

# 21 years of Confidential Enquiries into Maternal Deaths in South Africa: Reflections on Maternal Death Assessments

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## Abstract

Since 1999, seven triennial reports have been submitted by the South African National Committee for the Confidential Enquiries into Maternal Deaths (NCCEMD) to the Minister of Health along with recommendations on methods to reduce maternal mortality. The committee, via an extensive network of provincial assessors, has documented the rise and fall of maternal deaths with the institutional Maternal Mortality Ratio (iMMR) reaching a peak of 189/100000 live births in 2009 and dropping below 100/100000 live births in 2019 for the first time since the start of the enquiry. All provinces have shown a decline in the iMMR, with the Free State, KwaZulu-Natal, Mpumalanga, North West and Northern Cape halving their iMMR from their peaks. The enquiry documented the dramatic rise in deaths due to non-pregnancy related infections until 2008-2010 and a sharp decline from 2011-2013 deaths due in deaths. Consistently more than 90% of the women who died in this category were HIV positive, and the sharp decline is associated with the widespread availability and use of antiretroviral therapy. A decline in hypertensive disorders of pregnancy deaths from 2005-2007 after an early rise in 2002-2004 was observed and an increase obstetric haemorrhage deaths mostly due to bleeding during and after caesarean delivery, followed by a decrease from 2014-2016 once the problem had been identified and addressed. Unfortunately, there has been a steady rise in early pregnancy deaths and deaths due to pre-existing medical and surgical conditions. Interventions contributing to the downward trends include the introduction of safe antiretroviral therapy regimens, the district clinical specialist teams (DCST), the scale-up of Essential Steps in Managing Obstetric Emergencies (ESMOE) training, BANC plus, the Safe Caesarean delivery programme, and the Hypertensive disorders of pregnancy (HDP) guidelines. The proportion of all deaths that were potentially preventable has declined steadily indicating a steady continual improvement in the quality of care, but the types of missed opportunities and sub-standard care have remained constant. The confidential enquiry into maternal deaths (CEMD) system in South Africa has been very useful in describing the causes of maternal death, both pathological and health system failures, and for suggesting effective interventions which were adopted in the National Department of Health's Strategic Plans.

## INTRODUCTION

In 1997, the then Minister of Health, Dr Nkosana Dlamini-Zuma, asked Dr Roland E. Mhlanga, the then director of Maternal Health, to convene a meeting under the mentorship of Professor James Drife from the UK CEMD with a view to establishing a confidential enquiry into maternal deaths (CEMD) in South Africa. In 1997 maternal deaths became a notifiable condition and the first annual report was produced in 1999 which dealt with maternal deaths that occurred in 1998.

The chairperson (Professor J. Moodley) instituted a very effective devolved system of running the CEMD. This process has evolved over the years and the current enquiry process is shown in Figure 1

which shows that there are essentially two audit loops recommended in the process. Firstly, there is discussion at the facility where the death occurred, so that avoidable factors can be immediately identified and remedied action taken at a local level. The second audit loop is the CEMD process which is as follows: - The maternal death is notified to the provincial maternal and child health coordinator ('Provincial MCWH'), who will allocate it a unique number. A purpose designed Maternal Death Notification Form (MDNF) is completed and together with a photocopy of all clinical records, is sent to the coordinator from where it is assessed by independent provincial assessors who are teams which include obstetricians, medical officers, and midwives and when indicated, anaesthetists.

Assessors work as a pair (usually a midwife and obstetrician or an experienced medical officer) in order to overcome inherent biases. All deaths where the woman underwent an anaesthetic are also assessed by an anaesthetist. Assessors are appointed by the provinces based on their knowledge of the subject and respect within the fraternity.

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Assessors identify causes and avoidable factors using a structured form, data from which is entered into the electronic data collection system: The Maternal Morbidity and Mortality Audit System (MAMMAS) which then collates information from all the provinces. There is a quality control component at provincial level to ensure assessments are as accurate as possible. At national level, the MAMMAS data is used to generate tables and the information is collated into reports. These reports, called Saving Mother's Reports are produced as annual interim reports and more comprehensive triennial reports which include chapters on each of the major conditions that cause death.

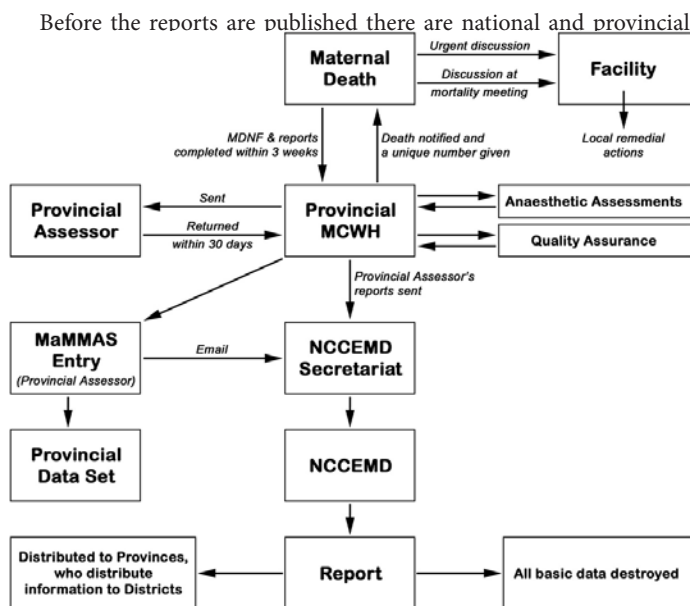


Figure 1. The process of the Confidential Enquiries into Maternal Deaths in South Africa

stakeholder discussion meetings to identify the key recommendations that arise from the data; which must be implemented in order to reduce the maternal mortality ratio (MMR) in South Africa. Reports are disseminated together with educational sessions on the key recommendations to provinces, districts and academic institutions. The national and provincial committees comprise of more than 100 health care professionals from the various hospitals and MCWH officials. This wide distribution of people involved allowed for an efficient collection and dissemination of information system. These assessors and provincial MCWH coordinators made the whole system functional and are key to keeping the process going.

The process is **confidential** and all copies of case notes are destroyed after publication of the reports. The data collected by the enquiry and the specific notification forms are for use by the CEMD process only, and cannot be used for medico-legal or disciplinary processes which, when they occur, are completely separate and parallel processes. This has been ratified by relevant judicial bodies.

MAIN FINDINGS OF NCCEMD 1998-2019

Number of deaths reported

Figures 2 and 3 show the increase in numbers of maternal deaths and the maternal mortality ratio (iMMR) from 1998 to 2019, initially due to improved reporting but subsequently related to the sharp increase in HIV related deaths. In 2009, the HINI epidemic also contributed to the large numbers for that year. Thereafter, there was a steady decline until 2019, when the iMMR was below 100 deaths per 100,000 live births for the first time.

Similar trends were observed in all provinces (Figure 4 and 5). All provinces have shown a decline in the iMMR, with the Free State, KwaZulu-Natal, Mpumalanga, North West and Northern Cape halving

their iMMR from their peaks. However, marked differences in iMMR occurred between provinces with KwaZulu-Natal and Western Cape having the lowest rates; and Free State, North West and Northern Cape having the highest rates in 2019.

The term 'iMMR' is used to reflect that the majority of deaths reported to the NCCEMD are 'institutional'.

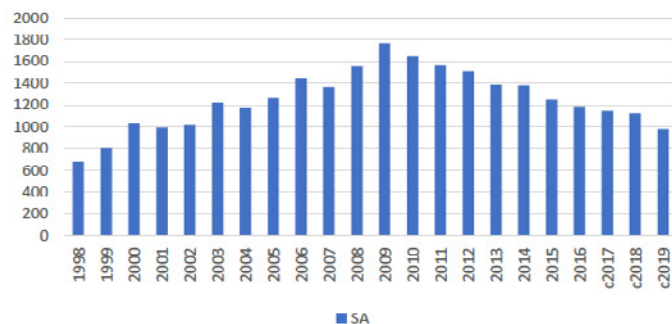


Figure 2. Number of maternal deaths from 1998 - 2019 in South Africa

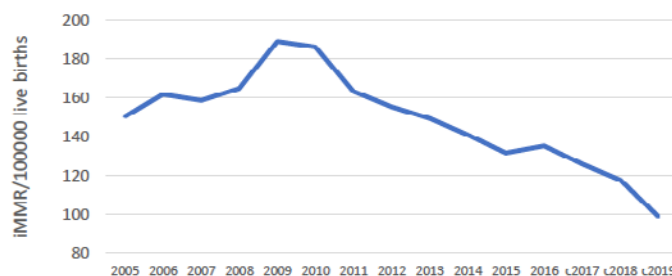
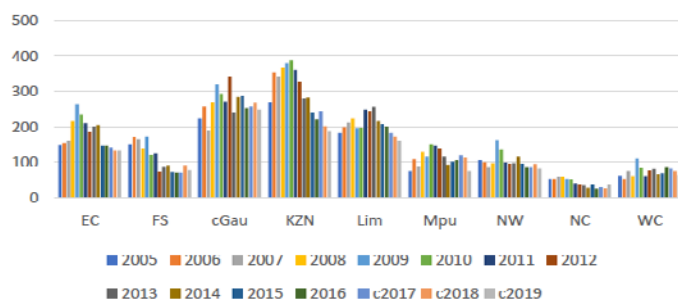


Figure 3. South African iMMR 2005 - 2019

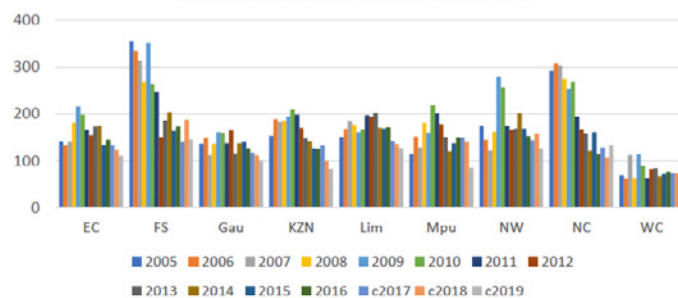
Figure 4. Number of maternal deaths per province from 2005-2018



EC – Eastern Cape, FS – Free State, cGau – Corrected Gauteng, KZN- KwaZulu-Natal, Lim – Limpopo, Mpu – Mpumalanga, NW – North West, NC – Northern Cape, WC – Western Cape

Figure 4. Number of maternal death per province from 2005 - 2018

Figure 5. iMMR per province from 2005-2019



EC – Eastern Cape, FS – Free State, cGau – Corrected Gauteng, KZN- KwaZulu-Natal, Lim – Limpopo, Mpu – Mpumalanga, NW – North West, NC – Northern Cape, WC – Western Cape

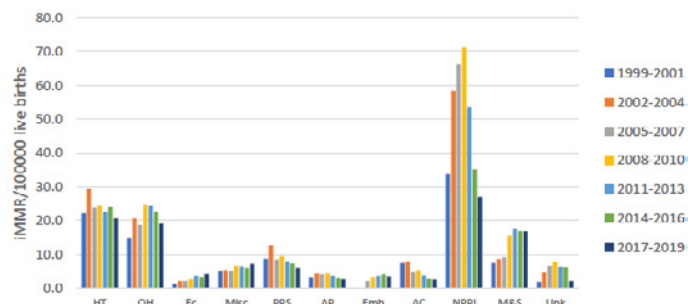
Figure 5. iMMR per province 2005 - 2019

# A SUMMARY

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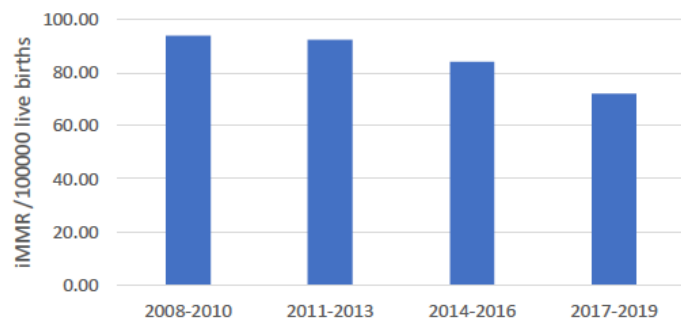
## Trends in Causes of Maternal Deaths in South Africa

The most common cause of maternal mortality is the non-pregnancy related infections group (NPRI) which include HIV related deaths notably Tuberculosis (TB). These have shown a marked decline after the introduction of universal HIV testing and antiretroviral therapy for pregnant women, together with TB screening (Figure 6). Hypertensive disorders of pregnancy (HPD) and Obstetric Haemorrhage (OH) are the second and third most common causes and have also shown a decline in the last triennia, although not as marked as that due to NPRI. Pregnancy related sepsis deaths have declined. A steady increase has been noted in iMMR due to Medical and Surgical disorders occurring in pregnant women, mostly cardiac; and also there has been a rise in early pregnancy deaths related to abortion and ectopic pregnancy. Anaesthetic deaths are not amongst the top five causes, but they remain the most preventable, and also are contributory to many deaths from HPD and OH where an anaesthetic was administered.

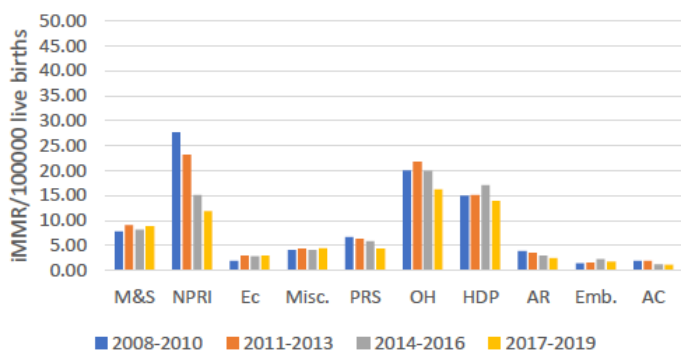


HT-Hypertensive disorders; OH-Obstetric Haemorrhage; Ec-Ectopic; Misc-Miscarriage; AR-Anaesthetic; Emb-Embolic; AC- Acute collapse; NPRI-Non pregnancy related infections; M&S- Medical disorders; Unk-Unknown

**Figure 6. Trends in causes of maternal death by triennia (1999 - 2019)**



**Figure 7. iMMR of potentially preventable maternal deaths per triennium**



**Figure 8. iMMR of potentially preventable deaths per underlying cause**

All maternal deaths were assessed for potential avoidability in terms of community related, administration and health care provider related factors. The latter two categories relate to the health system. Figure 7 shows the decline in the iMMR of potentially preventable deaths within the health system from 2008 to 2019, showing that the quality of care and functioning of the health system have shown improvement. The most marked improvements have been for NPRI, HPD, and OH deaths (Figure 8).

## Identification of Alarming trends

Over the last 21 years, the NCCEMD data has also provided an early warning system for 'alarming' trends in maternal health which have included:-

- the magnitude of HIV and TB related deaths,
- the excess deaths from adverse reactions to nevirapine containing ARV regimen were first detected in 2010 with 42 deaths, followed by 62 deaths in 2011, but subsequently ARV protocol changes saw a rapid reduction in these deaths,
- increasing numbers of deaths from bleeding associated with caesarean delivery (CD) first noted in 2005-2007 with a new sub-categories being added for this cause in 2008-2010. This allowed for better analysis leading to the development of the Safe CD programme.
- Expressing concern that the reduced schedule of ANC visits to four per pregnancy as recommended by WHO, was negatively effecting the detection of pre-eclampsia in the third trimester.

Responses to these alarming findings included advocacy and other initiatives listed below under Interventions.

## Interventions

The following interventions, supported or developed by the NCCEMD in conjunction with the Department of Health, have contributed to the observed reductions in maternal mortality.

- Dissemination of Saving Mothers Reports by visiting provinces and districts, to conduct meetings with health care workers, managers and academic institutions, which included educational sessions and discussion on key findings and recommendations.
- Universal HIV testing and ARV provision for pregnant women
- Replacement of Nevirapine in ARV regimens by Efavirenz
- Improved clinical governance and oversight by District Clinical Specialist Teams
- Upscaling of ESMOE training and drills with new modules on Hypertension, Obstetric haemorrhage, Safe Caesarean delivery and Respectful maternity care
- Promotion of Non Pneumatic Anti-Shock Garment (NASG) for transporting critically ill women between levels of care.
- Safe Caesarean delivery programme including facility audits for compliance with minimum standards
- Updated maternity case record (MCR) with more women centred antenatal and intrapartum care, and recommendation for mental health screening
- BANC plus programme with increased schedule of antenatal visits to 8 per pregnancy.

In recent reports, the Recommendations for Saving Mothers have been combined with those for Saving Babies given that in the workplace, health care providers, notable midwives, care for mother and baby simultaneously.

A new focus will be required for Medical and Surgical disorders, early pregnancy deaths and perinatal suicide deaths.

## Limitations

The limitations in the CEMD process include the lack of an established system to identify home deaths or community related avoidable factors. Also, limiting maternal death identification to 6 weeks after delivery could exclude women dying with certain conditions related to recent childbirth such as cardiomyopathy and postnatal depression.

## Conclusion

The CEMD in South Africa has been very useful in describing the causes of maternal death, both pathological and health system failures, and for suggesting effective interventions which have been adopted in the National Department of Health's Strategic

Plans. It is important to maintain the improvements achieved so far, to develop strategies to address limitations, to develop initiatives to address newly identified focus areas, and to address inequities between provinces.

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