

Saving Mothers



2020-2022

Executive summary 2020 -2022: Includes data for COVID-19 pandemic



health

Department:
Health
REPUBLIC OF SOUTH AFRICA



Table of contents

NCCEMD MEMBERS FROM 2020 AND ACKNOWLEDGEMENTS	3
ABBREVIATIONS.....	4
FOREWORD	5
INTRODUCTION	6
METHODS.....	6
VALIDITY OF THE DATA AND CORRECTIONS	6
RESULTS	7
DISCUSSION	28
CONCLUSION.....	28
RECOMMENDATIONS	29
REFERENCES	32

Figures:

Figure 1: iMMR per province 2017-2022.....	9
Figure 2: Number of maternal deaths in SA from 1998-2022.....	9
Figure 3: iMMR in SA per year 2005-2022.....	10
Figure 4: iMMR per province 2005-2022.....	10
Figure 5: Trends in iMMR per triennia in South Africa 2011-2022	11
Figure 6: iMMR per province for 4 triennia 2011-2022	12
Figure 7: iMMR per province and for SA for the 2020-2022 triennium	12
Figure 8: iMMR per Primary Obstetric Cause of maternal death 2017-2022	15
Figure 9: Comparison iMMR of 8 triennia per primary obstetric cause 1999-2022.....	15
Figure 10: iMMR per age category for the 2020-2022 triennium	17
Figure 11: iMMR per age category per underlying cause 2020-2022	17
Figure 12: Bleeding associated with CD CFR per triennia and province from 2014-2022.....	20
Figure 13: iMMR per level of care for the 2020-2022 triennium.....	21
Figure 14: Comparison of percentage managed at some point and those that died at that level.....	23
Figure 15: Impact of suboptimal care per underlying cause for 2020-2022 triennium	24
Figure 16: Impact of suboptimal care at level of care for 2020-2022 triennium	27
Figure 17: Potentially preventable deaths per level of care	28

Tables

Table 1: All pregnancy related deaths reported to MAMAAs and to DHIS.....	7
Table 2: Number Maternal Deaths per province 2017-2022	8
Table 3: In-facility maternal mortality ratio (iMMR) per province per year, and for the whole triennium.....	8
Table 4: iMMR per province for four triennia from 2011-2022	11
Table 5: Primary Obstetric Causes of Maternal deaths for 2020, 2021 and 2022, and triennium	13
Table 6: COVID-19 deaths per province for each year and the whole triennium, 2020-2022	14
Table 7: iMMR for Primary Obstetric Cause per year 2020-2022	14
Table 8: Maternal mortality ratio per underlying cause and province for the 2020-2022 triennium and the ranking of the 4 most common underlying causes.	16
Table 9: Details of HIV testing and treatment.....	18
Table 10: Numbers maternal deaths with anaemia and underlying cause of death	18
Table 11: Caesarean delivery and maternal deaths 2020-2022	19
Table 12: Location of DDPCP 2020-2022	20
Table 13: Number maternal deaths per underlying category and level of care 2020-2022	20
Table 14: Antenatal care details amongst maternal deaths	22
Table 15: Emergency referrals for maternal deaths	23
Table 16: Avoidability of DDPCP 2020-2022 compared with 2017-2019*	24
Table 17: Patient/Community related Avoidable factors 2020-2022 and comparison with previous triennium	25
Table 18: Administrative related avoidable factors.....	26
Table 19: Medical care related avoidable factors.....	26

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Bontle Mamabolo (South African Medical Research Council's Maternal and Infant Healthcare Strategies Unit) processed and analysed the MAMMAs data for the NCCEMD. Acknowledgements for the assistance of the previous editor, Prof. R Pattinson and previous NCCEMD committee chaired by Prof. J Moodley until August 2020.

ABBREVIATIONS

AR	Anaesthetic related
ART	Antiretroviral Therapy
BBA	Born before arrival
BMI	Body mass index
BP	Blood pressure
CD	Caesarean delivery
CEO	Chief Executive Officer
CFR	Case Fatality rate
CHC	Community Health Centre
CHW	Community health worker
CLEVER	Clinical care; Labour ward management; Eliminate barriers; Verify care; EOST on auto pilot; Respectful care
Clinic	Primary healthcare clinic
DCST	District Clinical Specialist Teams
DH	District hospital
DHIS	District health information system
EC	Eastern Cape province
EOST	Emergency obstetric simulation training
ESMOE	Essential Steps in Managing Obstetric Emergencies
FDC	Fixed dose combination
FRANC	First referral for antenatal care
FS	Free State province
GP	Gauteng Province
HIV	Human immunodeficiency virus
HPD	Hypertensive disorders in pregnancy
HOI	Head of Institution
iMMR	In Facility Maternal Mortality Ratio
IUCD	Intrauterine contraceptive device
KZN	KwaZulu-Natal province
LARC	Long acting reversible contraception
LP	Limpopo province
MD	Maternal death
M&S	Medical and Surgical conditions
MP	Mpumalanga province
MVA	Manual vacuum aspiration
NaPeMMCo	National Perinatal Morbidity and Mortality Committee
NC	Northern Cape province
NCCEMD	National Committee for Confidential Enquiries into Maternal Deaths
NCH	National central hospital
NPRI	Non-pregnancy related infections
NW	North West province
OH	Obstetric haemorrhage
OMBU	On-site Midwife run Birthing Unit
PHC	Primary healthcare
PMTCT	Prevention of Mother-to-Child Transmission
PPE	Personal Protective Equipment
PPH	Postpartum haemorrhage
PRS	Pregnancy related sepsis
RH	Regional Hospital
TB	Tuberculosis
TH	Tertiary hospital
TOP	Termination of pregnancy
TXA	Tranexamic acid
WBOT	Ward based outreach teams
WC	Western Cape province

FOREWORD

The death of a woman during pregnancy, childbirth, or the puerperium still remains one of the greatest possible tragedies. The right to life is everyone's constitutional right, and women also deserve it. Everyone has the right to have access to healthcare services, including reproductive healthcare. All women must feel safe when faced with the need to seek care everywhere within our health system, and it's everyone's moral obligation to ensure that safety.

In South Africa, a system of national confidential enquiries into maternal deaths exists to review maternal deaths. This team consists of highly committed healthcare professionals who dedicated their time to the confidential assessments of individual maternal deaths in all nine provinces of South Africa. This confidential enquiry identifies challenges in the health system and makes recommendations for improvement. The recommendations are produced in the form of annual and triennial reports, which highlight shortcomings in the healthcare system, avoidable factors in individual clinical care, and whether the death could have been prevented or not. The NCCEMD works as a ministerial team which reports to the Minister of Health, Dr J Phaahla, Deputy Minister, Dr S Dhlomo with support from the NDOH MCWH team.

It is quite a mammoth task to bring such triennial and annual reports to fruition, and it involves tremendous effort, energy, and meticulous attention to detail. Professor S Fawcus (editor) of the Saving Mothers' Reports and Ms B. Mamabolo (SAMRC-UP) deserve special mention and South Africa's gratitude for these thoughtful documents and the contributions that they have made to decrease maternal and newborn deaths in South Africa.

South Africa was just celebrating the fruits of implementation of these recommendations from the latest triennial report (Saving Mothers' Reports 2017–2019), which demonstrated that the assessment of individual maternal deaths and the lessons learned leading to recommendations do result in good news. For the first time since the initial report in 1998, the institutional maternal mortality ratio had dropped to less than 100 per 100,000 live births. This was certainly an achievement for South Africa, one of the few countries in the world that has an assessment of individual deaths and implements the recommendations. However, the unexpected happened. The COVID-19 pandemic came when we least expected it; South African women were not spared, and its aftermath is still evident. We also lost a significant number of healthcare workers. It had both direct and indirect effects on our health system, as highlighted in this triennial report, where maternal deaths increased by 30 per cent in 2020 and 47 per cent in 2021, during the COVID-19 pandemic, compared to 2019 but decreased to pre-pandemic level in 2022 to just above a 100 maternal deaths per 100,000 live births level. The pandemic set back progress towards achieving SDG goal of MMR 70 by 2030, but now we're back on track, and hopefully great lessons are learned for the future.

Let us continue to grow South Africa together in our journey to save lives. Together, we can!



Dr Sylvia N Cebekhulu: NCCEMD Acting Chairperson

INTRODUCTION

The 2020-2022 triennial Saving Mothers Executive Summary presents an overview of maternal mortality, with underlying causes, trends, associated factors and avoidability compared to previous triennia.

It is important to note that this report covers the COVID-19 pandemic period which was declared a public health emergency in South Africa in March 2020, and which was ended in May 2023. The pandemic contributed to the general excess mortality observed in 2020 and 2021, but less in 2022 when the variant was less virulent and vaccination had been introduced. Furthermore, the COVID-19 pandemic had a major impact on maternal health outcomes and utilisation of maternal and reproductive health services (1).

Previous triennial reports focused on the triennium as a whole (2,3,4); this report maintains the same format but also shows details of the individual years which make up the triennium because of marked differences between the years 2020, 2021 and 2022.

This report is the Executive Summary of the more detailed Short triennial report for 2020-2022 which will be published separately, and accompanied by the Comprehensive report which will include chapters on each cause of maternal death and provincial chapters.

METHODS

The method used to compile this report is the same as used for all previous reports (2,3,4), and the database was closed in May 2023. All Deaths during Pregnancy, Childbirth and the Puerperium (DDPCP) were notified to the provincial MCWH office, assessed by independent assessors, and data entered anonymously into the secure password protected national MAMMAs database used by the NCCEMD. Maternal death (MD) numbers were calculated by subtracting coincidental deaths from DDPCP.

Collection of maternal death data for the Saving Mothers triennial report was severely hindered due to human resource and other challenges in maintaining the NCCEMD process during the COVID-19 pandemic. Many provincial assessors were heavily involved in managing the COVID-19 pandemic in their places of work.

The classification of Maternal deaths used in South Africa is based on the WHO ICD 10 adaptation for maternal deaths (5).

Maternal deaths are classified by Primary Obstetric causes, for example Obstetric Haemorrhage (OH), Non pregnancy related infections (NPRI) etc. These are then subdivided into Causal Subcategories e.g. for OH: uterine atony, bleeding at Caesarean delivery (CD) etc; and for NPRI: TB, pneumonia etc. The classification can be found in NCCEMD documents (6).

Since SARS-CoV-2 or COVID-19 was a novel infection in 2020 with specific characteristics and high mortality, it needed to be incorporated into the classification in order to be identifiable. It was thus decided by the NCCEMD to code it as follows: NPRI /Other (specify COVID-19 complication). A death during pregnancy due to COVID-19 complications was thus categorised as an indirect maternal death.

There were also women who died from other primary causes such as Hypertension, but whose condition was possibly exacerbated by concurrent COVID-19 infection. In such cases, the NCCEMD decided that COVID-19 infection should be included as a final or contributory cause as: Other (specify COVID-19).

VALIDITY OF THE DATA AND CORRECTIONS

Table 1 gives the live births from the DHIS, and maternal deaths submitted to the NCCEMD and entered on the Maternal Morbidity and Mortality Audit System (MaMMAs) in 2020-2022. It is important to note that all Deaths During Pregnancy, Childbirth, and the Puerperium (DDPCP), previously known as pregnancy related deaths, were reported. DDPCP include any woman who died during pregnancy or the puerperium and includes coincidental deaths such as those due to motor vehicle accidents, natural disasters, and assault. The definition of a maternal death excludes these coincidental deaths.

Table 1 also compares the number of maternal deaths (MDs) submitted to the NCCEMD and entered into the

MAMMAs database with the numbers reported by the District Health Information system (DHIS) signed off in May 2023. In previous reports, MAMMAs has identified more maternal deaths than DHIS. This is because MAMMAs include deaths which happen outside health facilities and deaths at private hospitals, whereas DHIS only includes public facility deaths. In 2020 to 2022, this pattern of more deaths reported to MAMMAs than to DHIS occurred for all provinces except Gauteng (GP) and Eastern Cape (EC) in 2020; GP in 2021; and GP, Limpopo (LP) and KwaZulu-Natal (KZN) in 2022, where MAMMAs reported fewer. A correction was made for the provinces suspected of under-reporting, and involved correcting the numbers of maternal deaths upwards to match the DHIS numbers (shown in bold in Table One)

Table 1: All pregnancy related deaths reported to MAMMAs and to DHIS

2020-2022	DHIS MD	MaMMAS deaths (DDPCP)	Coincidental*	MaMMAs MD**	Corrected MDs***
2020	1121	1228	31	1197	1234
2021	1413	1513	24	1489	1507
2022	1035	993	24	969	1062
	3569	3734	79	3655	3803

*Coincidental deaths = fortuitous deaths during pregnancy and childbirth

**MaMMAs MD = DDPCP minus coincidental deaths

*** Details of correction per province are provided in the Short and Comprehensive Triennial reports

Details of this data and corrections made for each year of the triennium and province are shown in the Short and Comprehensive reports.

The corrections were applied for maternal death and iMMR calculations but not for the analysis of Causes of death, Associated factors and avoidability which all used uncorrected data.

RESULTS

A. Maternal deaths and iMMR for 2020-2022 and previous years/triennia (with corrections©)

There were 1234, 1507, and 1062 maternal deaths (MDs) in 2020, 2021 and 2022 respectively giving a corrected triennial total of 3803, which is greater than 3347 deaths reported in the previous triennium (2017-2019). There were 3,019,165 live births, reported by public health facilities via DHIS in 2020-2022, giving a corrected iMMR of 126 MDs per 100,000 live births compared to 113.8 in the previous triennium.

Table 2 shows the number of corrected maternal deaths per province per year 2017-2022, which covers the pre-COVID-19 years (2017-2019), the peak COVID-19 Years (2020-2021), and the year (2022) when the COVID-19 impact was becoming less.

Table 2: Number Maternal Deaths per province 2017-2022 (with corrections ©)

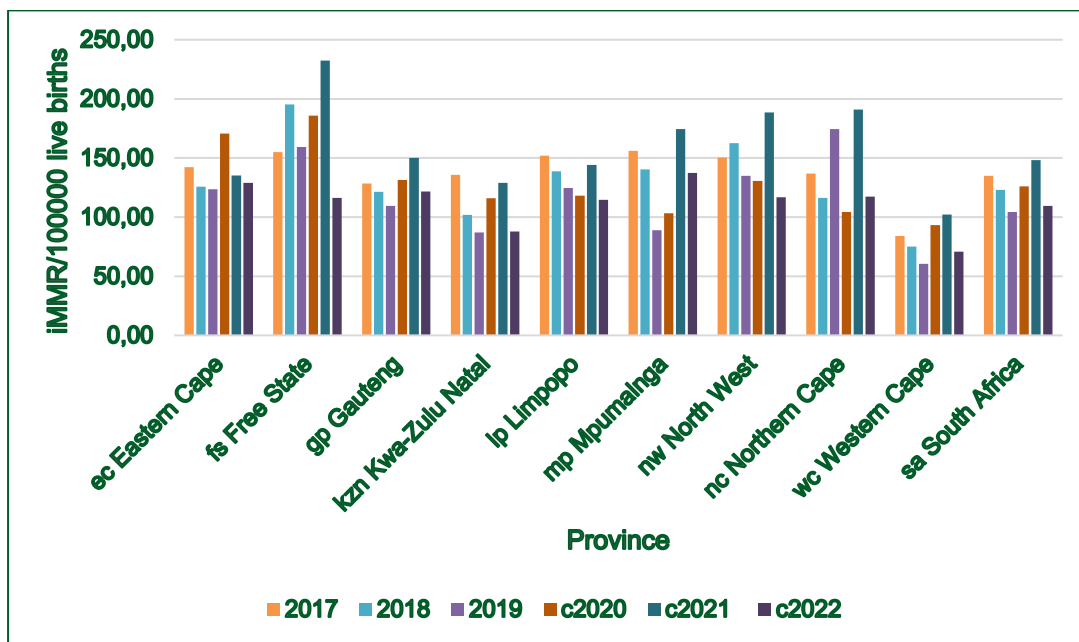
	c2017	c2018	c2019	c2020	c2021	c2022
Eastern Cape	138	131	118	c160	153	133
Free State	67	92	77	89	114	55
Gauteng	257	267	249	c271	c341	c266
KwaZulu-Natal	239	202	179	250	276	c189
Limpopo	174	152	166	166	196	c143
Mpumalanga	117	112	70	95	167	113
North West	82	95	78	81	116	70
Northern Cape	28	25	32	23	43	26
Western Cape	73	74	56	99	101	67
South Africa	1175	1150	1022	1234	1507	1062

Table 3: In-facility maternal mortality ratio (iMMR) per province per year, and for the whole triennium (with corrections©)

Province	2020 ©	2021 ©	2022 ©	2020-2022©
Eastern Cape	146.7	138.0	128.9	138.0
Free State	183.7	232.3	116.2	180.9
Gauteng	112.8	150.1	121.7	128.0
KwaZulu-natal	116.4	128.8	87.8	111.0
Limpopo	118.1	144.2	114.7	125.9
Mpumalanga	103.2	174.5	137.4	138.9
North West	130.6	188.5	116.8	145.5
Northern Cape	104.3	190.9	117.4	137.9
Western Cape	93.3	102.3	70.8	89.2
South Africa	119.2	148.4	109.7	126.0

It is notable that during 2020 and 2021, the iMMR was 30 per cent and 47 per cent respectively higher than for the pre-pandemic year 2019 when it was 98.8 maternal deaths per 100,000 livebirths. However, the iMMR declined to 109.6 in 2022, which is closer to the iMMR in the previous triennium (Figure one). This shows that the steep decline from 2010 was reversed in 2020 and 2021 but stabilised in 2022.

Figure 1: iMMR per province 2017-2022 (with corrections)



The downward trend in iMMR per province 2017-2019, increase in 2020 and 2021, and stabilisation in 2022 are shown in Figure 1, and occurred in all provinces.

Yearly trends in maternal deaths and iMMR

Figure 2 shows the national number of maternal deaths recorded per year since the inception of the SA Confidential Enquiry into maternal deaths, and Figure 3 the trend in iMMR from 2005 to 2022. Following the encouraging and steep decline from 2010, with an iMMR less than 100 in 2019, there was an increase in 2020 to 119.2 and even greater in 2021 to 148.4. The upturn correlated with the onset of the COVID-19 pandemic which started its impact in April 2020. In 2022 the iMMR came down to 109.7, similar to pre-pandemic levels. It is still far from the SDG goal of 70 per 100,000 live births by 2030.

Figure 3 shows the trend in iMMR from 2005 and shows a significant upsurge in 2020 compared to previous years. The iMMR increased by 30 per cent in 2020 and 47 per cent in 2021. This correlates with DHIS data for the financial year 2020/2021 which showed an increase of 38 per cent and is described in the SAHR chapter (1).

Figure 2: Number of maternal deaths in SA from 1998-2022 (corrected ©)

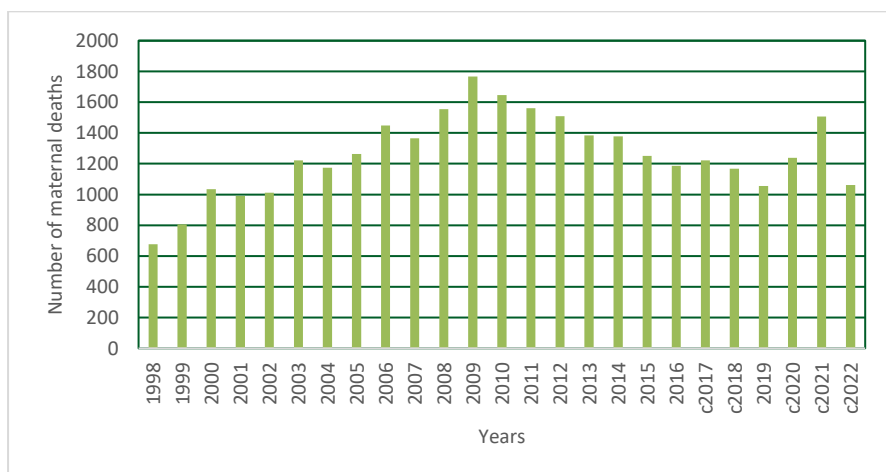


Figure 3: iMMR in SA per year 2005-2022 (corrected ©)

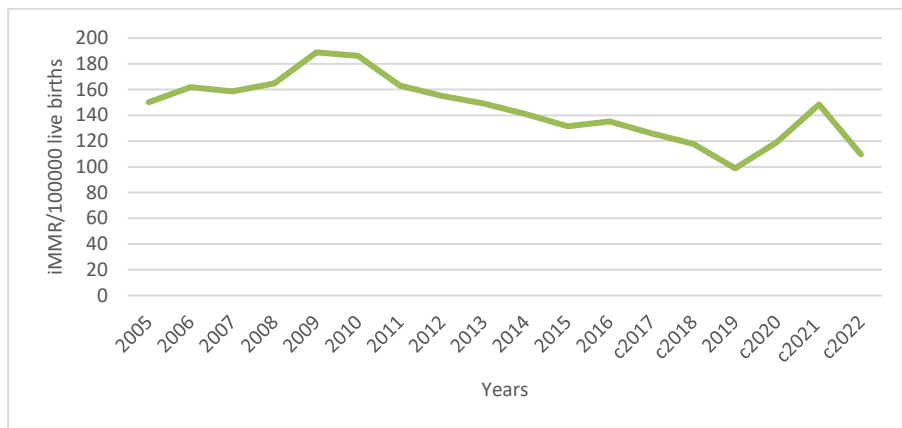
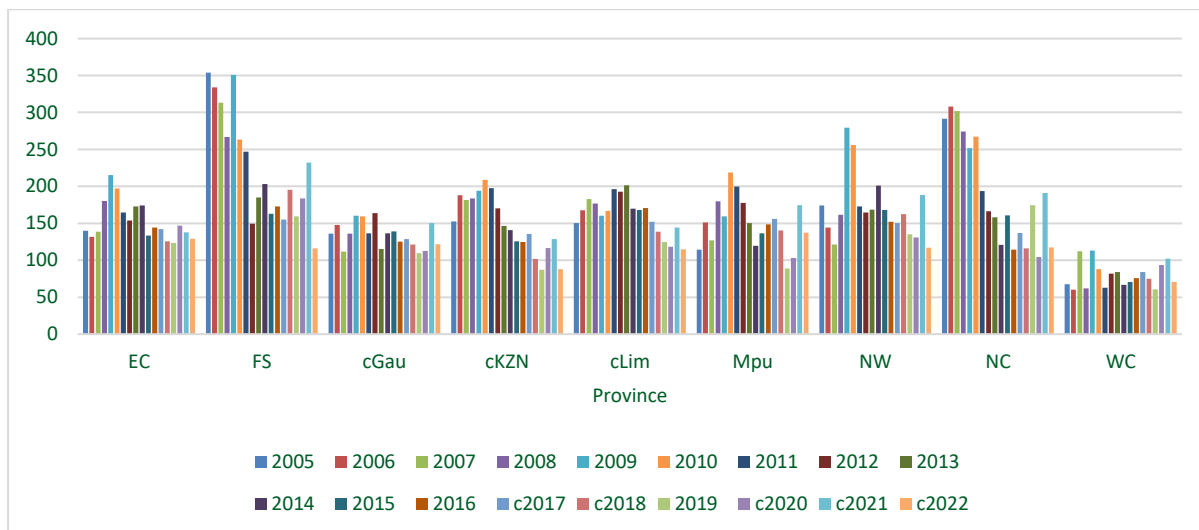


Figure 4 shows annual trends in iMMR for each province from 2005 to 2022 enabling comparisons to be made. Of note Western Cape has achieved an iMMR of less than 100 maternal deaths per 100,000 live births except in the COVID-19 years, and KwaZulu-Natal achieved an iMMR of less than 100 in 2019 and 2022, despite being a very populous rural province. All provinces have shown downward trends since 2010-2012, except for 2020 and 2021. Limpopo province has also shown remarkable progress.

Figure 4: iMMR per province 2005-2022 (with corrections)



Triennial trends in maternal deaths and iMMR

Triennial comparisons are more reliable than annual comparisons because they deal with larger numbers. Figure 5 show a steady decline in iMMR per triennium from 2011 but an increase in the recent triennium. The 2020 to 2022 iMMR is heavily influenced by the high iMMR in 2020 and 2021.

Figure 5: Trends in iMMR per triennia in South Africa 2011-2022 (with corrections)

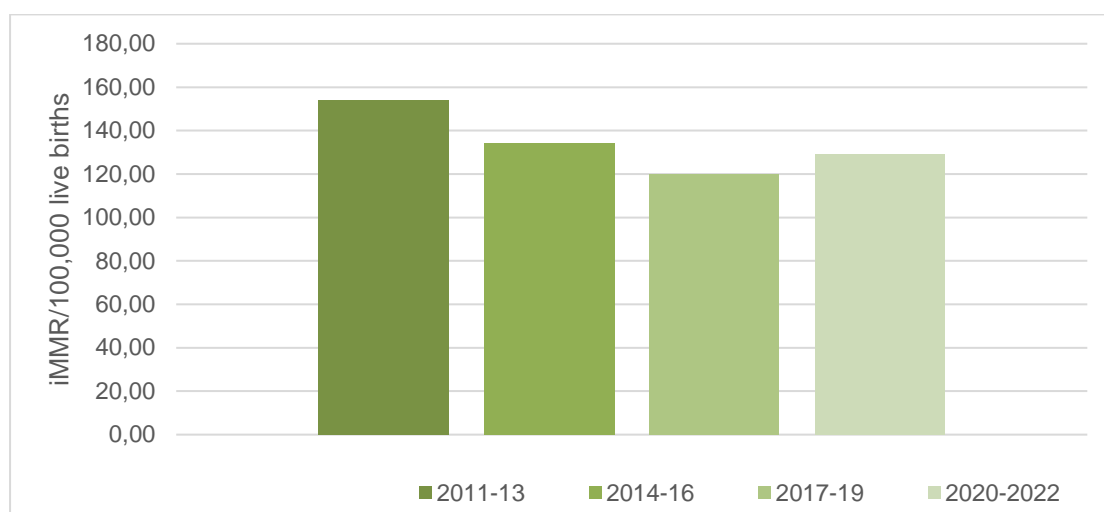


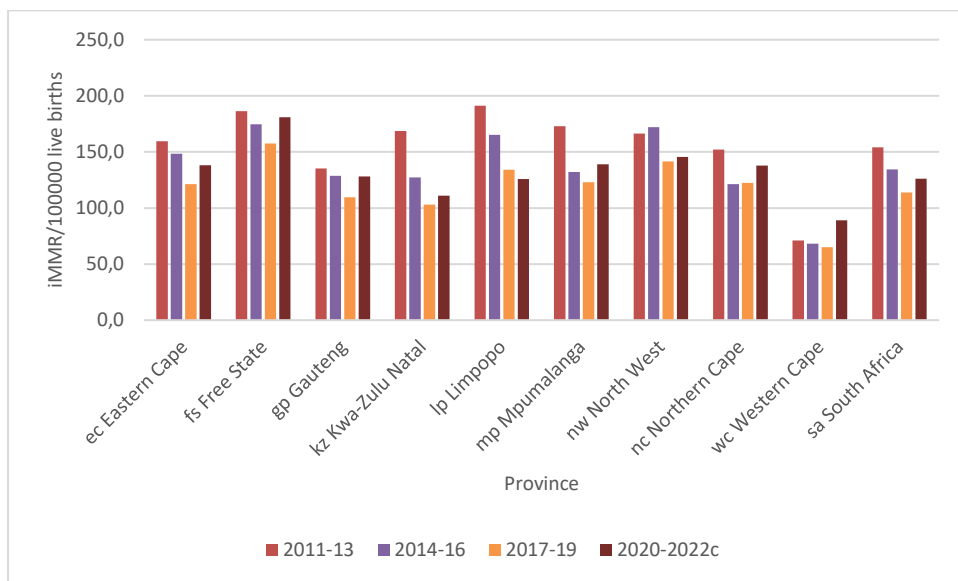
Table 4 and Figure 6 show triennial trends in iMMR per province from 2011

All provinces showed a downward trend till 2017-2019 and excepting Limpopo which declined further in 2020-2022, they all showed an increased iMMR in the 2020-2022 triennium.

Table 4: iMMR per province for four triennia from 2011-2022 (with corrections)

	2011-13	2014-16	2017-19	2020-22c
ec Eastern Cape	159.5	148.5	121.4	138.0
fs Free State	186.3	174.6	157.4	180.9
gp Gauteng	135.2	128.8	109.5	128.0
kz KwaZulu-Natal	168.6	127.1	103.1	111.0
lp Limpopo	191.1	165.2	134.1	125.9
mp Mpumalanga	172.9	132.2	123.0	138.9
nw North West	166.4	172.2	141.6	145.5
nc Northern Cape	152.2	121.4	122.3	137.9
wc Western Cape	71.0	68.3	65.2	89.2
sa South Africa	154.1	134.3	113.8	126.0

Figure 6: iMMR per province for 4 triennia 2011-2022 (corrected)



Free State had the highest iMMR in this triennium (2020-2022) with Limpopo iMMR having declined considerably so now it is the province with the third lowest iMMR.

District iMMR and maternal deaths will be shown in the Short and Comprehensive Triennial report and in Provincial chapters.

Figure 7: iMMR per province and for SA for the 2020-2022 triennium (corrected)

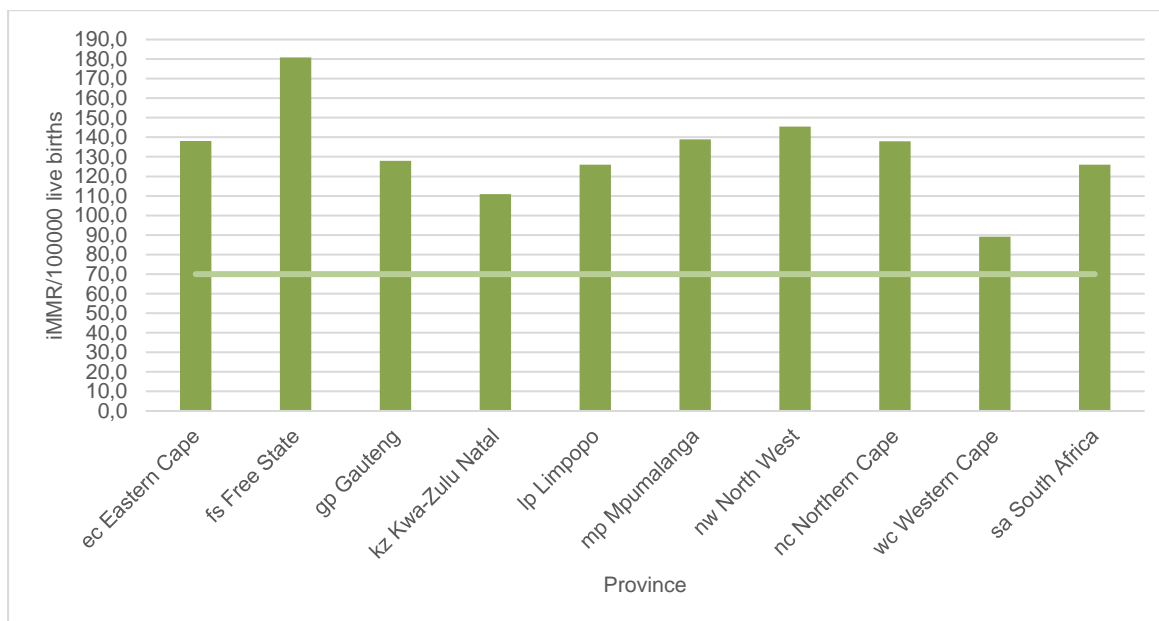


Figure 7 shows iMMR in the 2020-2022 triennium in relation to the SDG target of 70 maternal deaths per 100,000 live births by 2030. No province has yet reached the target, but Western Cape, and KwaZulu-Natal appear to be closest to it.

District iMMR and maternal deaths will be shown in the Comprehensive Triennial report and in Provincial chapters.

B. Primary Obstetric causes of Maternal Death (uncorrected data)

The Primary Obstetric Cause of death is shown in Table 5 for each year and the whole 2020-2022 triennium. Postmortems were performed for 26 per cent of maternal deaths.

Non-Pregnancy Related Infections (NPRI) was the major causal grouping in all three years as in previous triennia, but showed a very large increase in 2020 and 2021, where it accounted for 322 (27.1 per cent all MDs) in 2020 and 561 (37.7 per cent of MDs) in 2021. In 2022 it accounted for 180 deaths (18.6 per cent MDs) which is similar to previous triennia. For the whole triennium it was the leading cause accounting for 29.1 per cent of all MDs

COVID-19 pneumonia and complications constituted the majority of these NPRI deaths accounting for 124 (38.5 per cent of NPRI deaths) in 2020, and 369 (66.6 per cent of NPRI deaths and 25 per cent of all MDs) in 2021. In 2022, there were only 12 deaths directly due to COVID-19.

Obstetric haemorrhage (OH) deaths increased to become the second most common cause, accounting for deaths in 599 women (16.4 per cent of total MDs). This was accounted for by markedly increased OH deaths in 2020 and 2021.

Hypertensive disorders (HDP) were the third most common causes, accounting for 539 MDs (14.7 per cent of total)

Medical and surgical (M&S) disorders were the fourth cause accounting for 513 MDs (14 per cent of total MDs)

Early pregnancy deaths from miscarriage and ectopic accounted for 269 deaths (7.3 per cent) and thus Early Pregnancy complications combined are the fifth most common cause.

There were 39 Anaesthetic deaths in 2022 which is twice the number in previous years, and although not a major cause, almost all of these deaths are preventable.

Table 4: Primary Obstetric Causes of Maternal deaths for 2020, 2021 and 2022, and triennium (uncorrected)

Primary obstetric problem	Number MDs (%) 2020 N= 1197	Number MDs (%) (2021) N=1489	Number MDs (%) (2022) N=969	Number MDs (%) (2020-2022) N=3655
Medical and surgical disorders	183 (15.3)	190 (12.8)	140 (14.4)	513 (14.0)
Non-pregnancy-related infections*	322** (27)	561 (37.7)***	180(18.6)****	1063 (29.1)
Ectopic pregnancy	36 (3)	33 (2.2)	34 (3.5)	103 (2.8)
Miscarriage	49 (4.1)	54 (3.6)	63 (6.5)	166 (4.5)
Pregnancy-related sepsis	63 (5.3)	68 (4.6)	56 (5.8)	187 (5.1)
Obstetric haemorrhage	200 (16.7)	237 (15.9)	162 (16.7)	599 (16.4)
Hypertensive disorders of pregnancy	185 (15.5)	188 (12.6)	166 (17.1)	539 (14.7)
Anaesthetic complications	21 (1.8)	17 (1.1)	39 (4.0)	77 (2.1)
Adverse drug reactions	13 (1.1)	6 (0.4)	7 (0.7)	26 (0.7)
Embolism	33 (2.8)	43 (2.9)	40 (4.1)	116 (3.1)
Acute collapse - cause unknown	15 (1.3)	36 (2.4)	21 (2.2)	72 (2)
Miscellaneous	4 (0.3)	3 (0.2)	8 (0.8)	15 (0.4)
Unknown	73 (6.1)	53 (3.6)	53 (5.5)	179.9)

*Includes COVID-19 deaths **Includes 124 COVID-19 deaths in 2020

Includes 369 deaths in 2021 * Includes 12 COVID-19 deaths in 2022

Table 6 shows the number of COVID-19 deaths per province for each year and the triennium. The total deaths specified in MAMMAs as due to COVID-19 was 505 and the majority occurred in 2021. Gauteng, KwaZulu-Natal, Western Cape, and Eastern Cape were particularly affected.

Table 5: COVID-19 deaths per province for each year and the whole triennium, 2020-2022

Province	EC	FS	GAU	KZN	LIM	MPU	NW	NC	WC	TOTAL
NPRI/ COVID-19 2020	30	1	12	40	1	7	4	2	27	124
NPRI/ COVID-19 2021	32	17	78	89	43	33	20	14	43	369
NPRI/ COVID-19 2022	3	1	3	4	0	1	0	0	0	12
NPRI/ COVID-19 2020-2022	65	19	93	133	44	41	24	16	70	505

Causal subcategories for each Primary Obstetric Cause as well as Final and contributory cause for each condition are provided in the Comprehensive report and in more detail by Chapter heads.

Table 7 presents the iMMR for each primary obstetric cause per year and for the whole triennium.

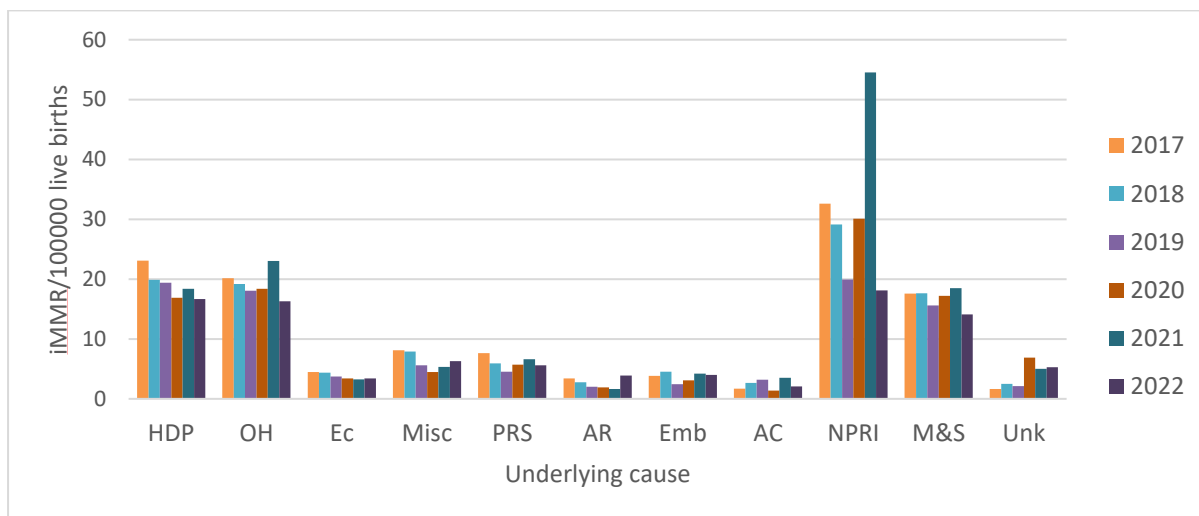
Table 6: iMMR for Primary Obstetric Cause per year 2020-2022 (uncorrected)

Cause*	2020	2021	2022	2020-2022
HDP	17.9	18.5	17.2	17.9
OH	19.3	23.3	16.7	19.8
Ec	3.5	3.3	3.5	3.4
Miscarriage	4.7	5.3	6.5	5.5
PRS	6.1	6.9	5.8	6.2
AR	2.0	1.7	4.0	2.6
Emb	3.2	4.2	4.1	3.8
AC	1.5	3.5	2.2	2.4
NPRI	31.0	55.2	18.6	35.2
M&S	17.7	18.7	14.5	17
Unknown	7.1	5.2	5.5	5.9
iMMR for all maternal deaths	115.6	146.6	100.1	121

*See abbreviations key on page 4

Figure 8 compares iMMR per year starting from 2017 so that pre-pandemic iMMRs can be compared with the pandemic years (2020 and 2021) for primary obstetric cause.

Figure 8: iMMR per Primary Obstetric Cause of maternal death 2017-2022



In terms of comparisons with the previous triennium and triennia, Figure 9 shows that the iMMR for NPRI increased from 27.1 MDs per 100,000 live births in 2017-2019 to 35.2 in 2020 to 2022. However, the iMMR for Obstetric Haemorrhage and Medical and Surgical disorders remained similar between the two triennia (OH iMMR 19.1 in 2017-2019 and 19.8 in 2020-2022; M&S iMMR 16.9 in 2017-2019 and 17 in 2020-2022). In contrast, the iMMR for Hypertension declined from 20.2 to 17.9, and for Early Pregnancy complications from 11.4 in 2017-2019 to 8.9 in 2020-2022.

Figure 9: Comparison iMMR of 8 triennia per primary obstetric cause 1999-2022)

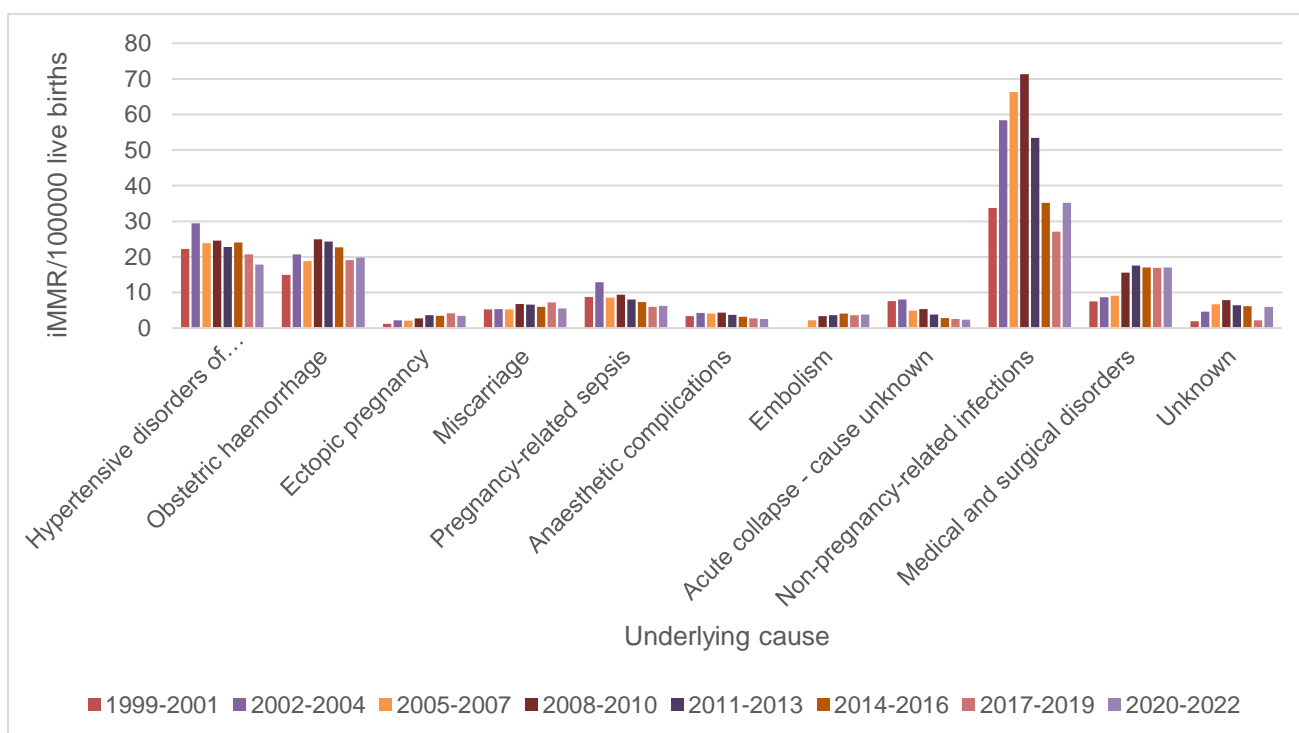


Table 8 shows the iMMR per province for primary obstetric cause

Table 7: Maternal mortality ratio per underlying cause and province for the 2020-2022 triennium and the ranking of the 4 most common underlying causes (uncorrected).

	EC	FS	GP	KZN	LP	MP	NW	NC	WC	SA
*M&S	17.64	28.30	17.20	17.23	15.71	15.92	19.07	14.99	11.69	16.99
*NPRI	47.97	34.52	27.26	39.89	26.68	35.92	40.33	38.97	36.74	35.21
Ec	2.48	6.21	3.79	3.10	4.49	2.59	3.27	5.99	1.67	3.41
Miscarriage	5.88	2.76	7.14	4.81	5.24	7.04	9.26	4.50	1.00	5.50
PRS	6.50	10.35	5.83	4.81	7.98	8.52	4.90	5.99	4.01	6.19
*OH	17.02	31.06	19.97	14.74	22.69	30.36	28.34	20.98	9.35	19.84
*HDP	20.73	35.90	17.49	9.78	21.69	20.00	25.07	26.98	10.69	17.85
AR	3.40	3.45	1.02	1.86	4.74	5.18	2.72	1.50	1.00	2.55
ADR	0.62	1.38	1.02	0.78	1.99	0.74	0.00	0.00	0.00	0.86
Emb	6.19	5.52	2.33	2.95	4.24	4.81	2.18	5.99	5.01	3.84
AC	1.86	0.00	3.94	2.02	0.75	1.85	3.81	1.50	3.34	2.38
Miscellaneous	0.31	1.38	0.00	0.47	0.50	0.74	0.00	1.50	1.34	0.50
Unknown	0.93	17.26	8.02	6.52	2.99	5.18	6.54	8.99	3.34	5.93

Key

*	Top 4 most common underlying causes
	Most common
	2 nd most common
	3 rd most common
	4 th most common

For all provinces NPRI was the most common cause, but the ranking of causes thereafter varied between provinces. OH had the highest iMMR in Free State, Mpumalanga and North West. HDP had the highest iMMR in Free State and Northern Cape. In the Western Cape M&S was the second most common cause. KwaZulu-Natal had the lowest iMMR from HDP and Western Cape the lowest from OH.

C. Associated factors for women who died (uncorrected data)

Age

The age distribution amongst all live births was sourced from STATS SA (7), thus enabling age related maternal mortality to be calculated. Figure 10 shows that MMR increases with maternal age. Figure 11 shows that this trend was most marked for NPRI, probably due to higher age related COVID-19 mortality, and Obstetric haemorrhage. The previous U-shaped care for Hypertension shown in the previous triennium was not observed in this triennium. This could reflect better care of HPD for young teenagers related to the new HPD protocol published in 2019 (8).

Figure 10: iMMR per age category for the 2020-2022 triennium

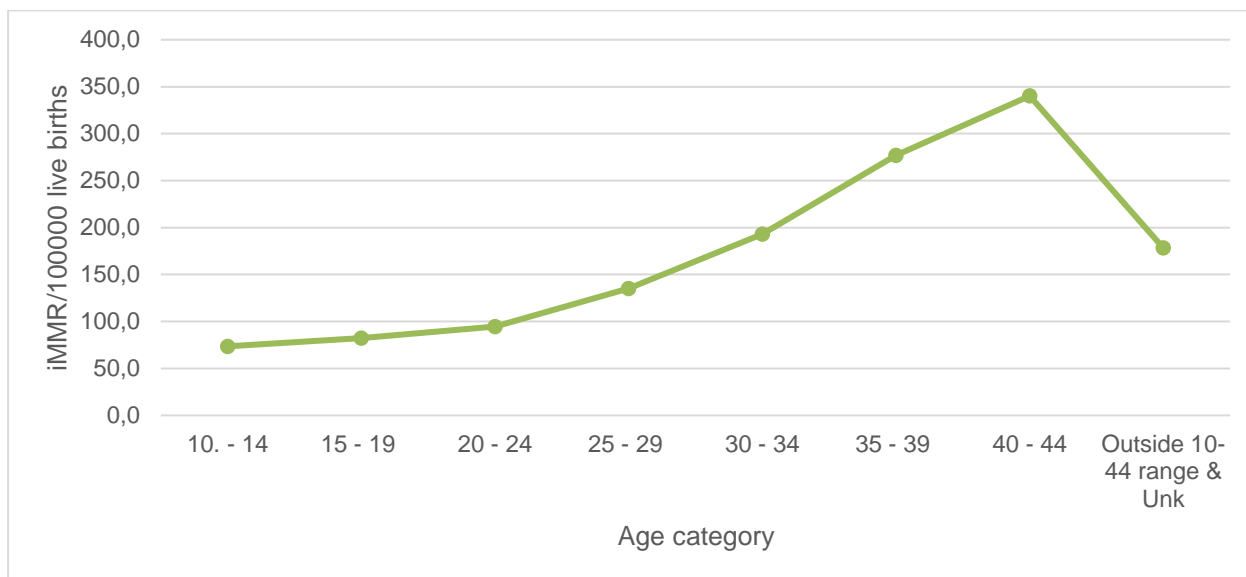
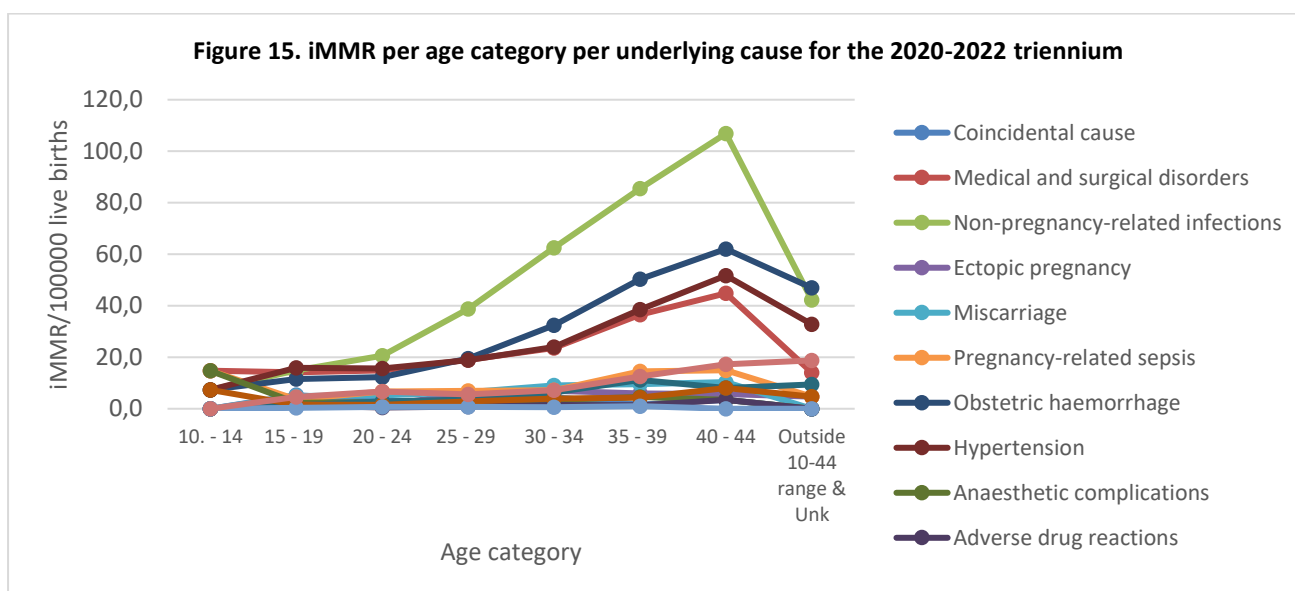


Figure 11: iMMR per age category per underlying cause 2020-2022



HIV status

Table 9 shows that HIV negative women exceeded HIV positive for maternal deaths in this triennium, unlike in previous triennia. This reflects improved testing, and treatment of HIV positive pregnant women and women in general. However, it remains a concern that HIV status was unknown for 13.4 per cent of deaths, and that 14.4 per cent of HIV positive women were not on antiretroviral treatment.

Table 8: Details of HIV testing and treatment

HIV Status		n	%
Positive		1475	39.5
Negative		1759	47.1
Declined test		1	0
Unknown		499	13.4

HIV Treatment	Known Positive	% of known HIV positive
None	213	14.4
TLD	300	20.3
TEE	531	36.0
Other HAART	431	29.2

Anaemia**Table 9: Numbers maternal deaths with anaemia and underlying cause of death**

Primary obstetric problems	No Anaemia	Anaemia	% Anaemia	Unknown
Medical and surgical disorders	268	145	35.1	100
Non-pregnancy-related infections	562	303	35.0	198
Ectopic pregnancy	26	47	64.4	30
Miscarriage	41	58	58.6	67
Pregnancy-related sepsis	102	35	25.5	50
Obstetric haemorrhage	385	114	22.8	100
Hypertension	366	64	14.9	109
Anaesthetic complications	64	10	13.5	3
Adverse drug reactions	14	7	33.3	5
Embolism	70	23	24.7	23
Acute collapse - cause unknown	45	13	22.4	14
Miscellaneous	12	2	14.3	1
Unkown	13	7	35.0	6
Lack of information	26	11	29.7	16
Maternal death	1994	839	29.6	722
Death at home or outside health services	53	12	18.5	35
Coincidental cause	20	8	28.6	51
DDPCP	2067	859	29.4	808

Anaemia, defined as haemoglobin less than 10 gms/dl in pregnancy before the events that led to the death,

occurred in 29.6 per cent of maternal deaths and was over 35 per cent for NPRI, and Medical and surgical disorders (Table 10). However, the high percentage of anaemia in women dying from ectopic pregnancy and miscarriage is probably due to the only HB result available having been measured after the onset of the emergency event.

Caesarean delivery

Table 10: Caesarean delivery and maternal deaths 2020-2022

PROVINCE	Deliveries	CD	CD rate (%)	MD+CD	CDCFR*
Eastern Cape	330739	100672	30.4	122	121.2
Free State	149849	45894	30.6	108	235.3
Gauteng	703334	207695	29.5	336	161.8
KwaZulu-Natal	662648	232152	35.0	257	110.7
Limpopo	409067	94513	23.1	190	201.0
Mpumalanga	273822	58057	21.2	143	246.3
North West	187657	43800	23.3	88	200.9
Northern Cape	68412	15586	22.8	33	211.7
Western Cape	306012	91123	29.8	109	119.6
South Africa	3091540	889497	28.8	1387	155.9

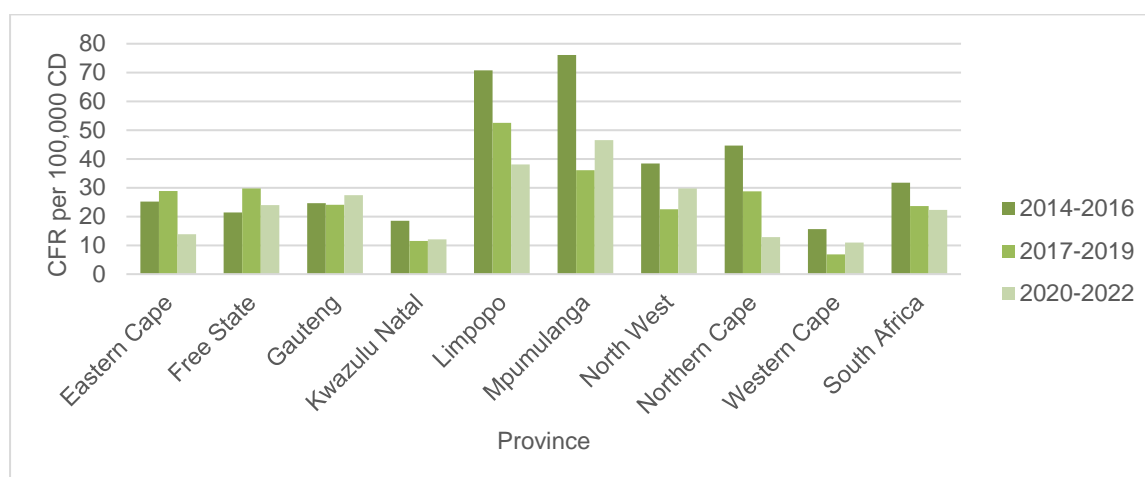
*CD CFR = Number CD deaths per 100,000 CDs

The national CD rate for 2020 to 2022 was 28.8 per cent which is similar to the previous triennium (28.1 per cent). The Case Fatality rate was 155.9 per 100,000 CD which has increased from 2019 (132.4 for 2017-2019 triennia and 112.5 in 2019). The CD Case Fatality Rate increased to 145.7 CD associated deaths per 100,000 CDs in 2020 and 203.6 in 2021, compared to 112.5 in 2019. This could reflect the fact that many sick women with COVID-19 pneumonia in the third trimester had CD for severe respiratory compromise, and it may not have been a direct effect of the CD. This increase in CD CFR could also reflect deterioration of quality of care relating to CD during the pandemic. FS had the highest CD CFR for the triennium and KZN the lowest, which could reflect KZN's rigorous implementation of the Safe CD programme.

In 2022, the CD CFR had declined to 118.4, similar to 2019.

There were 198 deaths from bleeding associated with CD (BLDACD), giving a BLDACD CFR for the triennium of 22.3, similar to 2017-2019 when it was 23.6. Of note in 2020-2022, is the wide discrepancy in BLDACD CFR between provinces with the highest rates in Mpumalanga (46.5 BLDACD deaths per 100,000 CDs) and Limpopo (38.1), with the lowest rates in Western Cape (10.0) and KwaZulu-Natal (12.1). However, Figure 12 shows some very encouraging trends in Limpopo and Northern Cape where BLDACD CFR is showing a downward trend.

Figure 12: Bleeding associated with CD CFR per triennia and province from 2014-2022



D. Health system factors (uncorrected data)

Location and Level of Care

In the 2020-2022 triennium, the majority of deaths (90.1 per cent) occurred at public hospitals with a larger number (6.9 per cent) in private hospitals than in previous years, especially during 2021 (Tables 12 and 13). This shows that the COVID-19 pandemic affected all classes of society.

Table 11: Location of DDPCP 2020-2022

	Facility* N (%)	In transit N (%)	Home/Outside N (%)	Total N (%)
2020	1093 (92.4%)	15 (1.3%)	75 (6.3%)	1183 (100%)
2021	1411 (94.3%)	14 (0.9%)	72 (4.8%)	1497 (100%)
2022	932 (93.9%)	11 (1.1%)	50 (5%)	993 (100%)
2020-2022	3436 (93.6 %)	40 (1.1%)	197 (5.4%)	3673 (100%)

* 2020. Included 80 deaths in private hospitals

*2021. Included 128 deaths in private hospitals

*2022. Included 36 deaths in private hospitals

In 2020-2022 triennium, deaths in private hospitals were 244 compared to 115 in 2017-2019

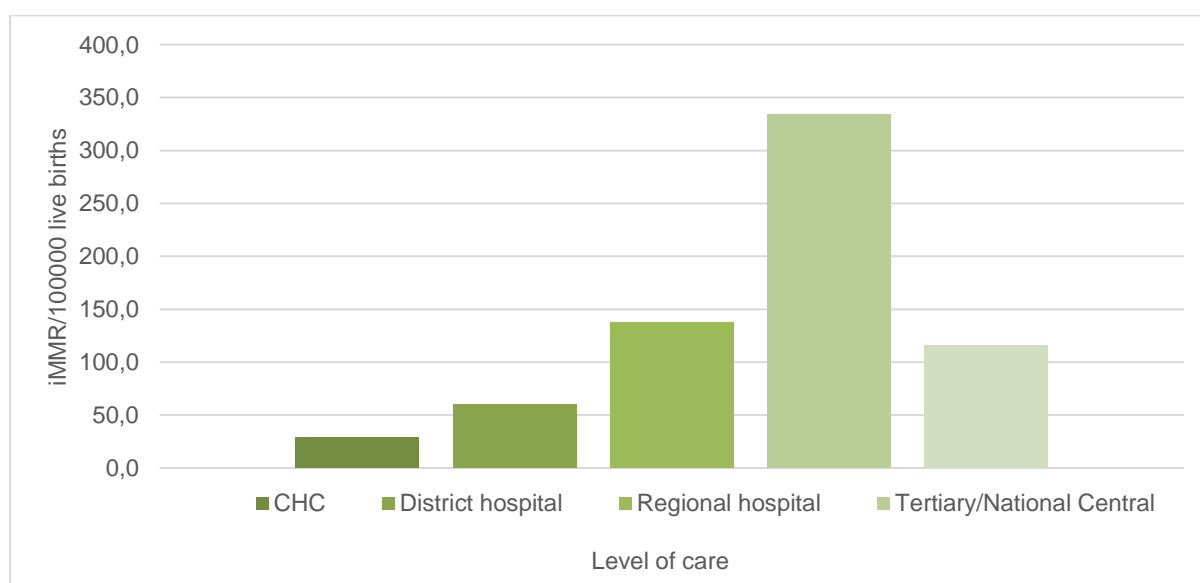
In Table 13, deaths in transit were assigned to the facility from which they were referred

Table 12: Number maternal deaths per underlying category and level of care 2020-2022

Primary obstetric problem*	CHC	District hospital	Regional hospital	Tertiary/ National Central	Private hospital	In facility
Coincidental	4	15	15	25	3	62
M&S	8	81	160	221	27	497
NPRI	14	194	333	380	124	1045
Ect	7	33	28	30	1	99
Miscarriage	7	35	47	72	3	164
PRS	2	22	64	84	10	182
OH	21	167	186	174	36	584
HDP	19	92	172	220	20	523
AR	0	34	26	15	2	77
ADR	2	4	9	10	1	26
EMB	4	38	35	20	12	109
AC	7	25	13	19	1	65
Miscellaneous	0	2	6	7	0	15
Unknown	11	20	26	24	4	85
Total	106 (3.0%)	762 (21.6%)	1120 (31.7%)	1301 (36.8%)	244 (6.9%)	3533 (100%)

*Abbreviations shown on page 4

Figure 13: iMMR per level of care for the 2020-2022 triennium *



*In facility deaths excluding private deaths because no denominator for private births

The finding of an increased iMMR at higher levels of care is due to high-risk women or women with new obstetric complications being referred to higher levels of care (Figure 13). This indicates that the referral system is working correctly; although the condition in which women arrive at TH/NC could reflect substandard care by the lower level that refers, or transport delays. Section E will look at avoidable factors for each level of care.

Booking status

Table 13: Antenatal care details amongst maternal deaths

Primary obstetric cause*	No ANC	Unknown	Received ANC	Total ANC known	% known to have received ANC	<20 weeks	% <20weeks
M&S	121	51	341	462	73.8	205	60.1
NPRI	232	97	734	966	76.0	432	58.9
Ect	64	12	27	91	29.7	20	74.1
Miscarriage	119	19	28	147	19.0	23	82.1
PRS	30	30	127	157	80.9	63	49.6
OH	71	22	506	577	87.7	260	51.4
HDP	113	21	405	518	78.2	236	58.3
AR	6	0	71	77	92.2	45	63.4
ADR	6	3	17	23	73.9	11	64.7
Emb	16	12	88	104	84.6	53	60.2
AC	16	2	54	70	77.1	27	50.0
Miscellaneous	3	1	11	14	78.6	9	81.8
Unknown	5	2	19	24	79.2	10	52.6
Lack information	10	5	38	48	79.2	22	57.9
Maternal death	812	277	2466	3278	75.2	1416	57.4
Death at home or outside health services	15	12	73	88	83.0	41	56.2
Coincidental	27	32	20	47	42.6	10	50.0
DDPCP	854	321	2559	3413	75.0	1467	57.3

*Abbreviations shown on page 4

Table 14 shows Antenatal care was received by 75 per cent of maternal deaths, but only 57.3 per cent booked before 20 weeks. Lowest attendance rates were in women dying from miscarriage or ectopic pregnancy, who would not have been expected to seek antenatal care.

Emergency Referrals

There were 1892 DDPCP (51.5 per cent) and 3655 (47.8 per cent) maternal deaths who had an emergency referral before they died (Table 15 and Figure 14). The majority of referrals were from CHCs, and DHs.

Table 15. Details of Emergency Referrals for maternal deaths

Primary obstetric Cause*	No Referral	CHC	DH	RH	TH/NCH	Pvt
M&S	231	85	121	53	14	9
NPRI	517	199	227	62	12	46
Ect	60	21	13	4	0	5
Miscarriage	83	28	43	8	1	3
PRS	75	36	52	18	1	5
OH	336	98	138	19	1	7
HDP	221	118	143	38	11	8
AR	46	12	18	0	0	1
ADR	12	4	6	3	0	1
Emb	69	27	17	0	0	3
AC	46	16	9	0	0	1
Miscellaneous	6	2	6	1	0	0
Unknown	11	7	7	1	0	
Lack of information	30	7	10	3	0	3
Maternal death	1743	660	810	210	40	92
Death at home or outside health services	96	2	2			
Coincidental cause	53	5	15	4	0	2
DDPCP	1892	667	827	214	40	94

*Abbreviations are shown on page 4

Figure 14: Comparison of percentage managed at some point and those that died at that level



E. Avoidable factors (uncorrected data)

Overall avoidability and comparison with previous triennia

Table 16: Avoidability of DDPCP 2020-2022 compared with 2017-2019*

	2020 (DDPCP = 1183)	2021 (DDPCP= 1497)	2022 (DDPCP= 993)	2020-2022 (DDPCP= 3673)	2017-2019 DDPCP= 3289)
	N (%)	N (%)	N (%)	N (%)	N (%)
<u>No</u> suboptimal care identified	401 (33.9%)	528 (35.3%)	320 (32.2%)	1249 (34%)	924 (28.1%)
Suboptimal care, <u>no impact</u> on outcome	96 (8.1%)	132 (8.8%)	87 (8.8%)	315 (8.6%)	312 (9.5%)
Suboptimal care, <u>possible</u> impact on outcome	408 (34.5%)	538 (35.9%)	333 (33.5%)	1279 (34.8%)	1021 (31.0%)
Suboptimal care, <u>probable</u> impact on outcome	278 (23.5%)	299 (20%)	253 (25.5%)	830 (22.6%)	1032 (31.4%)

*% potentially preventable 58 per cent in 2020; 56 per cent in 2021; 59 per cent in 2022; and 57.4 per cent in 2020-2022 compared to 62.4 per cent in previous triennium.

Deaths were assessed to be possibly or probably preventable by the health system for 58 per cent of women who died in 2020, 56 per cent in 2021, and 59 per cent in 2022, the most avoidable being OH, and HPD deaths, with lesser numbers in the NPRI group (Table 16 and Figure 15). There were 57.4 per cent of 2020-2022 triennial deaths that were potentially preventable compared to 62.4 per cent in the previous triennium. This decrease was probably due to the large numbers of deaths from COVID-19 in 2020-2022, most of which were assessed as being unavoidable. The largest percentage of avoidable deaths was found in OH deaths. There was a notable increase in the proportion of probably avoidable anesthetic deaths in 2022, and this will be further elucidated in the chapter on anaesthetic deaths in the comprehensive report.

Figure 15: Impact of suboptimal care per underlying cause for 2020-2022 triennium

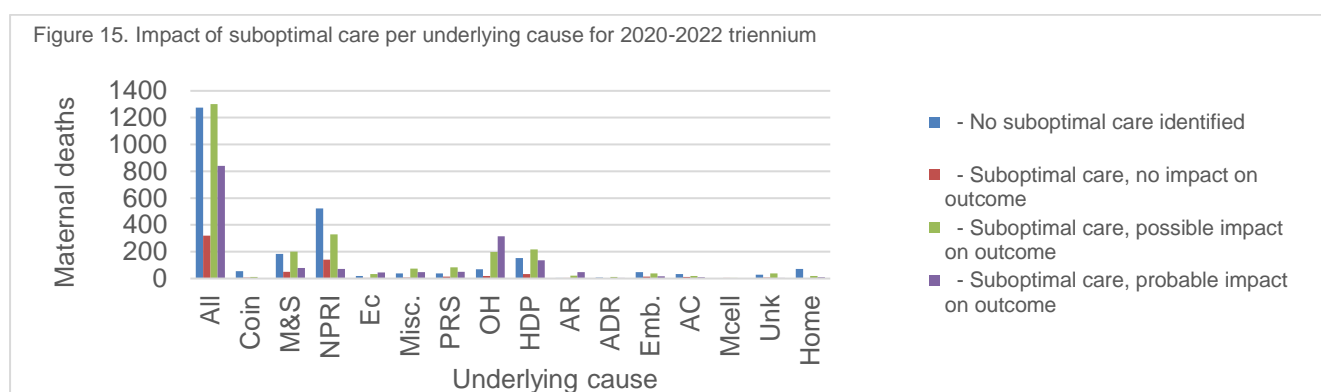


Table 17 shows that the most frequent avoidable factors in the patient/community related category were lack of antenatal care and delay accessing care. These both decreased slightly in the 2020-2022 triennium compared to the previous one, indicating that women continued to seek care for their pregnancies, despite the COVID-19 pandemic.

Table 17: Patient/Community related Avoidable factors 2020-2022 and comparison with previous triennium

2020-2022	Number 2020-22	% 2020-2022	% 2017-2019
Lack of information	400	10.7	8.7
Assessable cases	3334	89.3	91.2
No avoidable factor	1623	48.7	46.8
Avoidable factors/ assessable cases	1711	51.3	53.2
No antenatal care	609	16.3	19.9
Infrequent antenatal care	152	4.1	6.8
Delay in accessing medical help	1057	28.3	29.7
Declined medication/ surgery/advice	277	7.4	8.6
Family problem	78	2.1	1.8
Community problem	31	0.8	0.6
Unsafe abortion	44	1.2	1.6
Other	259	6.9	1.7
Total	3734		

Overall, there was a small increase in the proportion of deaths with administrative avoidable factors (Table 18). However, comparing years, the proportion of deaths with Administrative avoidable factors increased in 2020 (57.1 per cent) and 2021 (52.6) compared to 48.4 per cent in the previous triennium. The most frequently cited avoidable factors in this category were appropriate skill not available on site/standby, lack of healthcare facilities (eg ICUs) and delay attending to patient due to overburdened services. This probably reflects the effects of the COVID-19 pandemic on functioning of the health system. The Human Resource categories cannot be properly compared between triennia due to changes in categories as shown in the footnote beneath the table.

Table 18: Administrative related avoidable factors

Description	Number 2020-22	%2020-2022	%2017-19
Lack of information	330	8.8	8.7
Assessable cases	3404	91.2	91.3
No avoidable factor	1702	50	51.6
Avoidable factors/assessable cases	1702	50	48.4
Transport problem: Home to institution	57	1.5	1,9
Transport problem: Institution to institution	234	6.3	6,2
Lack of accessibility: Barriers to entry	47	1.3	1,2
Lack of accessibility: Other	50	1.3	0,7
Delay in attending to patient (Overburdened service)	265	7.1	6,4
Delay in attending to patient (Reason unknown)*	185	5	n/r
Lack of healthcare facilities: ICU	328	8.8	8,3
Lack of healthcare facilities: Blood/blood products	82	2.2	3,1
Lack of healthcare facilities: Other	119	3.2	2,9
Inadequate numbers of staff on duty*	271	7.3	n/r
Appropriate skill not available on site / on standby*	363	9.7	n/r
Communication problems: Technical	70	1.9	1,6
Communication problems: Interpersonal	63	1.7	3
Other	359	9.6	9,1
Total	3734		

* not recorded; new categories 2020-2022 compared to 2017-2019 when documented: Lack appropriately trained staff Drs - 20.5 per cent, Nurses- 13.7 per cent)

Medical care avoidable factors are shown in Table 19. These were most common for district hospitals which had increased since the previous triennium. Avoidable factors in private hospitals decreased. Poor problem recognition and sub-standard care remain the most frequent problems similar to previous triennia.

Table 19: Medical care related avoidable factors

Proportion avoidable cases (%)	CHC	DH	RH	TH/NC	Private
Avoidable cases	42.1 <i>(39.3 in prev triennium)</i>	65.3 <i>(69.4 in prev triennium)</i>	57.3 <i>(59 in prev triennium)</i>	42.5 <i>(40.2 in prev triennium)</i>	45.9 <i>(62.9 in prev triennium)</i>
Initial assessment	19.9	20.7	14	8.7	14.2
Problem with recognition / diagnosis	18.9	32.8	23.2	14.7	22.6
Delay in referring the patient	10.5	20	7.2	1.1	2.6
Managed at inappropriate level	4.3	15.3	5.2	0.8	0.6
Incorrect management (Wrong diagnosis)	3.1	9.5	7	3.5	5.8
Sub-standard management (Correct diagnosis)	10.9	25.2	29.1	22.5	17.7
Not monitored / Infrequently monitored	1.9	9.3	8.4	3.9	1.9
Prolonged abnormal monitoring with no action taken	2.9	10.8	11.2	6	6.1

Avoidability per level of care

Figure 16 shows the categories of preventability for each level of care. The highest proportion of potentially preventable deaths occurred at district hospitals, the first referral level for primary care facilities, often staffed by junior doctors and often far away from specialist care at higher level hospitals (Figure 17).

Figure 16: Impact of suboptimal care at level of care for 2020-2022 triennium

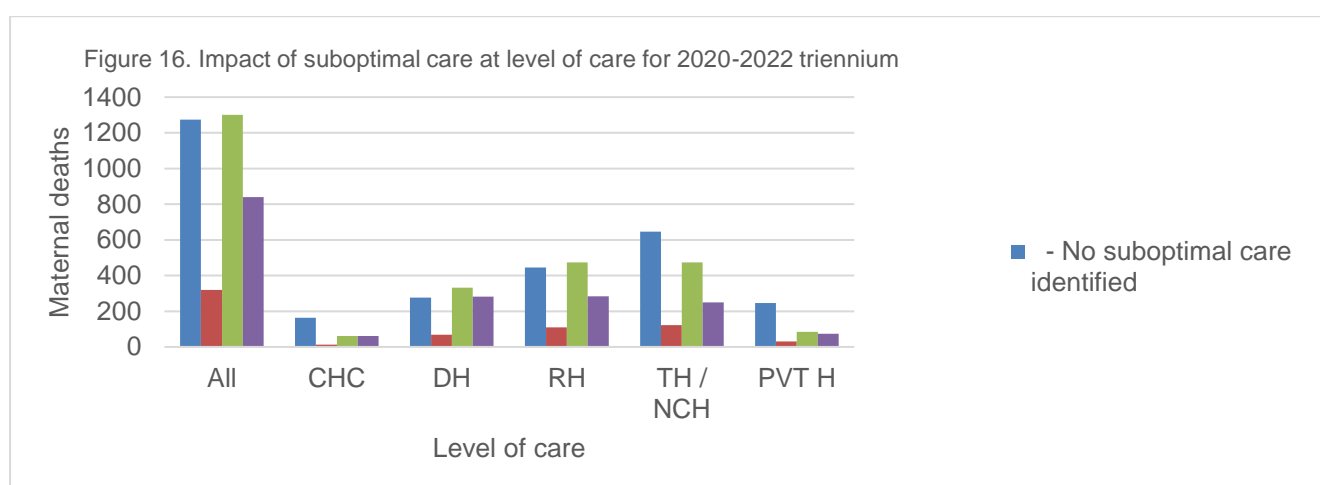
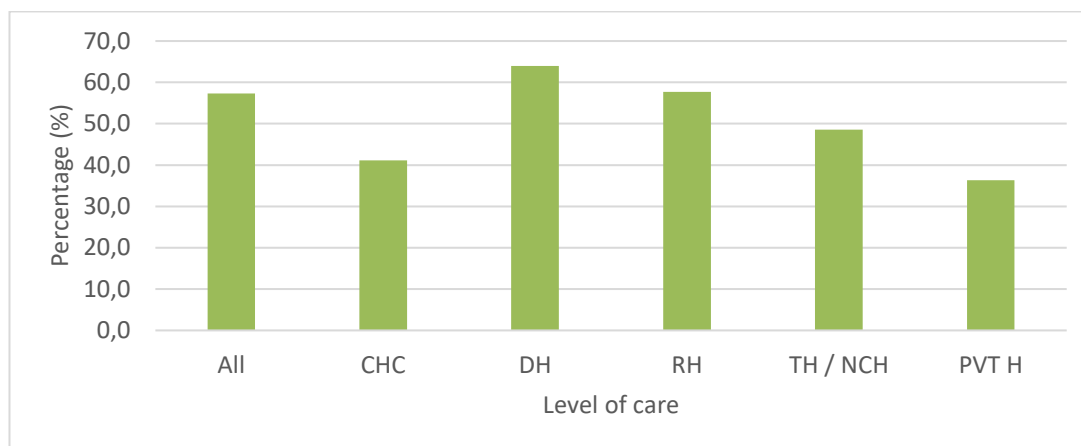


Figure 17: Potentially preventable deaths per level of care



DISCUSSION

Notification, submission, and assessment of maternal death cases for the Saving Mothers report was severely hindered after the onset of the COVID-19 pandemic. This meant that the data may not be as accurate as in previous years.

An important finding of this report is the 30 per cent and 47 per cent increase in iMMR in 2020 and 2021 respectively compared to 2019, after correcting for under-reporting. This is thought to reflect the direct and indirect impact of the COVID-19 pandemic and is similar to findings in other countries (9).

Of note, the return in 2022 of iMMR similar to pre pandemic levels suggests a resilient health system.

Assessment of the collateral impact of COVID-19 needs further interrogation of the data by chapter heads, although it is likely that the increase in OH deaths and deaths with administrative avoidable factors in 2020 and 2021, reflects a decline in quality of maternity care during the worst years of the pandemic, because preventing maternal deaths requires a fully functional health system. The increase in anaesthetic deaths needs to be investigated, especially given the concern in SA over several case reports of maternal deaths from inadvertent intrathecal tranexamic acid (TXA) injection.

KwaZulu-Natal and Western Cape have iMMRs less than 100 per 100,000LBs and are closer to achieving the MDG. Limpopo province has made remarkable progress in reducing its iMMR, possible due to the Limpopo Obstetric Response Team (LORT) launched in early 2020.

CONCLUSION

The NCCEMD process was impacted by the COVID-19 pandemic because of increased workload and sickness of Healthcare Workers.

Maternal deaths increased by 30 per cent in 2020 and 47 per cent in 2021 compared to 2019, during the most severe years of the COVID-19 pandemic, but the iMMR decreased to pre-pandemic levels in 2022.

This trend was seen in all provinces.

COVID-19 pneumonia /NPRI deaths were the major contributor to the steep increase in 2020 and 2021.

Deaths from Obstetric Haemorrhage increased in 2020 and 2021, reflecting collateral impact of the COVID-19 pandemic on functioning of the health system.

Of concern, anaesthetic deaths were twice as high in 2022 compared to 2020 and 2021.

Hypertensive deaths and Deaths from Medical and Surgical disorders were the third and fourth most common causes, followed by Early Pregnancy complications. The decline in Hypertension and Early pregnancy deaths in the current triennium is encouraging, but the possibility of under-reporting of maternal deaths during the pandemic must also be considered.

The pandemic reversed progress towards achieving SDG goal of MMR 70 maternal deaths per 100,000 live births by 2030, but progress is now back on track.

RECOMMENDATIONS

(a) Summary of Recommendations arising from Saving Mothers Triennial Report.

(Detailed Recommendations with allocation of responsibility will be found in the Short triennial report and the Comprehensive report)

The impact of previous findings of the NCCEMD in raising awareness of critical issues and recommending interventions is noted including HIV/TB deaths in pregnant women; Nevirapine toxicity when initially part of ARV regimen, Deaths from bleeding associated with Caesarean delivery; Hypertension deaths in teenagers etc. In addition, guidance on PPH, CD and Hypertension have been produced.

Renewed energy is required to implement new recommendations and previous ones that have not been fully implemented, in part due to the COVID-19 pandemic.

Crucial recommendations arising from both the 2017-2019 and the 2020-2022 triennial reports are as follows:

1. All maternity sites must continue to conduct morbidity and mortality review meetings, where:

- Minutes are kept
- Actions are assigned to individuals
- There is follow-up to check that the actions have been performed and there is accountability

2. Maternal and neonatal health services must be prioritised irrespective of existing parallel programmes by:

- Political commitment by NDOH and provinces in line with the International Maternal and Neonatal Health Conference (IMNHC) declaration. (There was signed Commitments to achieving the SDG of an MMR of 70 maternal deaths per 100,000 live births by 2030; and promotion of respectful dignified care for women in maternity services by South Africa DOH).
- MECs must ensure that the non-negotiable signal functions for MNH are in place and function properly. This includes ensuring that all equipment, medicines and other consumables required to implement the maternal and newborn package of care are in place in all health facilities/service points, and to feedback to the Ministry of Health quarterly.
- Financial Investment - funding for MNH services must be directed towards addressing the leading causes of maternal and neonatal mortalities and should be ring fenced.

3. Provincial health system interventions and oversight to ensure:

- The NCCEMD process functions effectively as mandated by MOH in each province, and data is submitted accurately and timeously.
- Integration of HIV, COVID-19, Contraception, Safe Surgery and Mental Health services into maternity and neonatal health services
- Regular monitoring and evaluation of progress towards implementing NCCEMD recommendations and progress towards the SDG.

- Strengthen lines of communication at all levels of care. Support is required for frontline healthcare workers from the province down to the lowest levels of care. HODs and MECs to visit institutions and engage with clinicians and patients on their daily challenges.
- Ensure functional communication channels exist for consultation with and referral to higher levels of care (inter-facility). Promote easy access to maternity care by the community.
- Establish On-site Midwife run Birthing Units (OMBUs) at all large district, regional and tertiary hospitals which currently conduct large numbers of births of low-risk women. This will allow healthcare workers to focus on those women with risk factors.

4. Clinical management interventions:

Focus to be on the top 5 leading cause of maternal deaths, **5 Hs** by:

- Institutionalising pandemic lessons about maintaining MNH and SRH services during humanitarian situation.
- Contraceptive services need to be expanded to include postpartum LARCs (esp. IUCD insertion), and Contraceptive availability at all facilities caring for women and at high-risk medical clinics must be ensured.
- Antenatal care restructured to ensure every problem case reviewed on-site prior to referral by most experienced midwife and at least once between 28-34 weeks gestation.
- Clinical examination skills during antenatal, intrapartum and postpartum care must be emphasized with ongoing training.
- Prior to discharge from a ward and facility, specific criteria must be checked and documented, with appropriate action taken for abnormal findings, and to ensure women are not discharged in unstable condition.

5. Specific interventions for 5Hs:

- **HIV** - Implement the updated PMTCT protocol for better HIV management and TB detection (viral load suppression and escalation for second line agents when needed). Ensure CD4 results are reviewed and high-risk women treated appropriately to prevent and treat HIV associated infections.
- **Haemorrhage** - Establish a Safe Labour minimum standards criteria and evaluation programme like the Safe Caesarean Delivery (surgery and anaesthesia) programme. Continue implementation of pre-existing initiatives e.g., NASG, Massive blood transfusion protocol, safe CD audits; and evaluate their impacts. Implementation of new approach to managing PPH in all maternity sites: EMOTIVE drape and care bundle for PPH.
- **Hypertension** - Guideline dissemination with training. Early pregnancy counselling service and access to safe MTOP where indicated. Community awareness for earlier initiation of antenatal care.
- **Heart (medical and surgical disorders)** - Medical Obstetric clinics to be established at regional and tertiary hospitals for women with medical disorders requiring multi-disciplinary care. Screening questions and Clinical examination skills during antenatal care. Screening for mental health issues and identifying women at risk of suicide.
- **first Half of pregnancy complications** - Set up an expert group to improve management of early pregnancy complications: miscarriage and ectopic pregnancy. Early Diagnosis (including access to pregnancy testing). Outreach to primary care gynaecology services in CHCs. Early pregnancy counselling service and access to safe TOP. Earlier initiation of antenatal care.

5. Training and policies

- ESMOE board to be constituted, ESMOE modules updated and programme to restart.
- ESMOE Training (including anaesthetic ESMOE) to be compulsory for all new staff and two-yearly updates for existing staff.
- EOST drills/exercises must occur monthly in maternity facilities. This is especially so at primary care and district hospital level as the rarity of conditions makes doing emergency drills essential to maintain skills.

- Each hospital and CHC should have at least one on-site trainer able to run the relevant ESMOE modules and drills.
- Adherence to new SA Maternity Care Guideline.

(b) Framework for Key Recommendations from Saving Mothers triennial report 2017-2019

	What	How	When & Where	
	Focal areas for interventions 5Hs	Pillars necessary for quality Care 3 Pillars	Interventions along continuum of care All phases (3Cs)	Phase Interventions at health care facilities
NCEMID Mortality and morbidity reviews, minutes, actions, accountability and feedback	1. HIV	1. Competent (knowledgeable and skilled) health care providers Ensure ESMOE (including anaesthetic ESMOE) training for all new staff and two-yearly updates for existing staff. EOST drills/exercises must occur monthly in maternity facilities. This is especially so at primary care level as the rarity of conditions makes doing emergency drills essential to maintain skills 2. Functional inter-facility referral system Ensure proper communication between clinicians at various levels and sites using Vula App. Improve access at Level one to higher level of expertise via Outreach from Regional hospitals or telephonic, or IT/Virtual linkages for advice in antenatal clinics and in emergency situations. Wi-Fi in all facilities 3. Appropriately resources health facilities Equipment and human resources determined by Safe Labour and CD programmes On site Midwifery Birthing Units (OMBUs) to relieve pressure on Regional and Tertiary hospital labour wards Policy on retention of staff in historically disadvantaged districts	Community <ul style="list-style-type: none"> • Use MomConnect to send messages to pregnant women • CHWs to integrate maternal health, mental health and contraception into their home visits • Increase numbers of social workers available to assess at risk women for social grants, and food parcels. Integration of Home affairs departments in delivery facilities enables immediate issuing of birth certificates and access to grants Quality Care <ul style="list-style-type: none"> • Establish minimum standards for safe maternity care/ safe care during labour including minimum staffing norms for safe care in labour. • Respectful care at all levels 	Pre-pregnancy <ul style="list-style-type: none"> • Contraception services need to expanded to include postpartum IUCD insertion and LARCs and ensuring contraceptive availability at all facilities caring for women and at high risk medical clinics, adolescent clinics and higher institutions
	2. Obstetric Haemorrhage			First Half Pregnancy <ul style="list-style-type: none"> • First evaluation/visit – antenatal care <ul style="list-style-type: none"> • Set up expert group to recommend on improving management early pregnancy miscarriage and ectopic Mx, early pregnancy counselling service and access to safe TOP, earlier initiation ANC after pregnancy diagnosis, screening mental health and identifying women at risk suicide • Follow-up antenatal care <ul style="list-style-type: none"> • Antenatal care restructured to ensure every problem case reviewed on-site prior to referral by most experienced midwife and all pregnant women have their pregnancies reviewed by the most experienced and knowledgeable midwife at least once between 28-34 week's gestation
	3. Hypertensive disorders in pregnancy			Pregnancy and Childbirth <ul style="list-style-type: none"> • Intrapartum care <ul style="list-style-type: none"> • Introduce new Intrapartum care guidelines (CLEVER) • Training in Safe CD and anaesthesia
	4. Heart and other M&S conditions			Postnatal - Mother <ul style="list-style-type: none"> • Discharge of mother <ul style="list-style-type: none"> • Follow-up hypertension with severe features, senior advice should be sought before discharge and patients provided with antihypertensive medications. • Before discharge certain criteria must be met. Temperature <37.2, Pulse <100, • Improve postnatal care coverage including use of contraception and detection of mental health problems
	5. First Half pregnancy			

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