2020 - 2022

National Perinatal Morbidity And Mortality Committee (NaPeMMCo) Triennial Report

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Department:
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List of Acronyms

AMS	Antimicrobial stewardship
BANC	Basic antenatal care
CPAP	Continuous positive airway pressure
COVID-19	Corona Virus Disease of 2019
DCST	District Clinical Specialist Teams
DHIS	District Health Information System
EC	Eastern Cape
EMS	Emergency medical services
END	Early neonatal deaths
ENMR	Early neonatal mortality rate
ESMOE	Essential steps in managing obstetric emergencies
FCC	Family centred care
GP	General practitioner
HBB	Helping babies breathe
HIC	High income countries
HHAPINESS	Health system improvements, healthcare worker recruitment and training, reducing deaths due to asphyxia, prematurity, and infections, and implementing neonatal survival strategy
ICU	Intensive care unit
IMR	Infant mortality rate
IPC	Infection prevention champion
IUD	Intrauterine death
IUGR	Intrauterine growth retardation
KMC	Kangaroo mother care
KZN	KwaZulu-Natal
LBW	Low birth weight
LBWR	Low birth weight rate
LMIC	Low- and middle-income countries
LNMR	Late neonatal mortality rate
MNCH	Maternal, neonatal and child health
MSSN	Management of small and sick neonates
MRC	Medical research council
NC	Northern Cape
NaPeMMCo	National Perinatal Morbidity and Mortality Committee
NCCEMD	National Committee on Confidential Enquiries of Maternal Deaths
NMR	Neonatal mortality rate
PNMR	Perinatal mortality rate
PPIP	Perinatal Problem Identification Programme
ProPeMMCo	Provincial Perinatal Morbidity and Mortality Committee
RMS	Rapid mortality surveillance
SB	Stillbirths
SBR	Stillbirth rate
SDGs	Sustainable Developmental Goals
SIDS	Sudden Infant Death Syndrome
StatsSA	Statistics South Africa
U5MR	Under-5 mortality rate
VR	Vital registration
WBOT	Ward-based outreach team
WC	Western Cape
WHO	World Health Organization

Definitions of Indicators

Acronym	Explanation	Calculation	Indicator for:
NMR	Neonatal mortality rate	Total number of neonatal deaths / Total number of live births x 1 000	Overall neonatal care HIC< 6 LMIC <12 (SDG)
ENMR	Early neonatal mortality rate	Total number of neonatal deaths in first week / Total number of live births x 1 000	Intrapartum care, and the quality of neonatal care in the facility where baby is born
LNMR	Late neonatal mortality rate	Total number of neonatal deaths from day seven to day 27/ Total number of live births x 1 000	Neonatal care in hospital, community or at home
LBWR	Low birth weight rate	Total number of births <2.5kg / Total number of births X100	Socio-economic status of an area
SBR	Stillbirth rate	Total number of stillbirths / Total number of births x 1 000	Quality of intrapartum obstetric care
PNMR	Perinatal Mortality rate	Total number of perinatal deaths (SB+END) / Total number of births x 1 000	Indicator of obstetric care

- A viable live born baby from birth to 28 days is called a neonate.
- Neonatal deaths are subdivided into:
    - early (day 0 to day six completed)
    - late (day seven to day 27 completed)
- A still birth is a viable baby born dead.

NaPEMMCo Members 2020/2022

Chairperson
TJ Mpembe (KwaZulu-Natal)

Deputy Chairperson
Prof. R Masekela (KwaZulu-Natal) resigned August 2022

Members
Prof. S Gebhardt (Western Cape)
T Makatane (Free State)
Dr L Sono (Mpumalanga)
Prof. D Mawela (Gauteng)
Prof. S Velaphi (Gauteng)
Dr M Rakgole (North West)

Secretariat
Dr M Makua
E Mokaba
J Mahuntsi
F Nchabeleng

FOREWORD

The National Perinatal Morbidity and Mortality Committee (NaPeMMCo) was appointed and tasked to assess the quality and practice of perinatal care and outcomes as well as support the national Department of Health with the formulation of guidelines during their term of office. The committee produces reports annually using multiple sources of data such as the Perinatal Problem Identification Programme (PIPP), District Health Information System (DHIS), Statistics South Africa (StatsSA) and the Department of Home Affairs. During the period 2020 to 2022 the healthcare systems in the country had to adapt to the challenges caused by the COVID-19 pandemic, which brought unexpected changes to the delivery of healthcare, but also allowed the system to adapt and learn how to function through a crisis. One of the biggest challenges faced by the committee in the last three years was getting the required data to input on the annual reports.

The committee would like to encourage all the PPIP sites in the country to collate data as required and provincial health departments to ensure that data is collected and submitted on time. Currently, the committee is preparing for the triennial report as mandated by the Minister of Health. The committee recommends that by end of 2023-2024 financial year, all data should be complete and sent through to allow all the processes to continue smoothly.

We would like to thank all facilities that kept on using PPIP data for improving quality care under the circumstances. We wish to continue working together in ensuring that our babies are saved at all costs and mitigating all the challenges facing the clinical and health systems to save mothers and babies.

In this report, the committee will be reporting on the perinatal outcomes of 2020 to 2022. The country lost 30 000 babies of which 20 000 were from stillbirths and 10 000 were neonatal deaths. The death of one newborn is a huge emotional blow to the mother and family. This should be declared a pandemic for the country which requires an urgent and robust mobilisation of funding towards resources to reduce perinatal mortality. It should be noted that this report excludes deaths which occurred outside healthcare facilities and neonatal deaths which occurred in the paediatrics wards, which the committee intends to include in the future based on data availability.

Saving the lives of our babies will save the future of our country. The National Department of Health should ensure that recommendations in this report are implemented with immediate effect.

By NaPeMMCo Chairperson: TJ Mpembe

EXECUTIVE SUMMARY

The NaPeMMCo was established by the Minister of Health to assess the quality and practice of perinatal care and monitor outcomes in the entire country, support the national Department of Health with the formulation of guidelines, and make recommendations that will improve perinatal and neonatal outcomes based on clinical evidence. In this report, the committee will be reporting the perinatal care indicators for the country and provinces for 2020 to 2022. The data on deliveries is based on the DHIS, the data on causes of deaths and avoidable factors is from the PPIP and data on mortality rates is from both databases. In addition, estimates of the number of births and neonatal mortality rates were captured from the Rapid Mortality Surveillance (RMS) Report for 2019 and 2020.

Data from the DHIS indicate that there has been a steady increase in the number of births over the last eight years increasing from 968 943 in 2014, reaching figures of over one million births at 1 055 741 in 2020 and 1 046 863 in 2021, with a reduction in 2022 to 988 936 births. The province with the highest number of births in 2021 was Gauteng with 235 308 births, and the one with lowest number of births was Northern Cape at 23 003. According to the DHIS the national perinatal mortality rate has remained the same over the years at about 30 per 1 000 births for the past eight years, with the recent rate recorded as 31 per 1 000 births. Similarly, both the national stillbirth and early neonatal mortality rate have not improved remaining at 20 per 1 000 births and 10 per 1 000 live births respectively. Put in simple terms, annually South Africa has 20 000 babies who are well grown or developed who die before they are born, and in addition to these 10 000 babies who are born alive die within the first seven days of life. The Rapid Mortality Surveillance (RMS) Report estimates, which include births and deaths from the private healthcare sector and community, compared to the DHIS data, which only include public healthcare in-facility births and deaths, reported that there were just over 1 200 000 births and the neonatal mortality rate was 12 per 1 000 live births in 2020, in South Africa.

Based on the PPIP data, the common obstetric conditions associated with perinatal deaths (stillbirths and early neonatal deaths) were unexplained intrauterine death (24.5%), spontaneous preterm births (21.0%), maternal hypertensive disorders (15.1%), intrapartum asphyxia (12.4%) and antepartum haemorrhage (10.5%). The common causes of neonatal deaths were prematurity (46.1%), intrapartum asphyxia (23.1%) and infections (16.2%). A significant proportion of neonatal deaths were assessed to be preventable, and the top ten modifiable or preventable factors were inappropriate response to foetal movement by the mother (32.2%), not attending antenatal care (18.2%), booking late in pregnancy (16.2%), lack of transport either from home to institution or institution to institution (15.0%), delay in seeking medical attention during labour (14.1%), anaesthetic delay (14.0%), insufficient nurses on duty (11%), medical employees not responding to maternal hypertension (9.5%), inadequate facilities/equipment neonatal unit/ nursery (9.1%), and no accessible neonatal intensive care unit (ICU) bed with a ventilator (8.1%).

In comparing the DHIS and PPIP databases, DHIS data was relatively more complete in terms of numbers of births and deaths but it did not provide information on causes of deaths, hence the PPIP database was used to assess causes of deaths and modifiable factors. Completeness of data varies between provinces. Every effort should be made to ensure that data on number of births, number of deaths, causes of deaths and on avoidable factors associated with these deaths is collected and complete, as its quality is critical in assessing the performance of the country in reducing stillbirths and neonatal deaths. There was a sharp increase in total births in 2020 which slowed down in 2021. This could be due to normal variation seen from year to year or impact of limited access to healthcare facilities during the COVID-19 pandemic, and thus more births occurred at home during 2021. This will need verification by comparing StatsSA birth registration and DHIS recorded births.

In conclusion, the country loses 30 000 babies every year either before they are born or within the first week of life. The committee has major concerns that such a high number of babies die every year, with several of the deaths being assessed to be preventable. Every effort should be taken to prevent perinatal deaths (stillbirths and neonatal deaths), and this requires considering the high perinatal mortality rate to be a pandemic, so that adequate resources are mobilised towards reducing these deaths, and addressing all avoidable factors associated with these deaths. The recently launched World Health Organization (WHO) guidelines on recommendations on use of antenatal corticosteroids in mothers in preterm labour for improving preterm births outcomes and on evidence-based interventions that have high impact on reducing deaths related to prematurity should be widely implemented in all facilities throughout the country with immediate effect.

INTRODUCTION

This interim report for 2020/2021 reflects the country's status quo post-COVID-19 years. The DHIS and PPIP data discrepancies have made the analysis of the data difficult. It should be noted that the committee resorted to relying mainly on the DHIS for counting deliveries and births. The PPIP data was utilised to interpret the common causes of deaths for those sites that submitted the data. This data gave a general status quo in the country. It is therefore further emphasised that PPIP be institutionalised in all healthcare facilities for all to get reliable information especially.

The expectation is to use PPIP data for quality improvement not just to comply with a national submission. The process should involve the identification of champions at a local level who could be a medical officer, midwife, and unit clerk (to assist with entering the data into the computer). The role of these champions should be to ensure that all deaths are discussed, and appropriate forms and codes are allocated after team discussions or file audits within the unit where possible within 24 hours to a maximum of seven days for busy hospitals. Over and above these champions, the monitoring and evaluation teams such as district information officers and facility information officers should be trained to support and lead as a technical team behind the PPIP process.

It is an expectation to align the PPIP data with DHIS data to ensure the discrepancies do not exceed more than 10 per cent at least. The responsibility of managers such as operational managers, heads of clinical units and hospital managers would be to ensure all the support like the availability of computers and or networks and ensure data is analysed before it is sent to the next level. If PPIP data is used to improve care a lot of patient safety incidences could be prevented.

It is therefore important to interpret this data with caution considering the incompleteness of data whilst learning from those sites that submitted. PPIP data should be presented at least six-monthly at local facilities, district, and provincial level where clinical governance meetings are held. This will assist facilities to use this data for quality improvement as well as keep up with updating the programme monthly.

In acknowledging that DHIS only reports data from births and deaths occurring in public healthcare facilities, we have included data from the RMS Report, which gives a true estimate of number of births and deaths in the country as it includes births and deaths from the private healthcare sector and those occurring at home. RMS was established to monitor the trend in the number of deaths recorded on the national population register at a time when there was a substantial time lag in the cause of death reports being produced by StatsSA(1). It has been providing empirical estimates of the mortality-based high-level indicators from monitoring health and the performance of the Department of Health since 2012. It estimates the number of births derived from the number of births from those reported by the DHIS, corrected for an estimate of the births that took place outside a public health facility. The estimate of number of births outside public health facilities is based on the number under the age of one year who were covered by medical aid or private health insurance plus the number of births which occur at home. The RMS estimated the neonatal mortality rate (NMR) from registered deaths (adjusted for under-registration assumed to be the same as deaths under the age of one year) for the period 2000 to 2017 and the DHIS (adjusted for under-coverage, relative to the registered deaths and the incompleteness of the vital registration) for the period 2011-] to 2020(2).

SECTION I. Analysis of Births and Perinatal Deaths based on the District Health Information System (DHIS)

Number of births in South Africa from 2014 to 2022

There was a steady increase in the number of births over the last eight years increasing from 968 943 in 2014, reaching figures of over one million births at 1 055 741 in 2020 and 1 046 863 in 2021 (Figure 1). This increase was noted in all provinces (Figure 2). The province with the highest number of births in 2022 was Gauteng with 223 069 births, and the one with lowest number of births was the Northern Cape at 22 864. There was a sharp increase in total births in 2020, but they slowed down in 2021. This could be due to the normal variation seen from year to year or the impact of limited access to healthcare facilities during the COVID-19 pandemic, and thus more births occurred at home during the year 2021. In 2022 the number of births declined further to just under a million at 988 936. This will need verification by comparing StatsSA birth registration and DHIS recorded births.

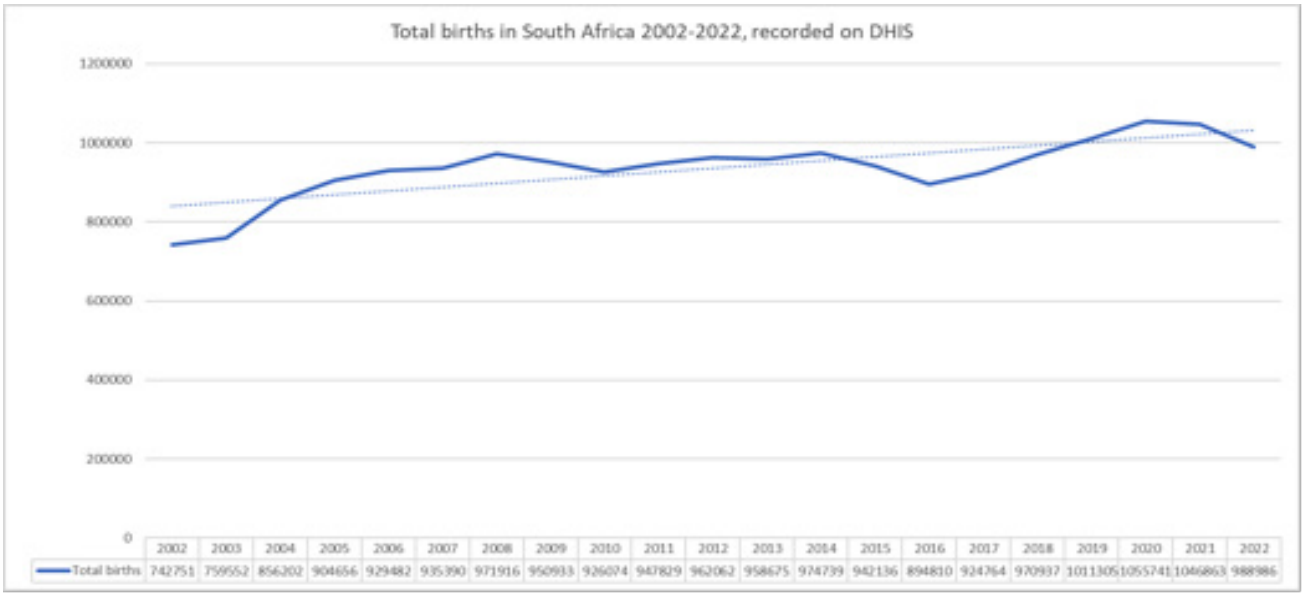


Figure 1. Trends in the number of births in South Africa

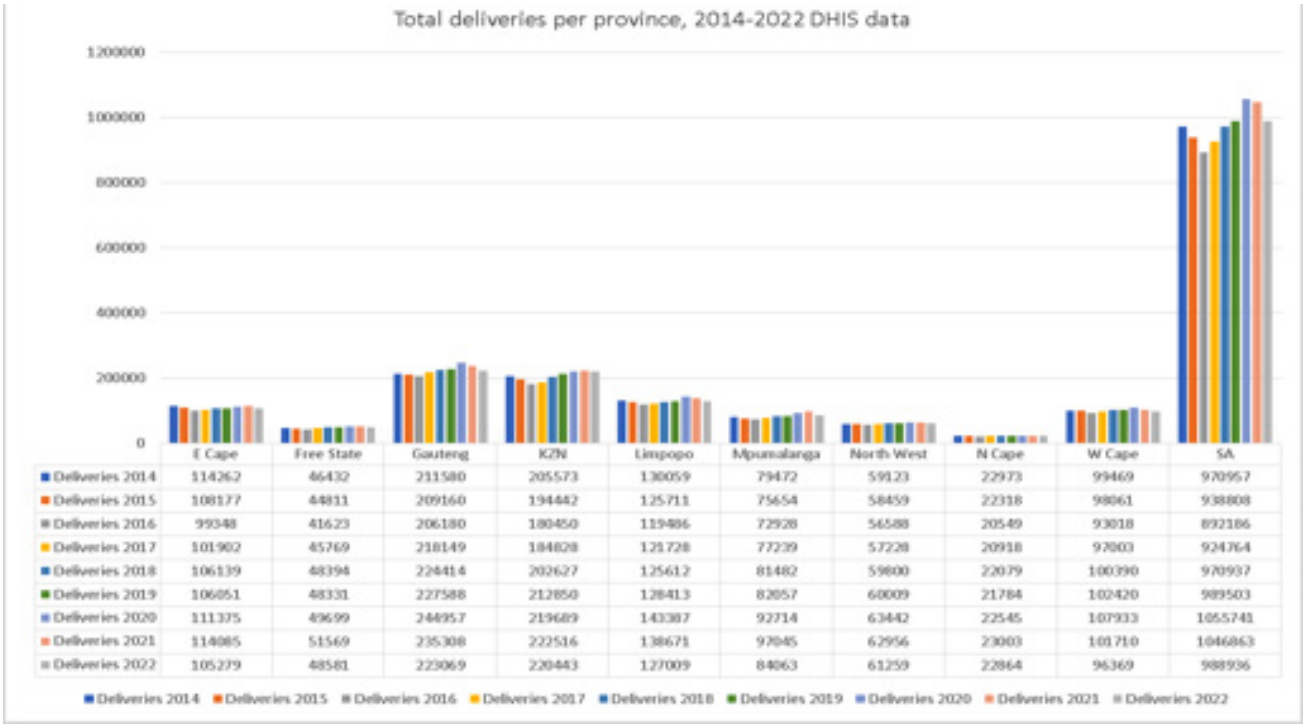
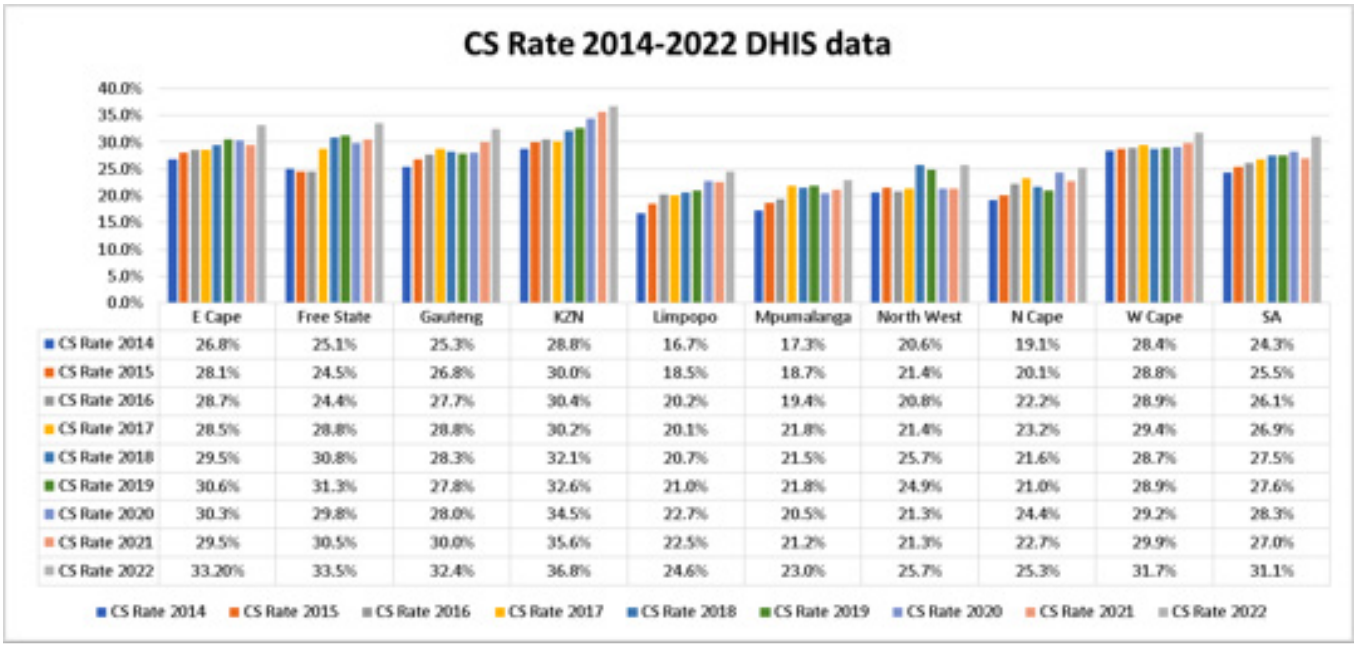


Figure 2. Number of births, national and provincial

Caesarean section rates in South African hospitals according to provinces

The Caesarean section rate seem to be increasing slowly year by year, increasing from 24.3% in 2014 to 31.1% in 2022 (Figure 3). The provinces with the highest Caesarean section rates were KwaZulu-Natal (36.8%), the Free State (33.5%), the Eastern Cape (33.2%) and Gauteng (32.4%) while provinces with relatively low Caesarean section rates were Mpumalanga (23.0%), Limpopo (24.6%), the Northern Cape (25.3%) and the North West (25.7%). These rates are still all higher than the 15 per cent rate for sub-Saharan countries recommended by the WHO. According to the WHO, the Caesarean section rates above 15 per cent does not lead to improved perinatal outcomes, but there are more risks for maternal morbidity.

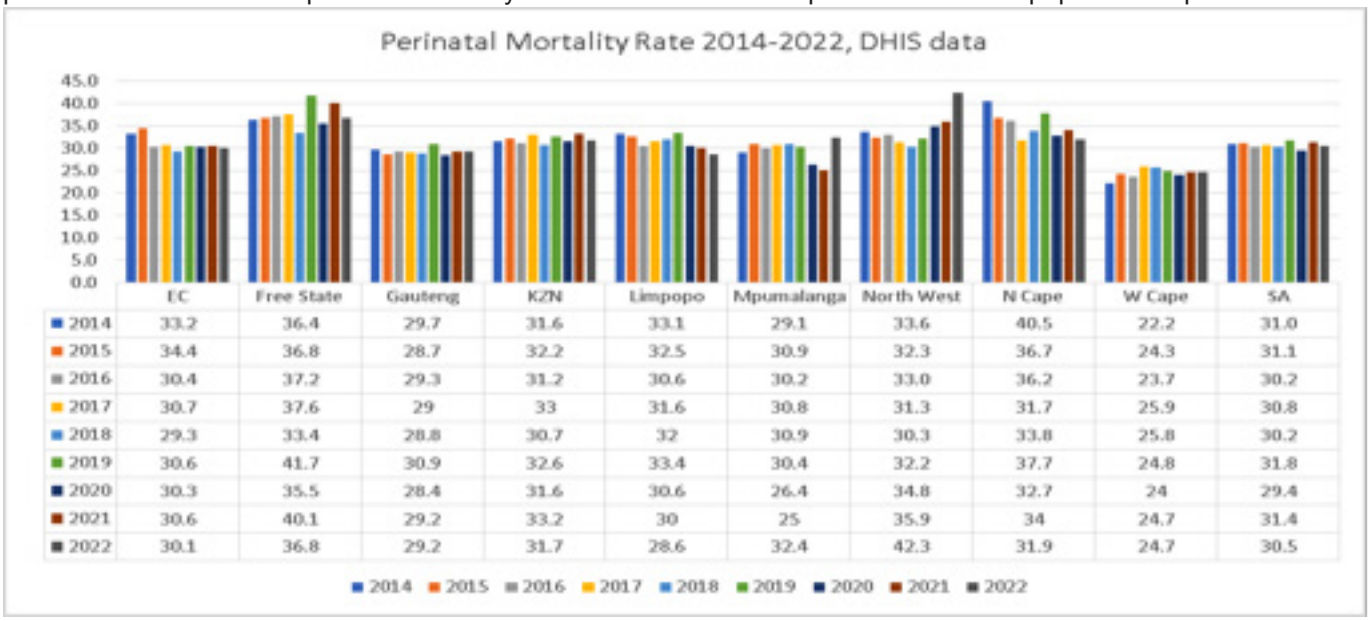


	E Cape	Free State	Gauteng	KZN	Limpopo	Mpumalanga	North West	N Cape	W Cape	SA
CS Rate 2014	26.8%	25.1%	25.3%	28.8%	16.7%	17.3%	20.6%	19.1%	28.4%	24.3%
CS Rate 2015	28.1%	24.5%	26.8%	30.0%	18.5%	18.7%	21.4%	20.1%	28.8%	25.5%
CS Rate 2016	28.7%	24.4%	27.7%	30.4%	20.2%	19.4%	20.8%	22.2%	28.9%	26.1%
CS Rate 2017	28.5%	28.8%	28.8%	30.2%	20.1%	21.8%	21.4%	23.2%	29.4%	26.9%
CS Rate 2018	29.5%	30.8%	28.3%	32.1%	20.7%	21.5%	25.7%	21.6%	28.7%	27.5%
CS Rate 2019	30.6%	31.3%	27.8%	32.6%	21.0%	21.8%	24.9%	21.0%	28.9%	27.6%
CS Rate 2020	30.3%	29.8%	28.0%	34.5%	22.7%	20.5%	21.3%	24.4%	29.2%	28.3%
CS Rate 2021	29.5%	30.5%	30.0%	35.6%	22.5%	21.2%	21.3%	22.7%	29.9%	27.0%
CS Rate 2022	33.20%	33.5%	32.4%	36.8%	24.6%	23.0%	25.7%	25.3%	31.7%	31.1%

Figure 3. Caesarean section rates, national and provincial

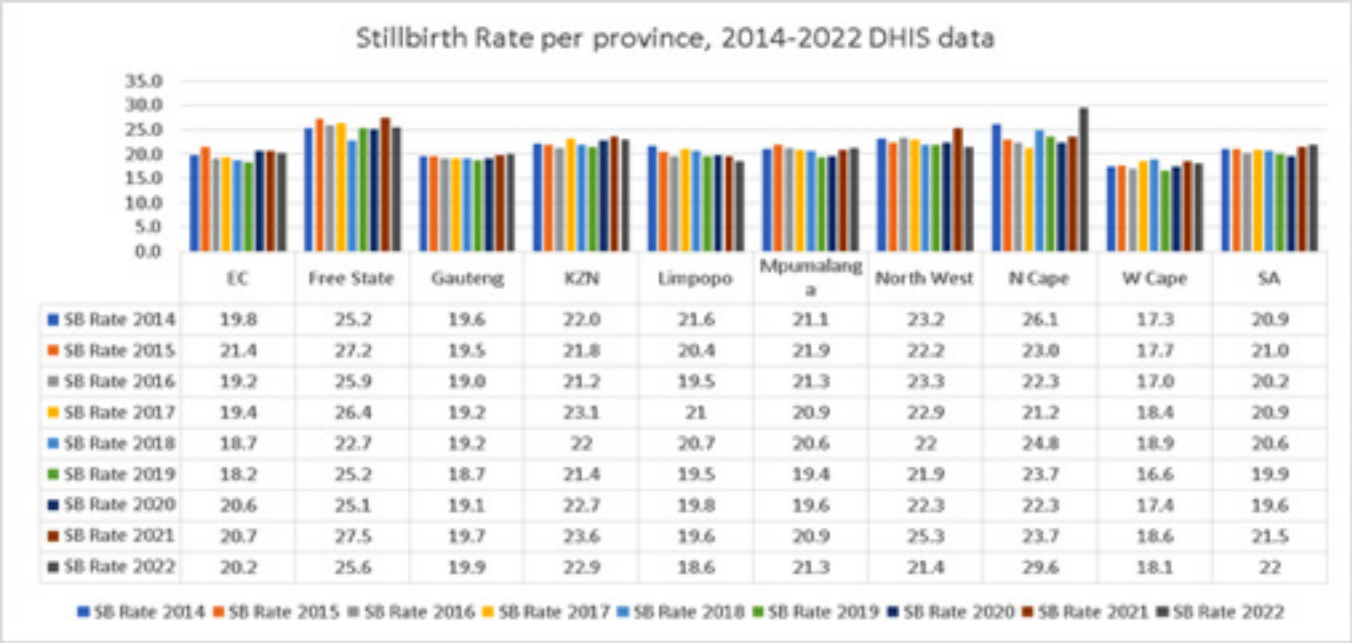
Perinatal, stillbirth and neonatal mortality rates

The perinatal mortality rate has remained the same at about 30 per 1 000 births for the past eight years, with the rate at 31.4 in 2021 and a decline to 30.5 per 1 000 births in 2022. The province with the highest perinatal mortality rate is the Free State, ranging from 33.4 in 2018 to 41.7 per 1 000 in 2019 with the recent rate of 36.8 in 2022 (Figure 4). The provinces with the lowest perinatal mortality rate are the Western Cape at 24.7 and Limpopo at 28.6 per 1 000 in 2022.



	EC	Free State	Gauteng	KZN	Limpopo	Mpumalanga	North West	N Cape	W Cape	SA
2014	33.2	36.4	29.7	31.6	33.1	29.1	33.6	40.5	22.2	31.0
2015	34.4	36.8	28.7	32.2	32.5	30.9	32.3	36.7	24.3	31.1
2016	30.4	37.2	29.3	31.2	30.6	30.2	33.0	36.2	23.7	30.2
2017	30.7	37.6	29	33	31.6	30.8	31.3	31.7	25.9	30.8
2018	29.3	33.4	28.8	30.7	32	30.9	30.3	33.8	25.8	30.2
2019	30.6	41.7	30.9	32.6	33.4	30.4	32.2	37.7	24.8	31.8
2020	30.3	35.5	28.4	31.6	30.6	26.4	34.8	32.7	24	29.4
2021	30.6	40.1	29.2	33.2	30	25	35.9	34	24.7	31.4
2022	30.1	36.8	29.2	31.7	28.6	32.4	42.3	31.9	24.7	30.5

Figure 4. Perinatal mortality rates, national and provincial

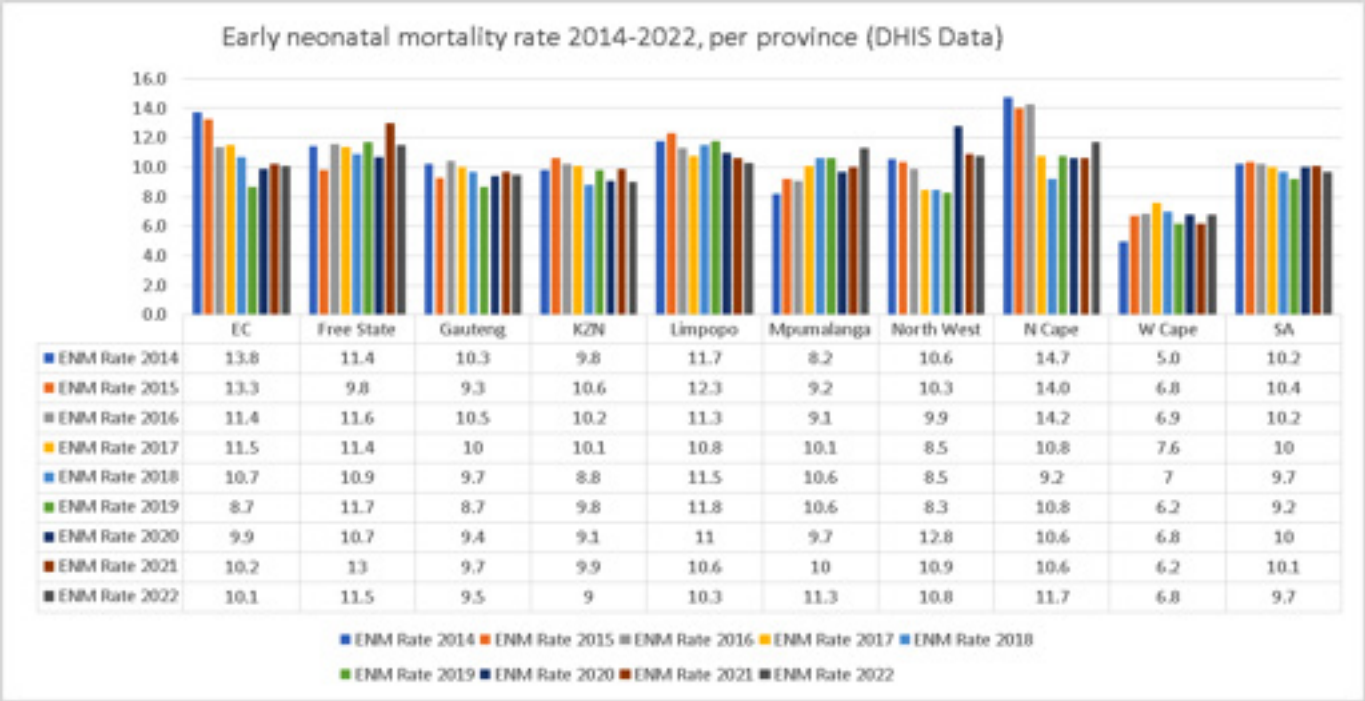


	EC	Free State	Gauteng	KZN	Limpopo	Mpumalanga	North West	N Cape	W Cape	SA
SB Rate 2014	19.8	25.2	19.6	22.0	21.6	21.1	23.2	26.1	17.3	20.9
SB Rate 2015	21.4	27.2	19.5	21.8	20.4	21.9	22.2	23.0	17.7	21.0
SB Rate 2016	19.2	25.9	19.0	21.2	19.5	21.3	23.3	22.3	17.0	20.2
SB Rate 2017	19.4	26.4	19.2	23.1	21	20.9	22.9	21.2	18.4	20.9
SB Rate 2018	18.7	22.7	19.2	22	20.7	20.6	22	24.8	18.9	20.6
SB Rate 2019	18.2	25.2	18.7	21.4	19.5	19.4	21.9	23.7	16.6	19.9
SB Rate 2020	20.6	25.1	19.1	22.7	19.8	19.6	22.3	22.3	17.4	19.6
SB Rate 2021	20.7	27.5	19.7	23.6	19.6	20.9	25.3	23.7	18.6	21.5
SB Rate 2022	20.2	25.6	19.9	22.9	18.6	21.3	21.4	29.6	18.1	22

Figure 5. Stillbirth rates, national and in provinces

The national stillbirth rate was 22.0/ 1 000 births in 2022, and there has been no significant change in stillbirth rates for the last eight years (Figure 5). Amongst the provinces, the Northern Cape had the highest stillbirth rate of 29.6/ 1 000 births, while the Western Cape had the lowest stillbirth rate at 18.1/ 1 000 births. Nationally and in all provinces the stillbirth rates remained the same or increased slightly.

The early neonatal mortality rate at national level has shown no significant change, remaining at about 10/1 000 live births since 2014 (Figure 6). Similarly, for many provinces the early neonatal mortality rates have relatively remained the same for the last eight years except for three provinces, the Eastern Cape, Northern Cape, and Free State. The Eastern Cape showed a reduction of 37% from 13.8 in 2014 to 8.7/ 1 000 live births in 2019; the Northern Cape had a reduction of 37.4% from 14.7 in 2014 to 9.2 / 1 000 live births in 2018 while the Free State showed an increase of 14% from 11.4 in 2014 to 13.0/ 1 000 live births in 2021. While the reduction observed in the Northern Cape has relatively been sustained, the Eastern Cape has seen a reversal from 8.7 in 2019 to 10.1/ 1 000 live births in 2022 an increase of 16.0%. Overall the Western Cape has had the lowest early neonatal mortality rate throughout the years.



	EC	Free State	Gauteng	KZN	Limpopo	Mpumalanga	North West	N Cape	W Cape	SA
ENM Rate 2014	13.8	11.4	10.3	9.8	11.7	8.2	10.6	14.7	5.0	10.2
ENM Rate 2015	13.3	9.8	9.3	10.6	12.3	9.2	10.3	14.0	6.8	10.4
ENM Rate 2016	11.4	11.6	10.5	10.2	11.3	9.1	9.9	14.2	6.9	10.2
ENM Rate 2017	11.5	11.4	10	10.1	10.8	10.1	8.5	10.8	7.6	10
ENM Rate 2018	10.7	10.9	9.7	8.8	11.5	10.6	8.5	9.2	7	9.7
ENM Rate 2019	8.7	11.7	8.7	9.8	11.8	10.6	8.3	10.8	6.2	9.2
ENM Rate 2020	9.9	10.7	9.4	9.1	11	9.7	12.8	10.6	6.8	10
ENM Rate 2021	10.2	13	9.7	9.9	10.6	10	10.9	10.6	6.2	10.1
ENM Rate 2022	10.1	11.5	9.5	9	10.3	11.3	10.8	11.7	6.8	9.7

Figure 6. National and provincial early neonatal mortality rates

The number of babies who are well developed and were expected to survive after birth but die before they are born (stillbirths) in South Africa has been 20 000 per year on average over the last three financial years (FY), 2019/2020 to 2021/2022 (Table 1). In addition, amongst those who are born alive 10 000 die within the first week of life. In all, 30 000 of babies die before they are born and before they are a week old amongst those who are born alive.

Table 1. Number of stillbirths, early neonatal and perinatal deaths FY 2019/2020 to 2021/2022

	Stillbirths		Early neonatal deaths		Perinatal deaths	
	n	%	n	%	n	%
Eastern Cape						
FY 2019/2020	2 064	65.9	1 069	34.1	3 133	100
FY 2020/2021	2 349	67.4	1 137	32.6	3 486	100
FY 2021/2022	2 278	66.5	1 145	33.5	3 423	100
Free State						
FY 2019/2020	1 115	66.9	551	33.1	1 666	100
FY 2020/2021	1 300	69.9	560	30.1	1 860	100
FY 2021/2022	1 351	68.3	628	31.7	1 979	100
Gauteng						
FY 2019/2020	4 311	67.0	2 127	33.0	6 438	100
FY 2020/2021	4 698	67.5	2 262	32.5	6 960	100
FY 2021/2022	4 497	65.2	2 403	34.8	6 900	100
KwaZulu-Natal						
FY 2019/2020	4 584	71.3	1 846	28.7	6 430	100
FY 2020/2021	5 007	72.2	1 932	27.8	6 939	100
FY 2021/2022	5 069	70.5	2 123	29.5	7 192	100
Limpopo						
FY 2019/2020	2 642	61.5	1 655	38.5	4 297	100
FY 2020/2021	2 937	66.3	1 492	33.7	4 429	100
FY 2021/2022	2 572	64.3	1 425	35.7	3 997	100
Mpumalanga						
FY 2019/2020	1 584	66.2	807	33.8	2 391	100
FY 2020/2021	294	22.8	996	77.2	1 290	100
FY 2021/2022	1 939	67.2	946	32.8	2 885	100
Northern Cape						
FY 2019/2020	530	65.3	282	34.7	812	100
FY 2020/2021	518	66.8	258	33.2	776	100
FY 2021/2022	776	77.1	231	22.9	1 007	100
North West						
FY 2019/2020	1 348	70.0	577	30.0	1 925	100
FY 2020/2021	1 487	68.9	670	31.1	2 157	100
FY 2021/2022	1 395	67.3	678	32.7	2 073	100
Western Cape						
FY 2019/2020	1 721	71.9	672	28.1	2 393	100
FY 2020/2021	1 911	73.8	677	26.2	2 588	100
FY 2021/2022	1 836	75.1	610	24.9	2 446	100
South Africa						
FY 2019/2020	19 899	67.5	9 586	32.5	29 485	100
FY 2020/2021	20 501	67.2	9 984	32.8	30 485	100
FY 2021/2022	21 713	68.1	10 189	31.9	31 902	100

SECTION II. Number of births and neonatal mortality rate in South Africa according to the Rapid Mortality Surveillance (RMS) Report for 2019 and 2020

The number of births in South Africa from 2000 to 2020

The estimate of number of births in South Africa according to the RMS report for 2019/2020 was just over 1 200 000 in 2020, higher than that reported in DHIS as it includes births occurring at home and in the private health sector **(Figure 7).**

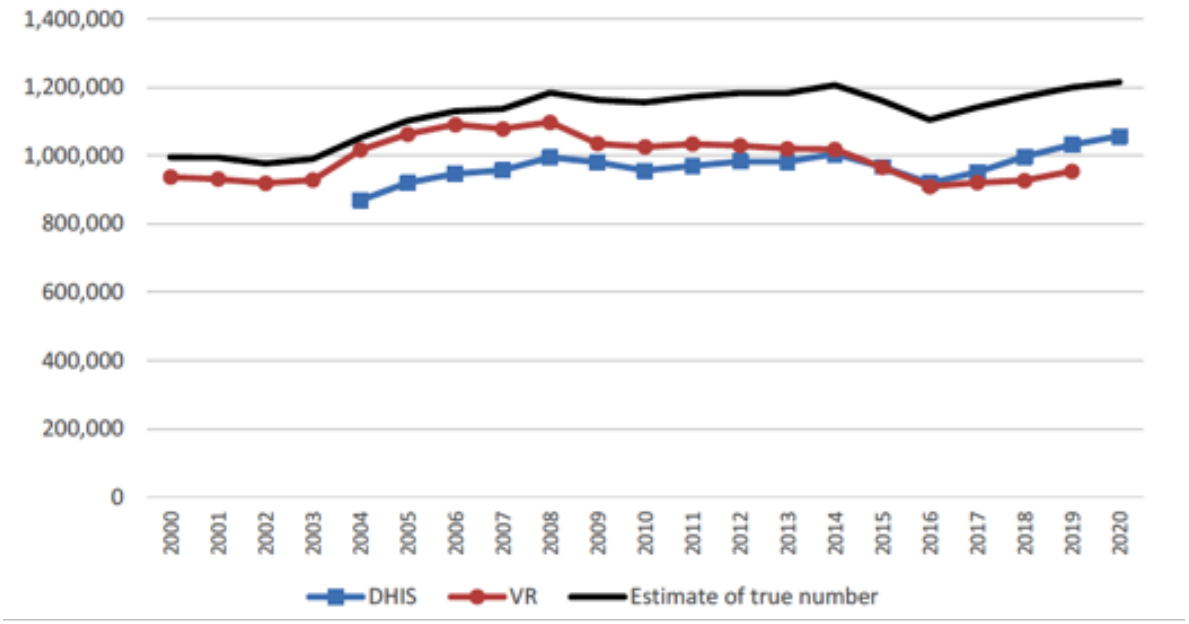


Figure 7. Estimates of the number of births compared to the numbers from the DHIS and vital registration (VR), 2000-2020

The neonatal mortality rate in South Africa from 2000 to 2020

The NMR has gradually declined from 14 per 1 000 live births for the period 2009 to 2013, then increased slightly to 12 per 1 000 in 2014 up to 2020 **(Figure 8, and Table 2).**

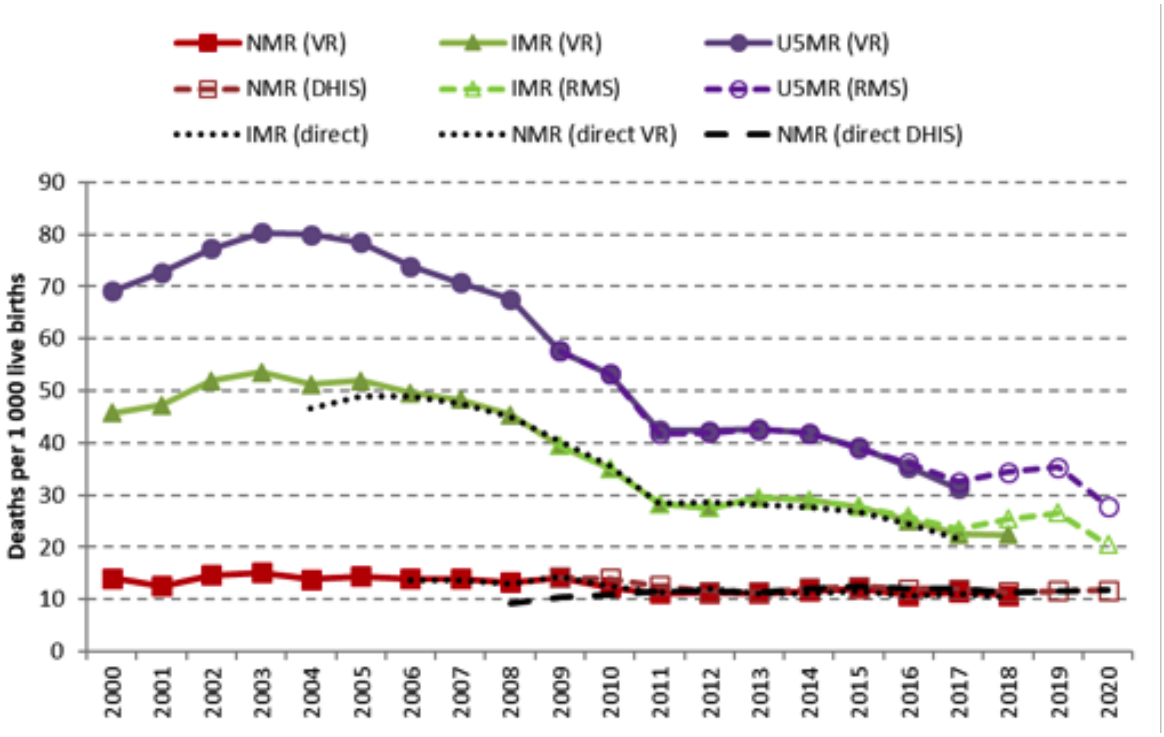


Figure 8. Under-5 mortality rate (U5MR), infant mortality rate (IMR) from vital registration (VR) and neonatal mortality rate (NMR) from VR and DHIS, 2000-2020 (after adjusting for incompleteness)

Table 2. Estimated NMR per 1 000 live births calculated from DHIS, 2014-2020

Indicator	2014	2015	2016	2017	2018	2019	2020
NMR	12	12	12	12	11	12	12

SECTION III. Analysis of births, perinatal deaths and their causes and avoidable factors based on Perinatal Problem Identification Programme (PPIP)

Births captured from healthcare facilities that submitted data on PPIP

Nationally, there were 975 101 births in 2020 and 2021 submitted to the PPIP database compared to a total of 2 102 604 births from DHIS, which is a difference of 53.6%. There were 611 853 deliveries recorded on PPIP for 2020, which is 443 888 fewer than that recorded on DHIS. There were 363 248 deliveries recorded on PPIP for 2021, which is 683 615 fewer than that recorded on DHIS. At national level the discrepancy between DHIS and PPIP data for total births was 52.3%, with Limpopo being the province with the largest discrepancy between DHIS and PPIP data at 93.2%, as few healthcare facilities from Limpopo submitted PPIP data in 2020/2021 **(Figure 9)**. The best performing provinces were Mpumalanga and the North West with discrepancies at less than 10%. The low birth weight (babies born with weight <2500 grams) rate in South Africa according to PPIP in 2020/2021 was 15.3%, with 21.5% of low-birth-weight babies being those with birth weight <1500 grams (very low birth weight babies) **(Table 3)**.

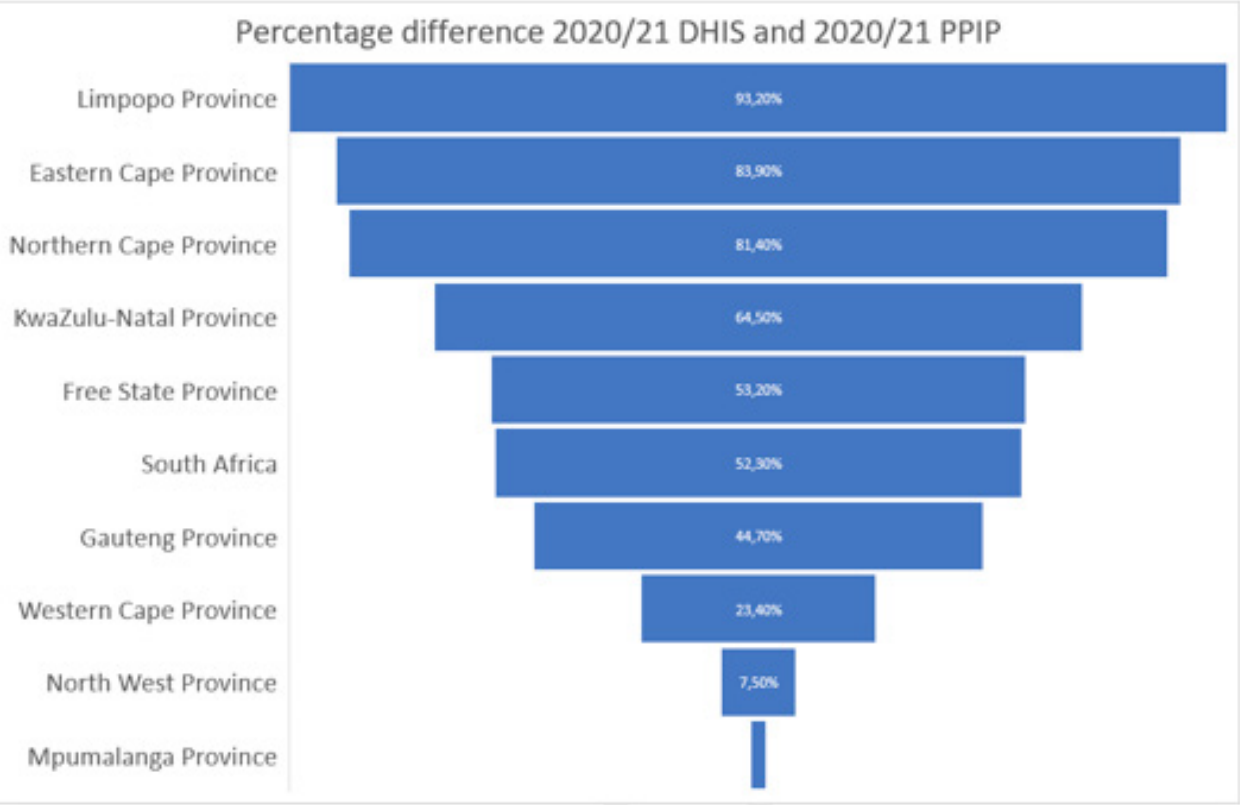


Figure 9. Discrepancies in total number of births from DHIS and PPIP data in 2020/2021

Table 3. Number of births from PPIP data according to birth weight categories

Birth weight category	Number	Percentage of		
		All deliveries %	Low birth weight (<2500g) %	Very low birth weight (<1500g) %
500 – 999g	13 482	1.4	9	42
1 000 – 1 499g	18 610	1.9	12.5	58
1 500 – 1 999g	31 272	3.2	20.9	
2 000 – 2 499g	85 954	8.8	57.6	
2 500g+	825 783	84.7		
Total	975 101			

Number of deaths and mortality rates according to PPIP

Amongst the 975 101 births reported in the PPIP, 2.2% were stillborn or 97.8% were born alive. And among those who were born alive 1.1% died within the first week of life (Table 4). Expressed in rates per 1 000, the still birth rate was 22/ 1 000 births and the neonatal mortality rate was 11/ 1 000 live births. Of the stillbirths, 10.9% were still alive at the time of maternal admission to the labour ward, but the majority were found to be macerated stillbirths.

Table 4. Proportion of babies that were stillbirths, early and late neonatal deaths according to PPIP data

	Number	Percentage of	
		All deliveries %	Live births %
Total births	975 101		
Stillbirths	21 804	2.2	
Born alive	953 297	97.8	
Survivors	943 061	96.7	98.9
Early neonatal death	8 244	0.9	0.9
Late neonatal death	1 992	0.2	0.2

The national perinatal mortality rate in South Africa is 30.8/ 1 000 births including all weight categories but, 21.8/ 1 000 births for babies with birth weight 1 000 grams or greater (Table 5). The neonatal mortality rate (deaths of babies within the first 28 days of life) was 10.7/ 1 000 live births for all weight categories and 7.4/ 1 000 live births for those with birth weight of 1 000 grams or greater. More than 80% of neonatal deaths occurred within the first week of life. The highest mortality rate was noted in the extreme low birth weight (birth weight <1 000 grams) category of infants at 456/ 1 000 live births compared to 3.6/ 1 000 live births in those weighing more 2 500 grams.

Table 5. Mortality rates in South Africa according to weight categories

	Perinatal mortality rate	Neonatal mortality rate	Early neonatal mortality rate	Late neonatal mortality rate	Stillbirth rate
All deliveries	30,8*	10,7	8,6	2,1	22,4
All 1 000g+	21,8	7,4	5,8	1,6	16,1
500 – 999g	673,3	455,9	385,3	70,6	468,6
1 000 – 1 499g	303,5	147,2	108,7	38,6	218,6
1 500 – 1 999g	138,8	36,0	27,7	8,3	114,3
2 000 – 2 499g	43,8	10,8	8,7	2,1	35,4
2 500g+	8,7	3,6	2,9	0,6	5,8

Causes of deaths according to PPIP

Primary (obstetric) causes of death

The common underlying obstetric causes of death in babies with birth weight ≥500g were unexplained intra-uterine deaths (25%), followed by spontaneous preterm labour (21%), hypertensive disorders (15.1%), and intrapartum asphyxia (12.4%) and antepartum haemorrhage (10.5%) **(Table 6).**

Table 6. Primary obstetric causes of death (stillbirths and neonatal deaths) in babies with birth weight ≥500g

Description	Number	% of total
Intrauterine death (IUD)	3 615	25
Unexplained IUD - macerated	2 971	20.6
Unexplained IUD - fresh	568	3.9
Unexplained IUD due to lack of notes	76	0.5
Spontaneous preterm labour	3 039	21
Idiopathic preterm labour	2 491	17.2
Preterm premature rupture of membranes	331	2.3
Cervical incompetence	75	0.5
Preterm premature rupture of membranes with chorioamnionitis	58	0.4
Iatrogenic preterm delivery for no real reason	55	0.4
Preterm labour with chorioamnionitis with intact membranes	29	0.2
Hypertensive disorders	2 176	15.1
Proteinuric hypertension	1 239	8.6
Pregnancy-induced hypertension without proteinuria	508	3.5
Eclampsia	266	1.8
Chronic hypertension	163	1.1
Intrapartum asphyxia	1 789	12.4
Labour related intrapartum asphyxia	913	6.3
Meconium aspiration	320	2.2
Cord around the neck	244	1.7
Cord prolapse	127	0.9
Ruptured uterus	91	0.6
Traumatic breech delivery	51	0.4
Shoulder dystocia	26	0.2
Traumatic assisted delivery	9	0.1
Precipitous labour	8	0.1
Antepartum haemorrhage	1 517	10.5
Abruptio placentae	643	4.4
Abruptio placentae with hypertension	501	3.5
Antepartum haemorrhage of unknown origin	289	2
Placenta praevia	84	0.6
Foetal abnormality	731	5.1
Foetal chromosomal abnormality	203	1.4
Abnormality of multiple systems	184	1.3
Hydrocephalus	81	0.6
Neural tube defects	79	0.5
Non-specific foetal abnormality	73	0.5
Cardiovascular system abnormality	66	0.5
Non-immune hydrops fetalis	30	0.2
Renal system abnormality	15	0.1
Intrauterine growth retardation (IUGR)	409	2.8
IUGR with histological features of ischaemic placental disease	207	1.4
Idiopathic IUGR	122	0.8
Postmaturity	80	0.6
Infections	381	2.6
Syphilis	204	1.4
Amniotic fluid infection	91	0.6
Other infections	73	0.5
Beta-haemolytic streptococcal infection	12	0.1

In the category of babies with birth weight ≥1 000g category, the common underlying obstetric causes of death were unexplained intra-uterine death (26.6%), intrapartum asphyxia (16.7%), spontaneous preterm labour (13.9%), hypertensive disorders (13.3%) and antepartum haemorrhage (11.6%) (Table 7).

Table 7. Primary obstetric causes of perinatal deaths in babies with birth weight ≥1 000g

Description	Number	% of total
Intrauterine death (IUD)	2 779	26.6
Unexplained IUD - macerated	2 315	22.2
Unexplained IUD - fresh	404	3.9
Unexplained IUD due to lack of notes	60	0.6
Intrapartum asphyxia	1 740	16.7
Labour related intrapartum asphyxia	905	8.7
Meconium aspiration	305	2.9
Cord around the neck	235	2.3
Cord prolapse	118	1.1
Ruptured uterus	87	0.8
Traumatic breech delivery	49	0.5
Shoulder dystocia	26	0.2
Traumatic assisted delivery	9	0.1
Precipitous labour	6	0.1
Spontaneous preterm labour	1 448	13.9
Idiopathic preterm labour	1 183	11.3
Preterm premature rupture of membranes	168	1.6
Preterm premature rupture of membranes with chorioamnionitis	33	0.3
Iatrogenic preterm delivery for no real reason	31	0.3
Cervical incompetence	19	0.2
Preterm labour with chorioamnionitis with intact membranes	14	0.1
Hypertensive disorders	1 385	13.3
Proteinuric hypertension	747	7.2
Pregnancy-induced hypertension without proteinuria	385	3.7
Eclampsia	146	1.4
Chronic hypertension	107	1
Antepartum haemorrhage	1 208	11.6
Abruptio placentae	544	5.2
Abruptio placentae with hypertension	423	4.1
Antepartum haemorrhage of unknown origin	175	1.7
Placenta praevia	66	0.6
Foetal abnormality	634	6.1
Foetal chromosomal abnormality	170	1.6
Abnormality of multiple systems	164	1.6
Hydrocephalus	75	0.7
Neural tube defects	67	0.6
Cardiovascular system abnormality	63	0.6
Non-specific foetal abnormality	60	0.6
Non-immune hydrops fetalis	23	0.2
Renal system abnormality	12	0.1
Intrauterine growth retardation (IUGR)	318	3
IUGR with histological features of ischaemic placental disease	152	1.5
Idiopathic IUGR	89	0.9
Postmaturity	77	0.7
Infections	296	2.8
Syphilis	159	1.5
Amniotic fluid infection	69	0.7
Other infections	58	0.6
Beta-haemolytic streptococcal infection	9	0.1

Final Neonatal Causes of Death

In neonatal deaths with weight ≥500g at birth, the common causes of deaths were prematurity/ immaturity related (46.1%), intrapartum asphyxia (23.1%), infections (16.2%) and congenital abnormalities (9.8%) (Table 8).

Table 8. The final (neonatal) causes of all deaths with birth weight ≥500g.

Description	Number	% of total
Immaturity related	2 247	46.1
Extreme multi-organ immaturity	1 309	26.9
Hyaline membrane disease	660	13.5
Pulmonary haemorrhage	127	2.6
Necrotising enterocolitis	76	1.6
Intraventricular haemorrhage	42	0.9
Other immaturity related causes	33	0.7
Hypoxia	1 126	23.1
Hypoxic ischaemic encephalopathy	867	17.8
Meconium aspiration	184	3.8
Persistent foetal circulation	42	0.9
Other complications of hypoxia	33	0.7
Infection	789	16.2
Nosocomial infection	343	7
Septicaemia	317	6.5
Other infection	28	0.6
Pneumonia	28	0.6
Congenital syphilis	26	0.5
Congenital infection	24	0.5
Group B streptococcal infection	12	0.2
Meningitis	5	0.1
HIV infection	4	0.1
Tetanus	2	0
Congenital abnormalities	477	9.8
Chromosomal abnormality	127	2.6
Other congenital abnormalities (including multiple and skeletal)	114	2.3
Cardiovascular system abnormalities	99	2
Central nervous system abnormalities	77	1.6
Respiratory abnormalities (including diaphragmatic hernia)	24	0.5
Alimentary tract abnormalities (excluding diaphragmatic hernia)	17	0.3
Renal system abnormalities	15	0.3
Biochemical abnormality	4	0.1
-	163	3.3
Other cause of death not described in classification	40	0.8
Aspiration pneumonia	32	0.7
Sudden Infant Death Syndrome (SIDS)	16	0.3
Haemorrhagic disease of the new-born	14	0.3
Hypoglycaemia	14	0.3
Hypothermia	13	0.3
Isoimmunisation	10	0.2
Non-immune hydrops	10	0.2
Apnoeic attacks in the first week	9	0.2
Hypovolaemic shock	5	0.1

In neonatal deaths with weight ≥1 000g at birth, the common causes of deaths were intrapartum asphyxia (34.2%), prematurity/ immaturity related (28.0%), infections (17.4%) and congenital abnormalities (14%) (Table 9).

Table 9. The final (neonatal) cause of death in the category with birth weight ≥1000g

Description	Number	% of total
Hypoxia	1 115	34.2
Hypoxic ischaemic encephalopathy	859	26.3
Meconium aspiration	183	5.6
Persistent foetal circulation	42	1.3
Other complications of hypoxia	31	0.9
Immaturity related	913	28
Hyaline membrane disease	549	16.8
Extreme multi-organ immaturity	192	5.9
Pulmonary haemorrhage	79	2.4
Necrotising enterocolitis	51	1.6
Intraventricular haemorrhage	27	0.8
Other immaturity related causes	15	0.5
Infection	568	17.4
Septicaemia	247	7.6
Nosocomial infection	214	6.6
Pneumonia	28	0.9
Congenital syphilis	25	0.8
Congenital infection	18	0.6
Other infection	17	0.5
Group B streptococcal infection	9	0.3
Meningitis	5	0.2
HIV infection	3	0.1
Tetanus	2	0.1
Congenital abnormalities	458	14
Chromosomal abnormality	123	3.8
Other congenital abnormalities (including multiple and skeletal)	107	3.3
Cardiovascular system abnormalities	99	3
Central nervous system abnormalities	74	2.3
Respiratory abnormalities (including diaphragmatic hernia)	21	0.6
Alimentary tract abnormalities (excluding diaphragmatic hernia)	16	0.5
Renal system abnormalities	15	0.5
Biochemical abnormality	3	0.1
Miscellaneous	145	4.4
Other cause of death not described in classification	34	1
Aspiration pneumonia	29	0.9
Sudden Infant Death Syndrome (SIDS)	16	0.5
Haemorrhagic disease of the new-born	14	0.4
Hypoglycaemia	13	0.4
Isoimmunisation	10	0.3
Non-immune hydrops	10	0.3
Hypothermia	9	0.3
Apnoeic attacks in the first week	5	0.2
Hypovolaemic shock	5	0.2

Amongst the 31 040 stillbirths and neonatal deaths with birth weight ≥500 grams, 11 445 (36.9%) were found to have probable modifiable factors **(Table 10)**. About half (5 712; 49.9%) of these modifiable factors were health system related.

Table 10. Modifiable factors in deaths with birth weight ≥500g

Description	Number	% of group
Patient associated	**5 733**	
Inappropriate response to poor foetal movements	1 848	32.2
Never initiated antenatal care	1 043	18.2
Booked late in pregnancy	931	16.2
Delay in seeking medical attention during labour	807	14.1
Failed to return on the prescribed date	251	4.4
Inappropriate response to antepartum haemorrhage	171	3
Other patient associated factors	143	2.5
Infrequent visits to antenatal clinic	138	2.4
Declines admission/treatment for personal/social reasons	108	1.9
Inappropriate response to rupture of membranes	94	1.6
Smoking	53	0.9
Attempted termination of pregnancy	46	0.8
Delay in seeking help when baby ill	42	0.7
Illegal drug use	22	0.4
Alcohol abuse	18	0.3
Partner/family declines admission/treatment	7	0.1
Abandoned baby	6	0.1
Assault	5	0.1
Medical employee associated	3 995	
No response to maternal hypertension	380	9.5
Incorrect management of hypertensive disease	276	6.9
Nosocomial infection	274	6.9
Delay in referring patient for secondary/tertiary treatment	273	6.8
Foetal distress not detected intrapartum; foetus monitored	267	6.7
Foetal distress not detected intrapartum; foetus not monitored	229	5.7
Other medical employee associated factors	201	5
Physical examination of patient at clinic incomplete	190	4.8
Medical employee underestimated foetal size	118	3
Antenatal steroids not given	109	2.7
No response to history of poor foetal movement	108	2.7
Management of second stage: prolonged with no intervention	104	2.6
No response to poor uterine fundal growth	101	2.5
Delay in medical employee calling for expert assistance	93	2.3
Neonatal care: Inadequate monitoring	89	2.2
No response to apparent post term pregnancy	89	2.2
Foetal distress not detected antepartum; foetus monitored	84	2.1
No response to history of stillbirths, abruptio etc.	80	2
Congenital abnormality not diagnosed; U/S examination not performed	67	1.7
Congenital abnormality not diagnosed; U/S examination was performed	66	1.7
Delay in doctor responding to call	60	1.5
Neonatal care: Management plan inadequate	59	1.5
Poor progress in labour, but partogram not used correctly	57	1.4
Neonatal resuscitation inadequate	55	1.4
Breech presentation not diagnosed until late in labour	48	1.2
Incorrect management of premature labour	47	1.2
Multiple pregnancy not diagnosed antenatally	45	1.1
No response to positive syphilis serology test	45	1.1
Incorrect management of antepartum haemorrhage	40	1
Poor progress in labour - partogram interpreted incorrectly	38	1
Medical employee overestimated foetal size	36	0.9
Poor progress in labour, but partogram not used	34	0.9
No response to maternal glycosuria	33	0.8
Foetal distress not detected antepartum; foetus not monitored	31	0.8
Management of second stage: Inappropriate use of vacuum	28	0.7
Inadequate / no advice given to mother	26	0.7

Baby managed incorrectly at hospital/clinic	25	0.6
Doctor did not respond to call	24	0.6
No antenatal response to abnormal foetal lie	19	0.5
Incorrect management of cord prolapse	17	0.4
Multiple pregnancy not diagnosed intrapartum	17	0.4
Management of second stage: Inappropriate use of forceps	5	0.1
Iatrogenic delivery for no real reason	4	0.1
General practitioner (GP) did not give card/letter about antenatal care	3	0.1
Baby sent home inappropriately	1	0
Administrative problems	1 717	
Anaesthetic delay	240	14
Insufficient nurses on duty to manage the patient adequately	189	11
Inadequate facilities/equipment in neonatal unit/nursery	157	9.1
No accessible neonatal ICU bed with ventilator	139	8.1
Other administrative problems	134	7.8
Lack of transport - Institution to institution	129	7.5
Lack of transport - Home to institution	128	7.5
Insufficient doctors available to manage the patient	126	7.3
Theatre delay: All theatres occupied	117	6.8
Employees not sufficiently trained to manage the patient	66	3.8
Congenital abnormality not diagnosed: No ultrasound service available	61	3.6
Inadequate theatre facilities	39	2.3
Employees too junior to manage the patient	36	2.1
Lack of adequate neonatal transport	31	1.8
Result of syphilis screening not returned to hospital/clinic	27	1.6
No syphilis screening performed at hospital / clinic	24	1.4
Theatre delay: Employees not available	23	1.3
Inadequate resuscitation equipment	21	1.2
No on-site syphilis testing available	12	0.7
No dedicated high-risk clinic at referral hospital	9	0.5
No motherhood card issued	5	0.3
Insufficient blood / blood products available	2	0.1
Employee rotation too rapid	2	0.1

DISCUSSION

Although there was a discrepancy between the DHIS and the PPIP data of more than 50%, the numbers and rates presented on the DHIS were more complete. The numbers in the PPIP although low with some provinces and facilities reporting more than others, the detailed analysis of the causes of deaths and modifiable factors can be generalised to the rest of the country. Based on the PPIP data, the NaPeMMCo committee was able to use the findings to make recommendations for the country that will improve perinatal and neonatal outcomes.

The number of deliveries in public healthcare facilities reached figures of over a million at 1 055 741 2020 and 1 046 86320 in 2021 with the latest figure at 988 936 in 2022 recorded on the DHIS. The true estimate number of births in the country, including births from the private sector and home births is just over 1 200 000 according to the RMS report. The Caesarean section rate was 27%, about two to three times the rate of 10-15% recommended by the WHO (3). The high Caesarean section rate has not resulted in the reduction of stillbirths, neonatal deaths, and intrapartum asphyxia. An analysis of the perinatal and neonatal outcomes of those born by Caesarean section compared to those born with normal vaginal delivery may be helpful.

On average 20 000 babies who are well-developed and are expected to survive after birth die before they are born (stillbirths) and in addition another 10 000 babies born alive die before the first week of life. Thus, the country loses 30 000 babies annually either before they are born or within the first week of life. The low birth weight was 15.3% and varied from province to province. Babies weighing below 1 000 grams had the highest mortality rate of 456 deaths per 1 000 live births, followed by those weighing between 1 000 and 1 500 grams with a mortality rate of 147 deaths per 1 000 live births. The Western Cape has the lowest neonatal mortality rate compared to all other provinces, and therefore other provinces should consider using this province as a benchmark in their efforts to reduce neonatal deaths.

The most common causes of neonatal deaths were prematurity, intrapartum asphyxia and infections. A significant proportion of the perinatal and neonatal deaths were assessed to be preventable. Most modifiable factors were health system-related (medical employees and administrator related). Under medical employee modifiable factors, antenatal steroids were not given in mothers in preterm labour yet research studies have shown that use of antenatal steroids results in reduction in risk of premature babies having respiratory distress syndrome and reduction in mortality. The low-birth-weight rate (which can be used as proxy for preterm births) in the country is high at 15.3% and the very low birth weight infants (birth weight <1 500g) had the highest mortality, and this could have been possibly reduced by antenatal steroids. Delays in transportation of babies between institutions, lack of neonatal facilities and equipment could have led to some of the preterm babies having delayed or no access to interventions like caffeine and mechanical ventilation including continuous positive airway pressure or mechanical ventilation on time, which have been shown to reduce complication and mortality associated with prematurity.

There is a resurgence in the number of neonates born with congenital syphilis, this could have been due to the impact of the COVID-19 Pandemic as there was a lack or poor access to healthcare facilities. The healthcare facilities are to make sure every pregnant woman is tested and retested according to the Basic Antenatal Care (BANC) Guidelines and results followed and acted accordingly. The guidelines should be clear that no baby or a mother who has delivered in a facility is to be discharged without syphilis and HIV results, this is to include mothers who gave birth to stillbirths. Congenital abnormalities were among the top five causes of neonatal mortality, this also impacts morbidity, and surveillance of congenital abnormalities is needed so that necessary interventions can be implemented especially for the congenital abnormalities that are common and correctable.

RECOMMENDATIONS

- We recommend immediate institutionalisation of the PPIP and the involvement of a monitoring and evaluation team from national up to lower levels of care in ensuring that PPIP is used in all healthcare facilities. All provinces must ensure that all PPIP sites are up to date with their PPIP data by the end of December 2022. All institutions must be supported with the requisite resources to ensure compliance.
- All efforts should be made to reduce deaths due to prematurity, asphyxia, and infections by following the HHAPINESs strategy which has been presented and discussed in previous reports.
- There must be urgent promotion and access to contraceptive methods and ensuring availability of mixed methods.
- Placental studies including histopathology should be performed routinely in all unexplained stillbirths and neonates diagnosed with intrapartum asphyxia or neonatal encephalopathy, to have a better understanding of causes of stillbirths and intrapartum asphyxia.
- The high stillbirth and neonatal mortality rate should be considered as pandemic so that all necessary resources can be mobilised to reduce this scourge of deaths of babies.
- Each facility management to focus on avoidable factors and address them by developing a quality improvement plan.
- Most avoidable factors including patient associated can also be addressed by involvement of community healthcare workers and primary healthcare managers and shared with relevant community stakeholders.
- Provinces must form provincial perinatal morbidity and mortality committees (ProPeMMCos) to review their perinatal and neonatal deaths at least quarterly. These ProPeMMCos must include obstetricians, midwives, neonatal/ paediatric doctors, units responsible for maternal and child health, PPIP and DHIS coordinators, District Clinical Specialist Teams (DCSTs), and other relevant stakeholders.
- In Table 11, we include the person/ group that needs to be responsible in leading in implementation of these recommendations.

Table 11. Recommendations, interventions, and person responsible to lead in implementation of recommendations

Recommendation	Intervention	Responsibility
1. Reduce deaths due to prematurity 2. Reduce deaths due to infections 3. Reduce deaths due to asphyxia	Strengthen maternal prevention interventions to prevent babies from these main primary causes, improve on use of antenatal steroids for mothers in preterm labour, and use of caffeine and CPAP in neonates with respiratory distress	Managers, clinicians in all levels of care
4. The department is required to ensure all delivering institution discuss every death within at least seven days and report on PPIP	PPIP institutionalisation	National Department of Health
5. Integrate PPIP programme into monitoring and evaluation teams in all levels of care and ensure capacity is developed to equip monitoring and evaluation teams to provide technical support to PPIP sites	Training of monitoring and evaluation teams	National Department of Health with MNCH support
6. Ensure that provinces submit and verify their data	Establish ProPeMMCos	National Department of Health, provincial health departments, Maternal, Neonatal and Child Health Chief Directorate
7. Revisit syphilis testing intervals and treatment	National guidelines to address	NCCEMD/NaPeMMCo
8. Improve access to regional and tertiary neonatal care and capacitate district level to improve care when referrals are delayed	Equip district hospitals with relevant needs to improve care	
9. Improve transport for neonatal care	Strengthen Obstetric neonatal transports availability	National Department of Health and Emergency Medical Services (EMS)
10. Education of communities on contraceptives, early health seeking behaviours	Develop clear guidelines on therapeutic anaemia	Guidelines writers

NaPeMMCo Recommendations in 2011 for the 2008-2010 triennium
The recommendations are summarised as HHAPINESS.
• Health system improvement
• Healthcare provider training
• Reduced deaths due to Asphyxia
• Reduce deaths due to Prematurity
• Reduce deaths due to Infection
This is incorporated in the Neonatal Survival Strategy.
These recommendations still hold today. However, to help achieve HHAPINESS some basic building blocks of the health system need to be in place. These are:
• Knowledgeable and skilled healthcare providers
• Appropriately resourced healthcare facilities (including equipment and human resources)
• Rapid inter-facility emergency transport system

Health system improvement	
Healthcare provider training	Management of small and sick neonates (MSSN) Kangaroo mother care (KMC) Helping babies breathe (HBB) CPAP training at the district level
Reduce death due to asphyxia	Helping babies breath Essential steps in managing obstetric emergencies (ESMOE) drills Equipment and protocols for therapeutic hypothermia at appropriate levels of care
Reduce deaths due to prematurity	Antenatal steroids Caffeine CPAP machines KMC Human milk banks
Reduce deaths due to infection	Availability and use of appropriate antibiotics Antimicrobial stewardship (AMS) champions Infection prevention champions (IPCs) Breastfeeding/ mother-baby friendly facilities
Family involvement	Family Centred Care (FCC)
Community involvement	Ward-based outreach teams (WBOTs)
Referral system	

APPENDIX: Recommendations by the World Health Organization (WHO) on Care of Preterm Infants

In the 10 listed recommendations we would like to put a special focus on reducing deaths due to prematurity as the WHO has recently launched two guidelines related to improving outcomes of preterm births; a) on care of the preterm and low-birth-weight infants(4), b) on use of antenatal corticosteroids to improve preterm birth outcomes (5). ***We recommend that the WHO recommendations on care of the preterm or low-birth-weight infant, and use of antenatal corticosteroids for improving preterm birth outcomes are implemented at all levels of care in our country.***

These recommendations are grouped into three main groups: Preventive and promotive care; curative care (care for complications); and family involvement and support. We recommend that at least the following recommendations are implemented with immediate effect:

A. PREVENTIVE AND PROMOTIVE CARE

Antenatal steroids

- Antenatal corticosteroid therapy is recommended for women with a high likelihood of preterm birth from 24 weeks to 34 weeks of gestation when the following conditions are met:
    - there is a high likelihood of preterm birth within seven days of starting therapy
    - there is no clinical evidence of maternal infection
- It should be administered:
    - even if it is anticipated that the full course of corticosteroids may not be completed
    - irrespective of whether single or multiple birth is anticipated
    - including for women with preterm prelabour rupture of membranes and no clinical signs of infection
    - including for women with hypertensive disorders in pregnancy who have a high likelihood of preterm birth
    - including women with a high likelihood of preterm birth of a growth-restricted foetus
    - including women with pre-gestational and gestational diabetes when there is a high likelihood of preterm birth, and this should be accompanied by interventions to optimise maternal blood glucose control
- A single repeat course of antenatal corticosteroids is recommended for women who have received a single course of antenatal corticosteroids at least seven days prior and, on clinical assessment, have a high likelihood of giving birth preterm in the next seven days
- Antenatal corticosteroids are NOT recommended:
    - for women with chorioamnionitis who are likely to give birth preterm
    - for women undergoing planned Caesarean section at 34 weeks to 36 weeks and six days

Kangaroo mother care

- Any KMC is recommended as routine care for all preterm or low-birth-weight infants. KMC can be initiated in the healthcare facility or at home and should be given for eight to 24 hours per day (as many hours as possible).
- KMC for preterm or low-birth-weight infants should be started as soon as possible after birth.

Feeding

- Mother's own milk is recommended for feeding of preterm or low-birthweight (LBW) infants, including very preterm (< 32 weeks' gestation) or very LBW (< 1.5 kg) infants.
- When mother's own milk is not available, donor human milk may be considered for feeding of preterm or LBW infants, including very preterm (< 32 weeks' gestation) or very LBW (< 1.5 kg) infants.
- Multicomponent fortification of human milk is not routinely recommended for all preterm or LBW infants but may be considered for very preterm (< 32 weeks' gestation) or very LBW (< 1.5 kg) infants who are fed mother's own milk or donor human milk.
- When mother's own milk and donor human milk are not available, nutrient-enriched preterm formula may be considered for very preterm (< 32 weeks' gestation) or very LBW (< 1.5 kg) infants.
- Preterm and LBW infants, including very preterm (< 32 weeks' gestation) and very LBW (< 1.5 kg) infants, should be fed as early as possible from the first day after birth. Infants who can breastfeed should be put to the breast as soon as possible after birth. Infants who are unable to breastfeed should be given expressed mother's own milk as soon as it becomes available. If mother's own milk is not available, donor human milk should be given wherever possible.
- In healthcare facilities, scheduled feeding may be considered rather than responsive feeding for preterm infants born before 34 weeks' gestation, until the infant is discharged.
- Fast and slow advancement of feeding in preterm or LBW infants, including very preterm (< 32 weeks' gestation) or very LBW (< 1.5 kg) infants, who need to be fed by an alternative feeding method to breastfeeding (e.g., gastric tube feeding or cup feeding), feed volumes can be increased by up to 30 ml/kg per day.
- Duration of exclusive breastfeeding - preterm or LBW infants should be exclusively breastfed until six months of age.

B. CARE FOR COMPLICATIONS

Respiratory distress

- Continuous positive airway pressure (CPAP) therapy is recommended in preterm infants with clinical signs of respiratory distress syndrome.
- CPAP therapy may be considered immediately after birth for very preterm infants (< 32 weeks' gestation).
- For preterm infants who need CPAP therapy, bubble CPAP may be considered (where available) rather than other pressure sources (e.g., ventilator CPAP).

Apnoea

- Caffeine is recommended for the treatment of apnoea in preterm infants.
- Caffeine is recommended for the extubation of preterm infants born before 34 weeks' gestation.
- Caffeine may be considered for the prevention of apnoea in preterm infants born before 34 weeks' gestation.

C. FAMILY INVOLVEMENT AND SUPPORT

- Family involvement in the routine care of preterm or LBW infants in healthcare facilities is recommended as standard of care.
- Families of preterm or low-birth-weight infants should be given extra support to care for their infants, starting in healthcare facilities from birth and continued during follow-up post discharge. The support may include education, counselling and discharge preparation from health workers, and peer support.
- Home visits by trained health workers are recommended to support families to care for their preterm or LBW infant.

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Notes

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