepsis, 46% of the cases tested were HIV-positive. Very few of the women with postpartum haemorrhage were tested (16%) and 57% of those were positive. Thrombocytopenia is a well-recognised effect of HIV infection and may have contributed to the increase in postpartum haemorrhage.

**Table 4. Direct Primary Obstetric Causes of Death**

(Note: Data is derived from the MDNFs received by the NCCEMD by 5<sup>th</sup> April 2000)

Primary cause of maternal death	1998 N=358	%	1999 N=345	%
Hypertension in pregnancy	131	36.6	111	32.2
Postpartum haemorrhage	48	13.4	55	15.9
Antepartum haemorrhage	27	7.5	23	6.7
Abortion	32	8.9	32	9.3
Ectopic pregnancies	11	3.1	8	2.3
Pregnancy-related sepsis	41	11.5	55	15.9
Anaesthetic accidents	27	7.5	22	6.4
Acute collapse and embolism	41	11.5	39	11.3

## Primary Cause of Death and Levels of Care

The most common cause of maternal deaths in all levels of care was non-pregnancy-related sepsis, (level 1, 30.9%, level 2, 31.6% and level 3, 27.0%) - see Table 5. A comparison between 1998 and 1999 of the pattern of disease at the various levels of care is shown in Table 6. The relative importance of complications of hypertensive diseases in pregnancy, as a cause of maternal death, has declined. However, this is not due to improved treatment of hypertensive diseases in pregnancy, but rather the dramatic increase in deaths due to non-pregnancy related sepsis, mainly AIDS. When only the direct causes of maternal death are examined (Table 7), there has been little change. Complications of hypertension remain the commonest cause of direct maternal deaths in level 2 and 3 hospitals (33.6% and 42.1% respectively) with obstetric haemorrhage being the commonest direct cause in level 1 institutions (32.4%). However, the relative importance of puerperal sepsis has increased at each level, most dramatically in level 1 institutions.

The proportions of maternal deaths occurring at each level of care per disease category for 1999 is shown in Table 8 and a comparison is made between 1998 and 1999 in Table 9. The causes of death occurring in sites other than level 1, 2 and 3 institutions is shown in Table A4, in Appendix 1.

It is disturbing to see the relative increase in deaths due to sepsis occurring in Level 1 and 2 institutions, with a subsequent reduction of these deaths occurring in Level 3 institutions. Deaths due to sepsis are seldom very rapid, and there should be ample time to refer patients up the health system, if the condition is recognised. Failure of recognition of the severity of sepsis was one of the major avoidable factors described in the "Saving Mothers" report. The lack of referral may be in part due to the masking of the signs and symptoms in women with HIV infections.

There has been a significant shift of where women with AIDS die, with many more dying at the lower levels of care than was the case in 1998.

There appears to have been improved referral of patients with complications of hypertension from level 1 institutions to level 2 institutions. However, there appears to have been poorer referral to level 3 institutions.

**Table 5. Levels of care and primary cause of all Maternal Deaths 1999**

Primary cause of death	Level 1		Level 2		Level 3	
	N	%	N	%	N	%
<b>Direct Deaths</b>	<b>102</b>	<b>61.8</b>	<b>128</b>	<b>59.5</b>	<b>95</b>	<b>58.3</b>
Hypertension in pregnancy	24	14.5	43	20.0	40	24.5
Postpartum haemorrhage	23	13.9	19	8.8	7	4.3
Antepartum haemorrhage	10	6.1	6	2.8	6	3.7
Abortion	5	3.0	10	4.7	17	10.4
Ectopic pregnancies	1	0.6	5	2.3	1	0.6
Pregnancy-related sepsis	17	10.3	20	9.3	16	9.8
Anaesthetic-related	12	7.2	6	2.8	3	1.8
Acute collapse and embolism	10	6.1	19	8.8	5	3.1
<b>Indirect Deaths</b>	<b>59</b>	<b>35.8</b>	<b>83</b>	<b>38.6</b>	<b>65</b>	<b>40.0</b>
Non-pregnancy-related infections	51	30.9	68	31.6	44	27.0
AIDS	20	12.1	43	20.0	25	15.3
Pre-existing maternal disease	8	48.5	15	7.0	21	12.8
Cardiacs	5	3.0	9	4.2	9	5.5
Unknown	4	2.4	4	1.9	3	1.8
<b>Total</b>	<b>165</b>	<b>100</b>	<b>215</b>	<b>100</b>	<b>163</b>	<b>100</b>
<b>Fortuitous Deaths</b>	1		5		4	

**Table 6. Comparison of the patterns of deaths for each level of care**

Primary cause of death	Level 1		Level 2		Level 3	
	%		%		%	
	1998	1999	1998	1999	1998	1999
<b>Direct Deaths</b>	<b>64.9</b>	<b>61.8</b>	<b>58.6</b>	<b>59.5</b>	<b>61.7</b>	<b>58.3</b>
Hypertension in pregnancy	19.5	14.5	20.2	20.0	29.3	24.5
Postpartum haemorrhage	12.3	13.9	8.1	8.8	4.2	4.3
Antepartum haemorrhage	7.8	6.1	5.1	2.8	1.8	3.7
Abortion	4.5	3.0	5.1	4.7	8.4	10.4
Ectopic pregnancies	3.2	0.6	2.0	2.3	1.2	0.6
Pregnancy-related sepsis	6.5	10.3	7.1	9.3	10.2	9.8
Anaesthetic-related	9.7	7.2	4.5	2.8	0.6	1.8
Acute collapse and embolism	7.8	6.1	6.6	8.8	6.0	3.1
<b>Indirect Deaths</b>	<b>23.4</b>	<b>35.8</b>	<b>45.5</b>	<b>38.6</b>	<b>38.8</b>	<b>40.0</b>
Non-pregnancy-related infections	17.5	30.9	27.8	31.6	24.0	27.0
AIDS	9.7	12.1	18.2	20.0	16.2	15.3
Pre-existing maternal disease	5.8	48.5	12.1	7.0	13.2	12.8
Cardiacs	3.2	3.0	5.6	4.2	7.2	5.5
Unknown	5.2	2.4	1.5	1.9	1.2	1.8
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 7. Direct causes of Maternal Death per Level of Care: 1998 and 1999**

Primary cause of death	Level 1		Level 2		Level 3	
	1998	1999	1998	1999	1998	1999
	% (N=110)	% (N=102)	% (N=116)	% (N=128)	% (N=103)	% (N=95)
Hypertension in pregnancy	27.3	23.5	34.5	33.6	47.6	42.1
Obstetric haemorrhage	28.2	32.4	22.4	19.5	9.7	13.7
Early pregnancy deaths	10.9	5.9	12.1	11.7	15.5	18.9
Pregnancy-related sepsis	9.1	16.7	12.1	15.6	16.5	16.8
Acute collapse and embolism	10.9	9.8	11.2	14.8	9.7	5.3
Anaesthetic-related	13.6	11.8	7.8	4.7	1.0	3.2
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 8. Proportions of Primary Causes of Death per Level of Care 1999**

Primary cause of death	Level 1		Level 2		Level 3			
	N	%	N	%	N	%	Tot.	%
Hypertension in pregnancy	24	22.4	43	40.2	40	37.4	107	100
Obstetric haemorrhage	33	46.5	25	35.2	13	18.3	71	100
Early pregnancy deaths	6	15.4	15	38.5	18	46.2	39	100
Pregnancy-related sepsis	17	32.1	20	37.7	16	30.2	53	100
Acute collapse and embolism	10	29.4	19	55.9	5	14.7	34	100
Anaesthetic-related	12	57.1	6	28.6	3	14.3	21	100
Non-pregnancy-related sepsis	51	31.3	68	41.7	44	27.0	163	100
<i>AIDS</i>	20	22.7	43	48.9	25	28.4	88	100
Pre-existing medical disease	8	18.2	15	34.1	21	47.7	44	100
<i>Cardiacs</i>	5	21.7	9	39.1	9	39.1	23	100

**Table 9. Comparison of the proportion of Primary Causes of Death between 1998 and 1999**

Primary cause of death	Level 1		Level 2		Level 3	
	1998	1999	1998	1999	1998	1999
Hypertension in pregnancy	25.2	22.4	33.6	40.2	41.2	37.4
Obstetric haemorrhage	46.3	46.5	38.8	35.2	14.9	18.3
Early pregnancy deaths	28.6	15.4	33.3	38.5	38.1	46.2
Pregnancy-related sepsis	24.4	32.1	34.1	37.7	41.5	30.2
Acute collapse and embolism	34.3	29.4	37.1	55.9	28.6	14.7
Anaesthetic-related	60.0	57.1	36.0	28.6	4.0	14.3
Non-pregnancy-related sepsis	22.1	31.3	45.1	41.7	32.8	27.0
<i>AIDS</i>	19.2	22.7	46.2	48.9	34.6	28.4
Pre-existing medical disease	16.4	18.2	43.6	34.1	40	47.7
<i>Cardiacs</i>	17.9	21.7	39.3	39.1	42.9	39.1

## **Primary Obstetric Causes of Death per Province**

The primary obstetric causes of maternal death are shown in Table 10 and a comparison with 1998 is shown in Table 11. In Table 11, no data are given for Eastern Cape 1999 and Northern Province 1998. This is because the poor reporting makes the data totally unreliable. Data for North West Province, Northern Cape and the Western Cape must be treated with caution, because all reported fewer than 50 deaths in 1998 and some for 1999. These low numbers make the data unstable.

In every Province, with the exception of Gauteng, there has been an increase in the number of deaths reported due to non-pregnancy related sepsis. There have been very few changes in anything else. Deaths related to anaesthesia appear to be remarkably high in the Northern Province. Should this be a true reflection, urgent investigation into the anaesthetic services of the Northern Province are required.

Table 10. Primary Obstetric Cause of Death per Province 1999

Primary Obstetric Cause	Eastern Cape		Free State		Gauteng		KZN		Mpumalanga		North West		Northern Cape		Northern Province		Western Cape	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
<b>Direct</b>				<b>65</b>		<b>67</b>		<b>56</b>		<b>67</b>		<b>67</b>		<b>76</b>		<b>76</b>		<b>50</b>
Hypertension	1		21	28	15	18	40	18	10	16	7	17	4	24	11	22	2	7
Obstetric haem.	-		8	11	16	19	21	10	13	21	11	26	1	6	7	14	1	4
Early preg. death	-		1	1	9	11	17	8	2	3	2	5	4	24	2	4	3	11
Preg. Sepsis	1		6	8	6	8	21	10	6	10	3	7	1	6	5	10	6	21
Emb. & acute coll.	-		6	8	10	12	18	8	1	2	1	2	1	6	2	4	-	-
Anaesthetic	2		3	4	-	-	3	1	3	5	2	5	-	-	9	18	-	-
<b>Indirect</b>				<b>35</b>		<b>33</b>		<b>44</b>		<b>33</b>		<b>33</b>		<b>24</b>		<b>24</b>		<b>50</b>
Non-preg. Infect.	4		19	26	19	23	79	36	15	25	14	33	4	24	8	16	11	39
Pre-exist med dis	1		7	9	9	11	17	8	5	8	-	-	-	-	4	8	3	11
<b>Unknown</b>	-		3	4	-	-	3	1	6	10	2	5	2	12	2	4	2	7
<b>Total</b>	<b>9</b>		<b>74</b>	<b>100</b>	<b>84</b>	<b>100</b>	<b>219</b>	<b>100</b>	<b>61</b>	<b>100</b>	<b>42</b>	<b>100</b>	<b>17</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>28</b>	<b>100</b>

Table 11. Comparison of proportions of Primary Obstetric Cause of Death per Province between 1998 and 1999

Primary Obstetric Cause	Eastern Cape		Free State		Gauteng		KZN		Mpumalanga		North West		Northern Cape		Northern Province		Western Cape	
	'98	'99	'98	'99	'98	'99	'98	'99	'98	'99	'98	'99	'98	'99	'98	'99	'98	'99
<b>Direct</b>																		
Hypertension	24		22	28	31	18	19	18	26	16	21	17	18	24		22	25	7
Obstetric haem.	26		9	11	8	19	13	10	16	21	21	26	14	6		14	13	4
Early preg. death	4		6	1	12	11	8	8	9	3	3	5	9	24		4	-	11
Preg. Sepsis	7		9	8	2	8	12	10	4	10	3	7	18	6		10	6	21
Emb. & acute coll.	11		14	8	10	12	4	8	4	2	6	2	9	6		4	-	-
Anaesthetic	6		5	4	2	-	3	1	11	5	15	5	5	-		18	6	-
<b>Indirect</b>																		
Non preg. Infect.	9		22	26	26	23	27	36	18	25	27	33	18	24		16	19	39
Pre-exist med dis	11		8	9	9	11	12	8	7	8	3	-	9	-		8	13	11
<b>Unknown</b>	2		3	4	1	-	2.5	1	6	10	3	5	-	12		4	19	7

\* Recorded less than 50 deaths in 1998, and data thus not stable. Data expressed as percentages

## **Final causes of maternal deaths for the major primary obstetric causes**

Tables A5-11 in Appendix 1 deal with the final causes of maternal death per disease category.

The final causes of death in the category hypertension in pregnancy are little changed from 1998. The main ones are cerebral haemorrhage 34% and cardiac failure, mainly pulmonary oedema (29%) - see Table A5.

The major final cause of death due to obstetric haemorrhage is hypovolaemic shock as expected. However, pulmonary oedema was a major problem in women dying of complications from abruptio placentae (17% in this category). There is no difference from 1998 - see Tables A6 and A7.

The major final cause of deaths due to abortion and puerperal sepsis was septic shock (58% and 68% respectively). This is no different from 1998 - see Tables A8 and A9.

Respiratory failure, mainly pneumonia, was the main final cause of death in women dying of AIDS. Cerebral complications and septic shock were also common - see Tables A10 and A11.

## The impact of HIV/AIDS on Maternal Deaths in 1999.

Testing for HIV infection improved during 1999, with 35.5% of maternal deaths being tested in contrast to the 24.2% in 1998. Sixty-eight percent of those tested in 1999 were HIV-positive - see Table 12. There is, however, considerable variation in the percentages tested between the various Provinces, with the Provinces with greater rural populations having lower rates of testing. The exception to this is the Free State - see Table 13.

**Table 12. HIV status of maternal deaths**

HIV Status	N	%
Positive	144	24.1
Negative	68	11.4
Not tested	385	64.5

Note: Of those tested 68% were positive

**Table 13. HIV testing of maternal deaths per Province**

Province	% Tested	% HIV positive
Eastern Cape	-	-
Free State	50	54
Gauteng	46	70
KwaZulu-Natal	33	75
Mpumalanga	23	72
North West	30	92
Northern Cape	39	57
Northern Province	12	67
Western Cape	50	44
Total	36	68

The prevalence of HIV-positive maternal deaths per disease category that may be affected by HIV infection is shown in Table 14. As discussed in the section on primary obstetric causes of death, each one of the disease categories below can be affected by HIV infection. However, few of the women dying of postpartum haemorrhage, cardiac disease and malaria were tested. Clinicians need to be more aware of the complications of HIV infection, so that they can treat the patients appropriately.

**Table 14. HIV Status in disease categories likely to be affected by HIV**

Disease category	Tested (%)	% Positive
Septic abortion	15/26 (57)	67
Puerperal sepsis	28/56 (51)	46
Cardiac disease	3/23 (13)	50
Postpartum haemorrhage	7/44 (16)	57
Pneumonia	*0/25	-
TB	*0/16	-
Meningitis	3/5 (60)	66
Malaria	7/21 (33)	43

\*- If the patients tested positive, they were classified as having AIDS

Reported deaths due to AIDS have risen from 82 in 1998 to 92 in 1999. However, 41 women who, if tested HIV-positive would have been classified as dying of AIDS, had



not been tested. There has been a dramatic increase in the number of maternal deaths who were classified as dying of non-pregnancy related sepsis (130 in 1998 to 173 in 1999). This large increase can not be explained by better reporting alone. The HIV epidemic is having a major impact on maternal deaths in South Africa. Non-pregnancy related sepsis has become the major cause of maternal deaths at all levels of care.

Recommendation 10 in the “Saving Mothers” report of 1998 states “A national HIV/AIDS policy, geared towards managing these women and dealing with the ethical considerations, must be available by 2001”. This second interim report serves to stress the urgency of achieving this recommendation.

Not mentioned previously, but of major concern, is the increasing exposure which health workers have to women infected with HIV, especially in emergency obstetric situations. It is an obligation for the health services to recognise this risk and to ensure that adequate protection for health workers is available. For example, gloves, goggles or facemasks with visors, plastic aprons, blunt-tipped (dolphin nose) needles on suturing material and skin clips should be immediately available in every labour ward and operating theatre.

## APPENDIX 1 – Global Data

**Table A1. Maternal deaths reported and forms not received from the Maternal Death Register for 1999 (as of 15/4/2000)**

	Jan '99	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total (n= 774)	69	60	47	55	64	65	71	66	83	75	56	58
No. not received (n=177)	13	9	6	7	17	8	16	16	26	19	18	20
% not received	19	15	11	13	27	12	23	24	31	25	32	34

Total: 774 deaths were reported to the NCCEMD. In 177 (22.9%) cases, no Maternal Death Notification Form had been received, but in 2 of these the primary cause of death was given. Data were entered on all 594 maternal deaths, received by NCCEMD by 5 April 2000. There are, therefore, data on 76.7% of the total number of reported deaths.

**Table A2. Maternal deaths reported per month per Province for 1999**

Province	Jan '99	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOT	% No inf.
Eastern Cape	4/7	1/6	1/4	0/5	1/11	1/5	0/7	0/5	0/13	0/5	0/8	0/6	8/84	89
Free State	9/9	3/3	4/4	5/5	5/5	6/6	7/7	10/10	7/8	5/6	3/4	10/12	74/79	6
Gauteng	6/6	9/9	5/7	6/8	5/7	10/12	17/23	3/11	5/11	8/13	5/9	5/9	84/123	32
KwaZulu-Natal	17/21	21/21	18/18	24/24	22/22	19/19	15/16	21/21	22/28	18/21	17/20	9/16	223/248	9
Mpumalanga	11/12	5/7	6/6	1/1	2/2	6/6	7/8	5/6	6/6	8/10	3/3	2/3	62/72	14
North West	0/4	4/4	2/2	4/4	3/3	7/7	1/1	2/4	7/9	6/8	¾	4/4	43/54	20
Northern Cape	4/4	-	1/1	2/2	2/2	5/5	-	2/2	1/1	3/3	3/3	-	18/18	0
Northern Province	3/3	5/7	4/5	5/5	6/9	0/2	3/5	3/3	5/5	4/5	4/5	3/3	50/60	19
Western Cape	0/1	3/3	-	1/1	1/1	3/3	5/6	4/4	4/4	4/4	-	5/5	32/34	6
<b>Total</b>	<b>56/69</b>	<b>51/60</b>	<b>41/47</b>	<b>48/55</b>	<b>47/64</b>	<b>57/65</b>	<b>55/71</b>	<b>50/66</b>	<b>57/83</b>	<b>56/75</b>	<b>38/56</b>	<b>38/58</b>	<b>594/774</b>	<b>25</b>

Data = data entered / deaths reported. Percent reported but no information received at NCCEMD. In 5 cases (2 EP, 3 KZN) the date of death was omitted but other information was given. If data from Eastern Province are omitted, then data are available on 85% of reported cases.

**Table A3. Primary cause of Maternal Deaths for 1998 and 1999**

Primary Cause	1998 N	%	1999 N	%
❖ Fortuitous (No obstetric cause)*	<b>20</b>		<b>13</b>	
➤ Motor vehicle accident	8		4	
➤ Assault	4		2	
➤ Trauma	2		1	
➤ Suicide	2		4	
➤ Herbal medicine	3		-	
➤ Other	1		2	
* Not included in maternal death calculations				
❖ Pre-existing maternal disease	<b>59</b>	<b>10.4</b>	<b>46</b>	<b>7.9</b>
➤ Cardiac disease	28		23	
Undiagnosed	3		9	
Mixed mitral valve disease	11		3	
Other rheumatic heart disease	-		-	
Artificial valve complications	4		4	
Congenital heart disease	1		1	
Arrythmias	1		-	
Cardiomyopathy	7		3	
Other	1		3	
➤ Endocrine	7		2	
▪ Diabetes mellitus	4		-	
▪ Thyroid	2		-	
▪ Other	1		2	
➤ Gastrointestinal Tract	5		8	
▪ Liver disease	2		4	
▪ Intestine	2		1	
▪ Pancreatitis	1		-	
▪ Other			3	
➤ Central Nervous System	11		4	
▪ Cerebrovascular accident	6		4	
▪ Epilepsy	3			
▪ Other	2			
➤ Respiratory	1		-	
➤ Haematological	3		2	
➤ Genito-urinary	2		3	
▪ Renal	1		3	
▪ Genital	1		-	
➤ Immune	-		3	
▪ Collagen disease			2	
▪ Other			1	
➤ Skeletal	2		1	
• Kyphoscoliosis	1		1	
• Dwarfism	1		-	

Primary Cause	1998 N	%	1999 N	%
<b>❖ Non-pregnancy-related infections and AIDS</b>	<b>130</b>	<b>23.0</b>	<b>173</b>	<b>29.6</b>
➤ Pneumonia	20		25	
➤ Acquired Immune Deficiency Syndrome (AIDS)	82		93	
➤ Tuberculosis	7		16	
➤ Bacterial endocarditis	1		-	
➤ Pyelonephritis, urinary tract infection	4		2	
➤ Appendicitis	2		-	
➤ Malaria	5		18	
➤ Meningitis	5		8	
➤ Other	4		11	
<b>❖ Ectopic pregnancy</b>	<b>11</b>	<b>1.9</b>	<b>8</b>	<b>1.4</b>
➤ Pregnancy less than 20 weeks	7		6	
➤ Extrauterine pregnancy (more than 20 weeks)	4		2	
<b>❖ Abortion</b>	<b>32</b>	<b>5.6</b>	<b>32</b>	<b>5.5</b>
➤ Septic abortion	26		26	
➤ Uterine trauma	4		4	
➤ Trophoblastic disease	2		3	
<b>❖ Pregnancy-related sepsis</b>	<b>41</b>	<b>7.3</b>	<b>55</b>	<b>9.4</b>
➤ Amniotic fluid infection with ruptured membranes	-		1	
➤ Amniotic fluid infection with intact membranes	-		-	
➤ Puerperal sepsis following normal delivery	19		28	
➤ Puerperal sepsis following caesarean section	11		19	
➤ Puerperal sepsis following vaginal delivery after obstructed labour	3		2	
➤ Puerperal sepsis following caesarean section after obstructed labour	8		2	
➤ Other	-		3	
<b>❖ Antepartum haemorrhage</b>	<b>27</b>	<b>4.8</b>	<b>23</b>	<b>3.9</b>
➤ Abruptio placentae	12		8	
➤ Abruptio placentae with hypertension	7		13	
➤ Placenta praevia	4		-	
➤ Other	4		2	
<b>❖ Postpartum haemorrhage</b>	<b>48</b>	<b>8.5</b>	<b>55</b>	<b>9.4</b>
➤ Retained placenta; placenta accreta, increta or percreta	12		13	
➤ Uterine atony - due to uterine overdistension (multiple pregnancy, polyhydramnios)	4		9	
➤ Uterine atony due to prolonged labour	10		10	
➤ Ruptured uterus – with previous caesarean section	6		4	
➤ Ruptured uterus – without previous caesarean section	3		6	
➤ Inverted uterus	1		2	
➤ Other uterine trauma	12		11	

Primary Cause	1998 N	%	1999 N	%
❖ Hypertensive disorders of pregnancy	<b>131</b>	<b>23.2</b>	<b>111</b>	<b>19.0</b>
➤ Chronic hypertension	10		4	
➤ Proteinuric hypertension	34		39	
➤ Eclampsia	77		61	
➤ HELLP syndrome	7		3	
➤ Rupture of the liver	3		2	
➤ Other	-		2	
❖ Anaesthetic complications	<b>27</b>	<b>4.8</b>	<b>22</b>	<b>3.8</b>
➤ Complications of general anaesthesia	18		15	
➤ Complications of epidural block	3		-	
➤ Complications of spinal block	6		7	
❖ Embolism	<b>9</b>	<b>1.6</b>	<b>8</b>	<b>1.4</b>
➤ Pulmonary embolus	7		8	
➤ Amniotic fluid embolus	2		-	
❖ Acute collapse – cause unknown	<b>32</b>	<b>5.7</b>	<b>31</b>	<b>5.3</b>
❖ Unknown	<b>18</b>	<b>3.2</b>	<b>20</b>	<b>3.4</b>
➤ Death at home/outside the health service	7		9	
➤ No primary cause found	4		11	
➤ Other	7		-	
<b>❖ TOTAL</b>	<b>565</b>	<b>100</b>	<b>584</b>	<b>100</b>

Note:

1. All maternal deaths where hypertension was involved were 124 (21.2%)
2. All maternal deaths where obstetric haemorrhage was involved were 90 (15.4%)
3. All maternal deaths where pregnancy related sepsis, including septic abortion, was involved were 81 (13.9%)
4. All maternal deaths where obstructed labour was involved were 24 (4.1%)

**Table A4. Causes of death outside Level 1,2 and 3 hospitals**

Primary cause of death	Home	Mortuary	Primary	Private	Not specified
<b>Direct Deaths</b>					
Hypertension in pregnancy	2	-	1	1	-
Postpartum haemorrhage	1	-	2	3	-
Antepartum haemorrhage	-	-	1	-	-
Abortion	-	-	-	-	-
Ectopic pregnancies	-	-	1	-	-
Pregnancy-related sepsis	-	-	-	2	-
Anaesthetic-related	-	-	-	1	-
Acute collapse and embolism	-	-	1	4	-
<b>Indirect Deaths</b>					
Non-pregnancy-related infections	3	1	3	2	1
AIDS	1	1	1	1	1
Pre-existing maternal disease	-	-	-	2	-
Unknown	8	-	1	-	-
<b>Total</b>	<b>14</b>	<b>1</b>	<b>10</b>	<b>15</b>	<b>1</b>
<b>Fortuitous Deaths</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>1</b>	<b>-</b>

**Table A5. Final and contributory causes of Maternal Deaths: Hypertension in pregnancy**

Organ system	1998 N	% of deaths	1999 N	% of deaths
Hypovolaemic shock	5	3.8	3	2.7
Septic shock	3	2.3	-	-
Respiratory failure	20	15.3	10	9.0
<i>Acute respiratory distress syndrome</i>	16	12.2	5	4.5
<i>Pneumonia</i>	4	3.1	1	0.9
Cardiac failure	51	38.9	32	28.8
<i>Pulmonary oedema</i>	22	16.8	22	19.8
<i>Cardiac arrest</i>	29	22.1	10	9.0
Renal failure	13	9.9	4	3.6
Liver failure	6	4.9	1	0.9
Cerebral complications	51	38.9	46	41.4
<i>Intracerebral haemorrhage</i>	43	32.8	38	34.2
<i>Other cerebral complications</i>	8	6.1	8	7.2
Metabolic complications	-	-	-	-
DIC	10	7.6	6	3.6
Multi-organ failure	13	9.9	6	5.4
Immune system failure	1	0.8	-	-
Unknown	4	3.1	5	4.5

NOTE: A patient can have more than one final and contributory cause of death

**Table A6. Final causes of Maternal Deaths: Obstetric Haemorrhage 1999**

Organ system	Antepartum Haemorrhage		Postpartum Haemorrhage		Total	
	N	%	N	%	N	%
Hypovolaemic shock	16	69.6	48	87.3	64	82.1
<i>Following APH</i>	8	34.8	-	-	8	10.3
<i>Following PPH</i>	8	34.8	48	87.3	56	71.8
Septic shock	-	-	-	-	-	-
Respiratory failure	-	-	1	1.8	1	1.3
Cardiac failure	6	26.1	1	1.8	7	9.0
<i>Pulmonary oedema</i>	4	17.4	-	-	4	5.1
<i>Cardiac arrest</i>	2	8.7	1	1.8	3	3.8
Renal failure	-	-	-	-	1	1.3
Liver failure	-	-	-	-	-	-
Cerebral complications	1	4.3	-	-	1	1.3
Metabolic complications	-	-	-	-	-	-
DIC	-	-	-	-	-	-
Multi-organ failure	-	-	1	1.8	1	1.3
Immune system failure	-	-	3	5.5	3	3.8
Unknown	-	-	-	-	-	-

**Table A7. Comparison of Final causes of Maternal Deaths due to Obstetric Haemorrhage**

Organ system	Total (n=75)	
	1998 %	1999 %
Hypovolaemic shock	82.7	82.1
<i>Following APH</i>	10.7	10.3
<i>Following PPH</i>	72.0	71.8
Septic shock	2.7	-
Respiratory failure	5.3	1.3
Cardiac failure	9.3	9.0
<i>Pulmonary oedema</i>	8.0	5.1
<i>Cardiac arrest</i>	10.7	3.8
Renal failure	1.3	1.3
Liver failure	2.7	-
Cerebral complications	1.3	1.3
Metabolic complications	-	-
DIC	21.3	-
Multi-organ failure	2.7	1.3
Immune system failure	1.3	3.8
Unknown	-	-

**Table A8. Comparison of the final causes of Maternal Deaths due to abortion**

Organ system	Abortion 1998 N=32		Abortion 1999 N=31	
	N	%	N	%
Hypovolaemic shock	3	9.4	3	9.7
Septic shock	18	56.3	18	58.1
Respiratory failure	3	9.4	6	19.4
Cardiac failure	3	9.4	1	3.2
Renal failure	1	3.1	-	-
Liver failure	-	-	-	-
Cerebral complications	1	3.1	1	3.2
Metabolic complications	-	-	1	3.2
DIC	3	9.4	-	-
Multi-organ failure	8	25.0	1	3.2
Immune system failure	3	9.4	-	-
Unknown	1	3.1	-	-

**Table A9. Comparison of final causes of Maternal Deaths due to puerperal sepsis**

Organ system	1998 N	%	1999 N	%
Hypovolaemic shock	-	-	-	-
Septic shock	30	73.2	36	67.9
Respiratory failure	7	17.1	6	11.3
Cardiac failure	4	9.8	4	7.5
Renal failure	1	2.4	-	-
Liver failure	-	-	-	-
Cerebral complications	-	-	-	-
Metabolic complications	1	2.4	-	-
DIC	3	7.3	-	-
Multi-organ failure	10	24.4	4	7.5
Immune system failure	6	14.6	2	3.8
Unknown	1	2.4	1	1.9



**Final and contributory causes of Maternal Deaths: Non-pregnancy-related infections and AIDS 1999**

Organ system	AIDS		Other		Total	
	N	%	N	%	N	%
Hypovolaemic shock	1	1.0	3	3.8	4	2.3
Septic shock	6	6.5	12	15.0	18	10.4
Respiratory failure	49	52.7	39	48.8	88	50.3
<i>ARDS</i>	5	5.4	1	1.3	6	3.5
<i>Pneumonia (incl. TB)</i>	44	47.3	38	47.5	82	46.8
Cardiac failure	2	2.2	2	2.5	4	2.3
Renal failure	4	4.3	2	2.5	6	3.5
Liver failure	1	1.0	2	2.5	3	1.7
Cerebral complications	7	7.5	12	15.0	19	11.0
<i>Meningitis</i>	3	3.2	10	10.0	13	7.5
<i>Other</i>	4	4.3	2	2.5	6	3.5
Metabolic complications	-	-	-	-	-	-
DIC	-	-	-	-	-	-
Multi-organ failure	-	-	5	6.3	5	2.9
Immune system failure	22	23.7	-	7.5	22	12.7
Unknown	2	2.2	3	3.8	5	2.9

**Table A11. Comparison of final and contributory causes of Maternal Deaths due to AIDS**

Organ system	AIDS	
	1998 % N=82	1999 % N=93
Hypovolaemic shock	-	1.0
Septic shock	17.1	6.5
Respiratory failure	64.6	52.7
<i>ARDS</i>	13.4	5.4
<i>Pneumonia (incl. TB)</i>	51.2	47.3
Cardiac failure	6.1	2.2
Renal failure	1.2	4.3
Liver failure	1.2	1.0
Cerebral complications	14.6	7.5
<i>Meningitis</i>	11.0	3.2
<i>Other</i>	3.7	4.3
Metabolic complications	-	-
DIC	3.7	-
Multi-organ failure	9.8	-
Immune system failure	100.0	100
Unknown	3.7	2.2

## APPENDIX 2

### NCCEMD Members, Provincial MCWH Co-ordinators and Assessors

#### National Committee for Confidential Enquiries into Maternal Deaths

- Chairman:** Prof. J Moodley, Director MRC/UN Pregnancy Hypertension Research Unit, Head Department of Obstetrics and Gynaecology, University of Natal. (From 1996)
- Editor:** Prof. RC Pattinson, Director MRC Maternal and Infant Health Strategies Research Unit, Clinical Head, Department of Obstetrics and Gynaecology, University of Pretoria. (From 1996)
- Members:** Dr M Bennun, Head: Department Obstetrics and Gynaecology, Cecilia Makiwana/Frere Hospital, East London. (From 1999)  
Prof. HS Cronje, Head: Department of Obstetrics and Gynaecology, University of the Orange Free State. (From 1996)  
Ms M Dichabe, Chief Professional Nurse, North West Department of Health  
Dr SR Kambaran, Head: Department of Obstetrics and Gynaecology, Mankweng Hospital, Pietersburg. (From 1999)  
Ms L Mahlasela, Health Systems Research, National Department of Health. (From 1998)  
Dr L Makubalo, Director: Health Systems Research, National Department of Health. (From 1996)  
Ms HL Mangate, Assistant Director, Maternal Health, National Department of Health. (From 1996)  
Dr RE Mhlanga, Chief Director, Maternal Child and Women's Health and Nutrition, National Department of Health. (From 1996)  
Mrs JM Mtsetwene, Chief Professional Nurse, Mankweng Hospital, Pietersburg. (From 1999)  
Dr R Mulumba, Deputy Director: Health Systems Research, National Department of Health. (From 1996)  
Ms D Nyasulu, Advanced Midwife, Maternal, Child and Women's Health, KwaZulu-Natal Department of Health. (From 1996)  
Ms N Nyathikazi, Deputy Director, Maternal Health, National Department of Health. (From 1999)  
Prof. GB Theron, Department of Obstetrics and Gynaecology, University of Stellenbosch. (From 1996)  
Prof. HA van Coeverden de Groot, Department of Obstetrics and Gynaecology, University of Cape Town. (From 1996)
- Secretary:** Ms R Makopo, Senior Administrative Clerk, National Director of Health (From 1998)
- Co-opted members:** Dr DK Desai, MRC/UN Pregnancy Hypertension Research Unit (1999)  
Dr DP Naidoo, Department of Medicine, University of Natal Medical School (1999)  
Prof. C Rout, Department of Anaesthesia, University of Natal Medical School (1999)

## **Provincial MCWH Co-ordinators and Assessors**

### **Eastern Cape**

- Facilitator: Prof. HA van Coeverden de Groot (1997-8), Dr M Bennun, (from 1999)
- Co-ordinator: Mr SS Masilela, Advanced Midwife, Eastern Cape Department of Health
- Assessors: Dr M Bennun, Head: Department of Obstetrics and Gynaecology, Cecilia Makiwana/Frere Hospital, East London (From 1997)  
Ms NA Kwadjo, Chief Professional Nurse, Eastern Cape

### **Free State**

- Facilitator: Prof. HS Cronje (from 1997)
- Co-ordinator: Ms L Katzen Deputy Director, MCHW, Free State Department of Health
- Assessors: Dr EC de Koning, Department Obstetrics and Gynaecology, University of Orange Free State (UOVS) (From 1997)  
Ms MKD Motsamai, Advanced Midwife, (UOVS) (From 1997)  
Dr MG Schoon, Department of Obstetrics and Gynaecology, (UVOS) (From 1997)

### **Gauteng Province**

- Facilitator: Prof. RC Pattinson (from 1997)
- Co-ordinator: Ms T Chaane, Deputy Director, MCWH, Gauteng Department of Health
- Assessors: Dr E Buchmann, Department of Obstetrics and Gynaecology, University of Witwatersrand (From 1997)  
Dr A Daponte, Department of Obstetrics and Gynaecology, University of Witwatersrand (From 1999)  
Ms M Dimati, Senior Professional Nurse, GaRankuwa Hospital  
Ms E Leepile, Chief Professional Nurse, Soweto Community Health Centre, Gauteng  
Dr G Mantel, Department of Obstetrics and Gynaecology, University of Pretoria  
Dr M Pitsoe, Head: Department of Obstetrics and Gynaecology, Natalspruit Hospital, Gauteng  
Ms F Scott, Chief Professional Nurse, Coronation Hospital, Gauteng  
Ms R van der Walt, Chief Professional Nurse, Johannesburg Hospital, Gauteng

### **KwaZulu-Natal**

- Facilitator: Prof. J Moodley (from 1997)
- Co-ordinator: Ms N Phillips, Deputy Director, KZN Department of Health
- Assessors: Dr G Bartlett, MCWH, KZN Department of Health  
Ms D Nyasulu, Advanced Midwife, MCWH, KZN Department of Health

### **Mpumalanga**

- Facilitator: Prof. RC Pattinson (from 1997)
- Co-ordinator: Ms NA Shabangu, Assistant Director, MCWH, Mpumalanga Department of Health.
- Assessors: Dr P Daya, Private Practice, Witbank (from 1997)  
Dr P Godi, Director, MCWH, Mpumalanga Department of Health (from 1999)  
Ms ZM Khoza, Chief Professional Nurse, Barberton (From 1997)  
Ms NM Magagula, Chief Professional Nurse, MCWH, Mpumalanga Department of Health (from 1997)  
Ms M Muller, Chief Professional Nurse, Middelburg Hospital (from 1997)

## **North West Province**

Facilitator: Ms M Dichabe (from 1999)

Co-ordinator: Ms P Chueu, Deputy Director, MCWH, North West Department of Health

Assessors: Dr E Buchmann, Department of Obstetrics and Gynaecology, University of Witwatersrand (from 1999)  
Ms M Dichabe, Chief Professional Nurse, North West Department of Health  
Ms KM Malgas, Chief Professional Nurse, Mmabatho

## **Northern Cape**

Facilitator: Prof. HS Cronje (from 1997)

Co-ordinator: NC Maikane, Assistant Director, MCWH, Northern Cape Department of Health

Assessors: Prof. HS Cronje, Head: Department of Obstetrics and Gynaecology, University of the Orange Free State. (From 1996)  
Dr E Narokes, Department of Obstetrics and Gynaecology, Kimberly Hospital (From 1999)  
Ms A Thupane, Assistant Director, Kimberly Hospital (From 1997)

## **Northern Province**

Facilitator: Dr Kambaran (from 1999)

Co-ordinator: Ms E Mabitsela, Deputy Director, MCWH, Department of Health

Assessors: Dr SR Kambaran, Head: Department of Obstetrics and Gynaecology, Mankweng/Pietersburg Hospitals  
Ms JM Mtsetwene, Chief Professional Nurse, Mankweng Hospital, Pietersburg

## **Western Cape**

Facilitator: Prof. GB Theron (from 1997)

Co-ordinator: Ms L Msutwana, Assistant Director, MCWH, Western Cape Department of Health

Assessors: Dr S Fawcus, Department of Obstetrics and Gynaecology, Mowbray Maternity Hospital, Cape Town (from 1997)  
Dr D Hall, Department of Obstetrics and Gynaecology, University of Stellenbosch (From 1999)  
Ms W Thomas, Assistant Director Nursing, Groote Schuur Hospital Maternity Centre (from 1997)  
Ms E Low, Manager-Nursing Service, Vergelegen Medi-Clinic, Strand (From 1997)