

**EVALUATION OF THE EFFECTS OF A DISTRICT CLINICAL SPECIALIST TEAM ON
MATERNAL AND WOMEN'S HEALTH SERVICES IN THE EKURHULENI DISTRICT**

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University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the
degree of Doctor of Philosophy

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DECLARATION

I, Jayati Kusari Basu declare that this thesis is my own work. It is being submitted for the degree of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

JBasu

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Date: 16/02/2022

DEDICATION

To

Late Ranendra Kumar Basu, Subhra Basu and Debjani Basu Muller

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PRESENTATIONS ARISING FROM THIS STUDY

Basu JK, Stewart A, 2019. Trend in maternal deaths at the Ekurhuleni district for last 7 years: a DCST experience. SAMA conference. Durban. 8 – 10 August, 2019

Basu JK, Stewart A, 2019. Trend in maternal deaths at the Ekurhuleni district for last 7 years: a DCST experience. 22nd Annual family physicians conference. Johannesburg. 23 – 25 August, 2019.

Basu JK, Stewart A, 2019. Trend in maternal deaths at the Ekurhuleni district for last 7 years: a DCST experience. 19th Annual Ekurhuleni health district research conference. Alberton. 27th November, 2019.

Basu JK, Stewart A & Wing J, 2021. Trend in maternal deaths at the Ekurhuleni district for last 7 years: a DCST experience. Gauteng provincial DCST research symposium. Virtual conference. 20th October, 2021.

Basu JK, Stewart A & Wing J, 2021. *Knowledge & perceptions of district health managers and health professionals regarding the role of DCST at the Ekurhuleni district.* Gauteng provincial DCST research symposium. Virtual conference. 20th October, 2021.

Basu JK, Stewart A & Wing J, 2021. *Knowledge & perceptions of district health managers and health professionals regarding the role of DCST at the Ekurhuleni district.* 21st Annual Ekurhuleni health district research conference. Aurum institute, Johannesburg, Hybrid conference. 24th – 25th November 2021.

Basu JK, Stewart A & Wing J, 2021. *Trend in couple year protection rate & termination of pregnancy rate for past nine years at the Ekurhuleni health district.* 21st annual Ekurhuleni district research conference. 24th – 25th November, 2021.

ABSTRACT

Background: Over the last two decades, maternal and child health have received renewed interest in South Africa, in the context of high maternal and child mortality. Since 1994, several initiatives have been taken by the government to improve the maternal health services in South Africa, without producing the desired results. The District Clinical Specialist Team (DCST) is the latest of these initiatives and probably the most innovative among them. These teams are expected to work at a district and sub-district level to improve maternal and child health services in South Africa through improvement of both the quality of health care and health outcomes for mothers, newborn and children and their performance will be judged by the impact on routinely collected data from DHIS (NDoH. 2012c).

Aim of this study: To explore, in a district health setting (Ekurhuleni District), the various obstetric intervention measures undertaken by the DCST over the last eight years (2012-20) within the current policy framework for the establishment of the DCST; to document the effect of the DCST interventions on the changes in maternal health indicators by analysing the maternal health data after the introduction of the DCST in the district, and lastly to document the knowledge and perceptions about DCST among the district managers and health professionals.

Methodology: The setting of the study was the Ekurhuleni Health District (one of the five districts of Gauteng province) and its three sub-districts. This study included analysis of routinely collected maternal health related data from all health facilities in the district (District Health Information System), review of all maternal deaths, review of documentation of all the interventions and key informant interviews of the managers and health professionals (n=20).

The study was initiated after obtaining necessary approval from the Human Research Ethics Committee (medical) of the University of the Witwatersrand, Ekurhuleni Health District Research Committee and Gauteng Province.

Results: This study analysed the data in quarters from 2011-12 quarter 1 to 2019-20 quarter 4 as reported in the District Health Information System.

The study showed that there were overall improvements in reproductive, antenatal, and postnatal indicators whereas there was equivocal success with the intranatal indicators.

For reproductive health indicators, there was a significant increase in *Couple year protection*

rate during this period; however, the District could achieve the Provincial target (55%) only in three quarters. However, the significant decrease in *Termination of pregnancy rate* from 2011/12 is of concern, which could possibly be attributed to decreases in the North and East Sub-districts.

For antenatal indicators, there was a significant improvement in antenatal indicators (namely in the *Antenatal First visit before 20 weeks' rate* as well as *ANC patients initiated on ART rate*) during the study period implying improvement in the antenatal care in the District.

For intranatal indicators, there was a significant increase in the *Total deliveries in facility*, which is predominantly ascribed to the North Sub-district. The significant increase in the teenage pregnancy (measured as *Delivery in facility under 18 years rate*) was of concern, which is possibly attributed to the East Sub-district. There was a significant increase in *Delivery by Caesarean section rate*, which is possibly due to increase at East and North Sub-districts. There was also a significant increase in the *Live birth to HIV positive women* due to increases in the North and South Sub-district. However, there were no significant changes in the *Delivery in facility rate*.

In terms of postnatal indicators, there was a significant improvement in the postnatal indicators (namely *Mother Postnatal visits within 6 days rate*) which possibly can be attributable to South Sub-district.

For outcome indicators, there was a significant decrease in all the mortality indicators (*Maternal mortality ratio, Stillbirth rate, Neonatal mortality rate and Perinatal Mortality rate*) across all three sub-districts during this period with best performance in the East Sub-district.

Maternal deaths in three sub-districts in the Ekurhuleni district: There was a significant decrease in *Total maternal deaths* from 2011/12. Although *In-facility maternal deaths* decreased significantly, *Maternal deaths outside health facilities* increased slightly. The Total Maternal death in the East Sub-district was consistently lower than the North and South Sub-districts. Analysis of maternal deaths in different gestational period: there was no significant decline in maternal deaths in all periods (namely antenatal, intranatal and postnatal) from 2011/12. Again, the maternal deaths in East Sub-district were consistently lower than North and South Sub-districts. In terms of analysis of causes of maternal deaths, it showed that the data for primary causes of maternal deaths were collected from the second quarter in 2014-15 as a part of the DCST intervention. There were significant declines in maternal deaths due to haemorrhage, HIV, and medical conditions with no changes in deaths due to other causes

and more importantly, there was an increase in death due to hypertension.

Obstetric intervention measures undertaken by the DCST in the Ekurhuleni District: The study reviewed various DCST reports generated in the last nine years and categorized the findings in accordance with the DCST Policy framework. The analysis showed that DCST members were active in all four pillars namely: Clinical effectiveness, Clinical risk management, Professional development and Accountability for Maternal, Newborn, Child and Women's Health (MNCWH). However, it was difficult to link their activities with the underperformance of the districts. The action plan mentioned in the reports were not clearly articulated and followed up which would require further attention.

Knowledge and perception about DCST among district health managers and health professionals in the Ekurhuleni District: Interviews with key stakeholders from different levels of the District health services in the Ekurhuleni Health District (n=20) revealed seven themes, four of which are similar to the DCST policy framework (namely clinical effectiveness, clinical risk management, professional development, accountability for maternal and child health) and other three newer themes (namely clinical work, monitoring and evaluation, leadership and governance). All the participants acknowledged the key role of DCST members as a change agent and their positive impact for improvement of MNCWH services, which reflected on the improvement of MNCWH indicators. Their role as a clinician, communicator, mentor, negotiator, trainer, and researcher were highlighted.

Conclusion: Maternal health services should move beyond the focus on emergency obstetric care, to a broader approach that encompasses preventive and early interventions and integrations with existing services, as countries would like to achieve its SDG targets. This study was planned against this background to develop a comprehensive understanding of maternal health services within a district in South Africa. It further studied the role of DCST members, which were introduced in 2012 as change agents to improve the MNCWH services across the country as a part of PHC re-engineering to prepare the country for the introduction of National Health Insurance (NHI) and Universal Health Coverage (UHC). The study looked at their activities through the lens of the DCST policy framework and found that their relative success, in improving the maternal health services, was evidenced in improvement of maternal health indicators as well as in the DCST interventions and echoed by key stakeholders in the District. The findings of this study should be used by the District management to further improve its maternal health services by instituting evidenced based action plans and further operational research into severe maternal morbidity and stillbirths and perinatal mortality. Lastly, the important suggestions (such as

improved emergency transport services, improving human resource and employing additional DCST members) provided by the participants should be looked at to improve maternal health services.

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GLOSSARY OF TERMS

Advanced nurses: A registered nurse having education beyond basic nursing education and certified by a nationally recognized professional organisation in a specific nursing area such as Midwifery, Paediatrics and Primary Health Care. They are highly experienced in their area of practice and are often educated to a Masters' degree level.

Clinical governance: It is defined as clinical leadership and accountability, as well as the organisation's culture, systems and working practices, that ensure that quality assurance, quality improvement and patient safety are central components of all activities of the health care organization (NDoH, 2013c).

District Clinical Specialist Team: It is a team of specialist doctors and experienced nurses that is based at the district and this team was inaugurated in July 2012 by the Minister of Health, Dr Motsoaledi. The team consists of an obstetrician, an advanced midwife, a paediatrician, a paediatric nurse, a family physician, and a primary health care nurse. The purpose of the District Clinical Specialist Team is to improve both the quality of health care and health outcomes for mothers, newborn, and children i.e. the core component of strengthening the district health system. DCST members are to function first as a team, and second as individuals within their respective disciplines.

Family physician: Family physicians are specialist physicians who provide continuing and comprehensive medical care, health maintenance and preventive services to each member of the family regardless of gender, age, or type of problem (American Academy of Family Physicians, 2020).

Health policy: The World Health Organization (WHO) defined health policy as an agreement or consensus on the health issues, goals, and objectives to be addressed, the priorities among those objectives, and the main directions for achieving them (WHO, 1999).

Health policy analysis: Health Policy analysis is used to determine the policies' ability to achieve a given set of goals. Health care policy analysis is a multi-disciplinary method to evaluate public policy that aims to explain the interaction between the institutions, government bodies, and interests in the process of policy. Health policy analysis is useful to get a firm grasp on past failures and successes to better build a plan for the policy executions future (Collins, 2005; Dodson and Koepsell, 2014)

Impact: A health impact can be positive or negative. A positive health impact is an effect, which contributes to good health or to improve health. A negative health impact causes or contributes to ill health (WHO, 2015a).

Maternal mortality: Maternal mortality is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes." (WHO, 2015b)

Maternal mortality rate: The maternal mortality rate is found by dividing the average annual number of maternal deaths in a population by the average number of women of reproductive age (typically those aged 15 to 49 years) who are alive during the observation period. Thus, the *Maternal Mortality Rate* reflects not only the risk of maternal death per pregnancy or per birth, but also the level of fertility in a population. (NDoH, 2014e).

Maternal mortality ratio: The maternal mortality ratio (*MMRatio*) is obtained by dividing the number of maternal deaths in a population during some time interval by the number of live births occurring in the same period and is expressed per 100,000 live births. Thus, the *MMRatio* depicts the risk of maternal death relative to the frequency of childbearing. (NDoH, 2014e).

Maternal mortality ratio (In-facility): The in-facility maternal mortality ratio (*iMMRatio*) is obtained by dividing the number of maternal deaths in health facilities during some time interval by the number of live births occurring in the same period and is expressed per 100,000 live births in health facilities (NDoH, 2014e).

Obstetrician and Gynaecologist: They are specialist physicians who possess special knowledge, skills, and professional capability in the medical and surgical care of women related to pregnancy and disorders of the female reproductive system (American Board of Obstetrics and Gynecology, 2021)

Paediatrician: They are specialist physicians, who possess special knowledge, skills and professional capability for management of physical, emotional, and social health of children from birth to young adulthood (American Board of Pediatrics, 2021).

Neonatal mortality: Neonatal mortality is defined as death within the first 28 days of life (NDoH, 2014e).

Neonatal mortality rate (in facility): Neonatal mortality rate (in facility) is obtained by dividing the number of neonatal deaths in health facilities during some time interval by the number of live births occurring in the same period and is expressed per 1,000 live births in health facilities (NDoH, 2014e).

Perinatal mortality: The perinatal mortality is the sum of the number of stillbirths and early neonatal deaths (first seven days of life) (NDoH, 2014e).

Perinatal mortality rate (in facility): Perinatal mortality rate (in facility) is obtained by dividing the number of perinatal deaths in health facilities during some time interval by the number of live births occurring in the same period and is expressed per 1,000 total births in health facilities (NDoH, 2014e).

Stillbirth: A stillbirth is the death of a baby after week 20 of gestation.

Stillbirth rate (in facility): Stillbirth rate (in facility) is obtained by dividing the number of stillbirths in health facilities during some time interval by the number of total births occurring in the same period and is expressed per 1,000 total births in health facilities (NDoH, 2014e).

LIST OF ABBREVIATIONS

AIDS	Auto Immunodeficiency Syndrome
ANC	African National Congress
ART	Anti-Retroviral Therapy
BBA	Born Before Arrivals
CARMMA	Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa
CEDAW	(United Nations) Commission on the elimination of all forms of discrimination against women
CEO	Chief Executive Officer
CHC	Community Health Centre
CHoD	Clinical Head of Department
CHoU	Clinical Head of Unit
CI	Confidence Interval
CME	Continuing Medical Education
CPD	Continuous Professional Development
CTG	Cardiotocograph
CYPR	Couple Year Protection Rate
DCST	District Clinical Specialist Team
DoH	Department of Health
DHC	District Health Council
DHCTC	District Health Council Technical Committee
DHIS	District Health Information System
DHMIS	District Health Management Information System
DHS	District Health System
DHMT	District Health Management Team
EOST	Emergency Obstetrics Simulation training (popularly known as <i>Fire drill</i>)
ESI	Employees' State Insurance
ESMOE	Essential Steps in Managing Obstetric Emergencies
FWCW	Fourth World Conference on Women
GDoH	Gauteng Department of Health
HAST	HIV, AIDS, Sexually Transmitted infection and Tuberculosis
HIV	Human Immunodeficiency Virus
HBB	Helping Babies Breathe
HDACC	Health Data Advisory and Coordination Committee

HPV	Human Papilloma Virus
HR	Human resources
HRH	Human Resources for Health
ICPD	International Conference on Population and Development
IEC	Information, education, and communication
IMCI	Integrated Management of Childhood Illness
iMMR	In-facility Maternal Mortality Ratio
INOSS	International Network of Obstetric Survey Systems
IQR	Inter Quartile Range
IUCD	Intra-uterine contraceptive devices
IUGR	Intra-uterine growth retardation
LARC	Long-Acting Reversible Contraception
MCR	Maternity case record
MCWH	Maternal, Child and Women's Health
MNCWH	Maternal, Newborn, Child and Women's Health
MDG	Millennium Development Goals
mHealth	Mobile health
MMM	Maternal mortality and morbidity meetings
MMRate	Maternal Mortality Rate
MMR	Maternal Mortality Ratio
MOU	Midwifery Obstetrics Unit
MRCSA	Medical Research Council of South Africa
MSSN	Management of Sick and Small Newborns
NCS	National core standards
NDoH	National Department of Health
NDoBE	National Department of Basic Education
NDP	National Development Plan
NGO	Non-Governmental Organizations
NHI	National Health Insurance
NIDS	National Indicator Data Set
OMBUs	On-site Midwife run Birthing Units
PDoH	Provincial Department of Health
PHC	Primary Health Care
PMTCT	Prevention of Mother to Child transmission
PNC	Postnatal care

PPH	Postpartum hemorrhage
PSI	Patient Safety Incident
QIP	Quality Improvement Project
RPR	Rapid plasma reagin
SANAC	South African National AIDS Council
SADHS	South Africa Demographic and Health Survey
SD	Standard Deviation
SDG	Sustainable Development Goals
SGA	Small-for-gestational age
SMGL	Saving Mothers, Giving Life
SMM	Severe Maternal Morbidity
STIs	Sexually transmitted infections
TOP	Termination of Pregnancy
TPTH	Tembisa Provincial Tertiary Hospital
WBOT	Ward Based Outreach Team
WCDoH	Western Cape Department of Health
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

This introductory chapter will cover a description of the District Clinical Specialist Team (DCST) in the context of maternal and women's health services in South Africa, the background of this study, the motivation for this project, and its aims and objectives.

1.1 BACKGROUND

Over the past two decades, maternal and child health have received renewed interest in South Africa, in the context of high maternal and child mortality and morbidity. Numerous initiatives have been introduced by the National Department of Health (NDoH) in South Africa to address these challenges including the launch of the DCST in every district in South Africa as a part of Primary Health Care (PHC) re-engineering (NDoH, 2011a; NDoH, 2011b). It is important to document the effect of this important initiative on the maternal and women's health services at a health district level (NDoH, 2011c).

1.1.1 MATERNAL AND WOMEN'S HEALTH: GLOBAL SCENARIO

Worldwide, over 295,000 women and girls died of complications related to pregnancy and childbirth in 2017, yielding an overall maternal mortality ratio (MMR) of 211 per 100,000 live births for 185 countries (WHO, 2019). The vast majority of these deaths (94%) occurred in lower and middle-income countries. Sub-Saharan Africa and Southern Asia accounted for approximately 86% (254,000) of the estimated global maternal deaths in 2017. Sub-Saharan Africa alone accounted for roughly two-thirds (196,000) of maternal deaths, while Southern Asia accounted for nearly one-fifth (58,000) of these deaths (WHO, 2020a). There has been very little reduction in maternal mortality in countries in this region over the last decade. Several countries (such as Zambia, Mozambique, Angola, Zimbabwe, Malawi, and Lesotho) have MMR of close to 500 maternal deaths per 100,000 live births. A woman in sub-Saharan Africa has a lifetime risk of maternal death of 1 in 39 compared with around 1 in 10,000 in high-income countries (Bergevin, Fauveau, McKinnon, 2015).

A number of initiatives have been developed globally to improve maternal health. Most important among them are: Campaign on accelerated reduction of maternal mortality in Africa (CARMMA), Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) as well as emergency obstetric care services and programme such as Saving

Mothers, Giving Life (SMGL).

The CARMMA was launched in 2009 and it aims to increase resources and societal change in support of maternal health. CARMMA is a country-driven strategy and 39 countries including South Africa had been incorporated into it (CARMMA, 2013). The MDG 5 was devoted to maternal health; its target was to reduce MMR by three-quarters and to achieve universal access to reproductive health (United Nations, 2009; Republic of South Africa, 2010). In 2015, SDGs were introduced. The SDG 3.1 aimed to reduce the global maternal mortality ratio to less than 70 per 100 000 live births by 2030 (United Nations, 2015; WHO, 2020b). The World Health Organization (WHO) provided guidelines for estimating the availability and use of emergency obstetric care services (WHO, 2009). This document identified a concise list of clearly defined '*signal functions*' for the purposes of assessing and monitoring levels of care actually provided by a facility. These are key medical interventions that are used to treat the direct obstetric complications that cause the vast majority of maternal deaths around the globe and include drug administration [parenteral antibiotics, uterotonic drugs (such as oxytocin), anticonvulsants for pre-eclampsia and eclampsia (such as magnesium sulphate)], blood transfusion, procedures [such as manual removal of the placenta and retained products of conception (e.g., manual vacuum extraction, dilation, and curettage)], equipment and skills for assisted vaginal delivery, (e.g., vacuum extraction, forceps delivery), surgery (e.g., caesarean section) (WHO, 2009). In 2011, a programme called '*Saving Mothers, Giving Life (SMGL)*' was launched as a 'Global Health Initiative' to dramatically reduce maternal mortality in low-resource, high-burden sub-Saharan African countries. SMGL used a District Health System (DHS) strengthening approach combining both supply- and demand-side interventions to address the three key delays to accessing effective maternity care in a timely manner - delay in seeking, reaching, and receiving quality obstetric services (Conlon, Serbanescu, Marum, 2019). As a result of these initiatives, worldwide maternal mortality was reduced by almost 50% between 1990 – 2010. While Africa achieved a 41% reduction in maternal mortality during 1990 – 2010, five countries in Sub-Saharan Africa (South Africa, Botswana, Lesotho, Namibia, and Swaziland) still reported an increase in maternal deaths (WHO, 2013).

1.1.2 MATERNAL AND WOMEN'S HEALTH IN SOUTH AFRICA

1.1.2.1 POLICIES AND LEGISLATION RELATED TO MATERNAL HEALTH

Over the last two decades, South Africa has developed excellent maternal and child health policies. However, implementation of these policies remained a major challenge (Human

Rights Watch, 2011). High maternal mortality in South Africa might be related to poor implementation of the policies at a facility level. Key policies and legislation since 1994 are listed in Table 1.1 (Cooper, Morroni, Orner, 2004; Daniels, Lewin, The Practice Policy Group, 2008):

Table 1.1 List of selected maternal health related legislations, policies, and guidelines

Constitution	Right to reproductive health care in the Constitution (Republic of South Africa, 1996a)
Legislations	Sterilisation Act as amended, (Republic of South Africa, 1998a; Republic of South Africa, 2005); Choice on Termination of Pregnancy Act as amended (Republic of South Africa, 1996b; Republic of South Africa, 2008)
Regulations	Free health services for pregnant women and children under the age of 6 years (Republic of South Africa, 1994); Maternal death as a notifiable condition (NDoH, 1997a)
Policies	Decreasing Maternal and Child mortality: Negotiated Service Delivery Agreement: A long and Health Life for all South Africans (NDoH, 2010a); Policy document on Primary Health care re-engineering (2011a); Primary Healthcare re-engineering Policy: District Clinical Specialist Team (DCST) (NDoH 2012a)
Guidelines	Basic Antenatal care (BANC) (Pattinson, 2007); Clinical Guidelines: Prevention of Mother-to-Child Transmission (PMTCT) (NDoH, 2010b); Guidelines for maternity care in South Africa: A manual for clinics, community health centers and district hospitals (NDoH, 2007a); Essential steps in the management of common conditions associated with maternal mortality (NDoH, 2007b); The South African Antiretroviral Treatment Guidelines (NDoH, 2013a) Basic Antenatal care plus (Pattison, Buchman, 2016) National Clinical Guideline for Implementation of the Choice of Termination of Pregnancy Act (NDoH. 2019a)
Reports	Confidential Enquiries into Maternal Deaths in South Africa: 1st report (NCCEMD, 1998); 2nd report (NCCEMD, 1999); 3 rd report (NCCEMD, 2005); 4 th report (NCCEMD, 2009); 5 th report (NCCEMD, 2012); 6 th report (NCCEMD, 2014); 7 th Report (2014-2016) (NCCEMD, 2018); 8 th Report Saving Mothers and Babies Report (2017-19) (NCCEMD, 2020)

In 2011, the Government released the policy document on National Health Insurance (NHI) (NDoH, 2011d), Green paper (NDoH, 2012c) and White paper (NDoH, 2015d) and subsequently the NHI Bill in 2019 (Republic of South Africa, 2019). In addition, a policy document on PHC re-engineering (2011) was published, leading to the appointment of a new team (DCST) of experts in each district (NDoH, 2011a). These interventions are probably the most important health interventions introduced during the last decade in South Africa and are expected to improve maternal health services.

1.1.2.2 MATERNAL DEATH

While many countries are making progress in reducing maternal mortality, this has increased during the last decade in South Africa. Data from the 2007 Community Survey suggest that maternal mortality in South Africa may have quadrupled from 1998 to 2007 (Garenne, McCaa, Nacro, 2011) but estimates from both global metrics and institutional reporting, although widely divergent, indicate South Africa has made considerable progress in reducing maternal and neonatal mortality since then (Damian, Njau, Lisasi, et al, 2019). In 2009, the Health Data Advisory and Coordination Committee (HDACC) report estimated that the MMR would be 310 per 100,000 per live births in 2012 (at the time of introduction of DCST) (NDoH, 2011d; WHO 2013). The MMR for South Africa was estimated at 122 per 100,000 live births in 2017- 19 (WHO, 2020a; NCCEMD, 2020; NDoH, 2020a).

There was a significant decline in MMR in all nine provinces (Bomela, 2015). However, there are significant differences in MMR among these provinces ranging between 195 per 100,000 in Free State, 117 per 100,000 in Gauteng and 75 per 100,000 in Western Cape (NCCEMD, 2020; NDoH, 2020a).

The Health Data Advisory and Coordination Committee (HDACC) of the NDoH set a target of reducing the ratio to 270 per 100,000 live births by 2014 (NDoH, 2011e) in every district. At that time, Ekurhuleni District was perceived to be one of the 25 worst performing health districts in the country in terms of MMR, which has changed considerably in the recent years. The 2012 and 2020 MMR of the Ekurhuleni District was 218 and 115/ 100,000 live births respectively (Massyn, Day, Damboo, et al, 2013 Massyn, Day, Ndlovu, et al, 2020).

The NDoH established the National Committee on the Confidential Enquiry into Maternal Deaths (NCCEMD) in 1997 and the Committee has produced eight reports till 2020 (Drife, 2012; Pattinson, 2012, NCCEMD 2020). The value of these confidential enquiries was well recognised by the WHO (WHO, 2004). The NCCEMD in its 7th and 8th reports recommended that decline in maternal deaths could be achieved by taking specific actions (3Hs) for reduction in deaths associated with HIV infection (27.05%), obstetrics hemorrhage (19.11%) and hypertensive disorders of Pregnancy (20.73%) by multi-stakeholder involvements from policy makers, health care professionals to the community. They recommended a strategy of 5Cs to achieve that: clinicians being committed for provision of quality of care to all pregnant women, safe caesarean deliveries, use of contraceptives for preventing unwanted pregnancies, engagement of the communities to ensure that women know what to do when pregnant.

(NCCEMD, 2018; NCCEMD, 2020). In their 8th report, they reported emergence of medical and surgical conditions associated death as a major underlying cause (16.91%), as deaths associated with other conditions had decreased in frequency (NCCEMD, 2020). Burton (2013) reviewed all publications on maternal deaths in South Africa, where factors such as health care workers' training, skill and attitude were also found to be additional contributors to maternal death.

1.1.2.3 OTHER MATERNAL HEALTH INDICATORS

Maternal health needs to be seen in a broader context than preventing maternal mortality. Both MDG 5 and SDG 3.1 also contained targets relating to universal access to reproductive health (Burton, 2013). Antenatal care (ANC), HIV in pregnancy rate, contraceptive prevalence rate and adolescent birth rate are some of these important indicators, which can affect maternal mortality and morbidity (see Appendix B).

In addition to these indicators, each of the public health-care facilities in South Africa collect another set of maternal health related indicators (n=15) (see Table 1.2), which are collated at a district level every month and reported at provincial level as a part of the District Health Information System (DHIS). There is a need to analyse these indicators at sub-district and district levels in order to engage the health facility managers to use this information for evidence- based decision making for improvement of maternal health.

The latest '*South Africa Demographic and Health Report*,' reported that maternal healthcare utilisation has increased significantly between 1998 and 2016 (NDoH, Statistics South Africa, South African Medical Research Council, and ICF, 2019):

- Antenatal care: the proportion of women with four or more antenatal visits was much lower amongst women with no education (69.3%) in 1998 and women with primary education (69.8%) in 2016 than those with higher education levels. For younger women aged 15–19, the proportion using four or more antenatal care visits increased from 66% in 1998 to 75% in 2016. However, the proportion of older women aged 35–49 receiving four or more antenatal care visits decreased.
- Intranatal care: Deliveries in a health facility increased from 83.4% in 1998 to 96.7% in 2016. Home deliveries decreased from 14% in 1998 to 4% in 2016. A skilled health provider assisted in nearly all deliveries (97%) in South Africa. The proportion of births delivered by Caesarean section increased from 16% in 1998 to 24% in 2016 – an increase of almost 50%. The South Africa Demographic and Health Survey (SADHS)

(2016) has shown that six in ten births (61%) delivered at private health facilities were caesarean births, as compared with 22% of births delivered at public health facilities. Women aged 40–44 showed a higher proportion of deliveries by C-section (33.3%), compared to women aged 35–39 (26.6%) in 2016.

- Postnatal care: The majority of maternal and infant deaths occur in the first month after birth in Africa (WHO, 2021). In South Africa, 84% of mothers had a postnatal follow-up within the first two days after the birth, while 16.4% did not receive any postnatal follow-up. By province, Western Cape and Free State have the highest proportions of women who received a timely postnatal health check (91% each), while KwaZulu-Natal has the lowest percentage (80%).

1.1.3 MATERNAL HEALTH INITIATIVES

Besides the policies, legislations and regulations mentioned in Table 2.1, the National and Provincial Departments of Health have taken some steps to improve maternal health services. The NDoH (2008) highlighted a strategy to improve maternal health services, which includes family and community involvement, basic antenatal care, basic intrapartum care, emergency obstetric care and postnatal care.

Chopra, Daviaud, Pattinson, et al (2009) summarized the key recommendations of three maternal, neonatal, and child health mortality audit groups, which were later included in the National Strategic Plans (NDoH, 2012b; NDoH. 2014d). They suggested that these actions would be affordable, possible, and sustainable for South Africa. They also proposed the importance of leadership and advocacy to make the health of women and children a priority and strengthening the capacity of health workers by instilling simple but effective quality improvement approaches as routine practice. These steps could have the potential to get South Africa on track to achieve the MDGs, which unfortunately did not happen.

The NCCEMD suggested that maternal mortality could be attributed to: (a) administrative factors, (b) patient related factors and (c) health workers related factors (NCCEMD, 2009). Subsequently, the NDoH decided to address these factors by appointment of a DCST in each health district in South Africa (NDoH. 2011a; NDoH. 2012a).

The targets for maternal and newborn indicators for 2019-20 set by the National (NDoH, 2014d) and Gauteng Provincial Department of Health (GDoH, 2019) as well as Ekurhuleni District (Ekurhuleni, 2019) are listed in Table 1.2. It was noted that there were no targets for

many of these indicators.

Table 1.2 Targets for Maternal and newborn indicators

Indicators	NDoH target	GDoH target	Ekurhuleni target
Family Planning			
Couple year protection rate (CYPR)	75	55	55
<i>Termination of pregnancy rate</i>	-	-	-
Antenatal indicators			
The <i>Antenatal visits before 20 weeks rate</i>	80	66	66
<i>Antenatal patients initiated on ART rate</i>	98	90	90
Intranatal indicators			
<i>Total in facility delivery</i>	-	-	-
<i>Delivery in facility rate</i>	100%	100%	100%
<i>Delivery in facility under 18 years rate</i>	-	-	-
<i>Delivery by caesarean section rate</i>	-	-	-
Live birth to HIV positive woman	-	-	-
Postnatal indicators			
<i>Postnatal visits within 6 days rate</i>	95%	75%	75%
Outcome indicators			
<i>Maternal mortality in facility ratio</i> (per 100,000 live births)	<100	<100	<100
<i>Neonatal mortality in facility rate</i> (per 1000 live births)	6	13	<12
Stillbirth in facility rate (per 1000 births)	-	-	-
Perinatal mortality in facility rate (per 1000 births)	-	-	-
<i>Live birth under 2500g in facility rate</i>	-	-	-

1.1.3.1 DISTRICT CLINICAL SPECIALIST TEAM (DCST)

The NDoH (2012a) formulated a policy for the appointment of a DCST comprised of experienced clinicians in each district of South Africa. In 2013, there were 17 DCST's operating in South Africa in all provinces (NDoH, 2012a; Nathan, Rautenbach, 2013). The DCST comprises of an obstetrician and gynaecologist, a paediatrician, a family physician, an advanced midwife, an advanced paediatric nurse and an advanced primary health care (PHC) nurse and anaesthesiologist (where available) (NDoH, 2011c).

The DCST policy framework defined the primary role of this team, which is to reduce maternal and child mortality and morbidity in each district, to reduce HIV related illness by clinical governance, to provide supervision, mentoring and support services throughout a district (NDoH, 2014a; NDoH, 2014b). In each district, a DCST was expected to be responsible for the

following areas of work, which would form the basis of their annual performance assessments: (a) quality of clinical services; (b) clinical training; (c) monitoring, evaluation and improving clinical services; (d) supporting district level organisational activities; (e) supporting health systems and logistics; (f) collaboration, communication, and reporting; and (g) teaching and research activities. Their work would be judged based on changes in maternal and paediatric indicators in a district (NDoH, 2011c). The DCST was expected to work together with other stakeholders in a district (such as the District Health Management Team (DHMT), unit responsible for district health information system (DHIS), local municipality, district managers, health programme coordinators), for planning purposes. Additionally, they were also expected to work in collaboration with provincial and national health authorities. It was anticipated that improved clinical governance would result in improved systems and better quality care across all disciplines. (NDoH, 2011c)

1.2 THE PROBLEM STATEMENT

South Africa had been taking a number of steps to improve its maternal health services without producing the desired results. The DCST was the latest of these initiatives and probably, the most innovative among them. These teams were expected to work at a district and sub-district level to improve maternal and child health services in South Africa (NDoH, 2012a). These teams were expected to work within the DHS and to use routinely collected data from DHIS for monitoring maternal and child health services. They were also expected to conduct operational research within the DHIS, as there had been a dearth of research performed on maternal health services at a sub-district and district level using routinely collected data (DHIS) as the NCCEMD reports mainly focused on provincial level analysis.

1.3 THE KNOWLEDGE GAP

Although much published research is available on the maternal health outcomes in South Africa (Chopra, et al, 2009; Coovadia, Jewkes, Barron, et al, 2009, Moodley, Fawcus, Pattinson, 2018; Damian, et al, 2019), very little is known about the state of maternal health and its determinants at district and sub-district levels. The NDoH acknowledged and addressed this through the appointment of DCST's. Therefore, it is important to document their efforts on maternal health services in district and sub-district settings. This study was planned against this background to document the changes in maternal health indicators in a district, since the inception of DCST and to document the knowledge and perception of the DHMT (at district, sub-district, and health facility levels) about the effect of DCST for these changes.

1.4 SIGNIFICANCE OF THE RESEARCH

This study explored the current policy framework for the establishment of the DCST in the context of maternal health policies in South Africa from 1994 until now. It further explored in a district health setting (Ekurhuleni District), the various obstetric intervention measures undertaken by the DCST over the last eight years and endeavoured to document the effect of these DCST interventions on the changes in maternal health indicators by comparing the maternal health data before and after the introduction of the DCST in the Ekurhuleni District (herein after referred as the District). In addition, it also attempted to document the knowledge and perception about DCST's among the district managers.

Ekurhuleni DCST has been functioning since July 2012. The primary role of the obstetric team within the DCST was to reduce maternal mortality and morbidity; its work covered a wide range of activities to improve mothers' health during the antenatal, intranatal and postnatal periods. This study was planned in this context and focused on a document review (maternal health policy analysis), analysis of routinely collected maternal health data from all health facilities in the District, documentation of all the interventions and conducting key informant interviews to understand the perception and knowledge of DCST. It is hoped that the results from this study might be used to inform policymakers at national, provincial and district levels about the effects of DCST's on maternal and women's health services in the Ekurhuleni District.

1.5 RESEARCH QUESTIONS

What are the various obstetric intervention measures undertaken by the DCST since its inception in 2012 within the current policy framework, in a district health setting (Ekurhuleni District), and what are the effect of the DCST interventions on the changes in maternal health indicators based on the analysis of these indicators as well as the knowledge and perceptions of the district managers and health professionals?

1.6 STUDY AIMS AND OBJECTIVES

1.6.1 AIM

To explore, in a district health setting (Ekurhuleni District), the various obstetric intervention measures undertaken by the DCST over the last eight years (2012-20) within the current policy framework for the establishment of the DCST and to document the effect of the DCST

interventions on the changes in maternal health indicators by analysing maternal health indicators after the introduction of the DCST in the District and lastly, to document the knowledge and perceptions about DCST among the district managers and health professionals.

1.6.2 SPECIFIC OBJECTIVES

1. To establish any changes in the maternal health indicators for the last eight years (July, 2012- March 2020 since the inception of the DCST in the Ekurhuleni District and three sub-districts
2. To establish any change in the prevalence of maternal deaths and their causes for the last six years (July 2014- March 2020), since the inception of DCSTs in three sub-districts in the Ekurhuleni District.
3. To describe the various obstetric intervention measures undertaken by the DCST in Ekurhuleni District over an eight-year period (2012– 2020) and to evaluate these interventions against the DCST policy framework. (see Table 3.2)
4. To establish the knowledge and perceptions of the DCST among the district health managers and health professionals (doctors and nurses) in the Ekurhuleni District.

1.7 CONCEPTUAL FRAMEWORK

A simple conceptual framework for the study was developed. The conceptual framework highlights the link between maternal health interventions and the health systems factors (identified by the NCCEMD) that might influence implementation and outcomes of the interventions (implementation of PHC re-engineering) as reflected by process and outcome indicators. In this study, DCST's would be used as a tracer to investigate health systems issues that require strengthening in order to achieve the ultimate goal of reduced maternal mortality. Assessment of a health system using the tracer approach is about tracking carefully selected health problems, in order to identify strengths and weaknesses of the health system (Kessner, Kalk, and Singer, 1973).

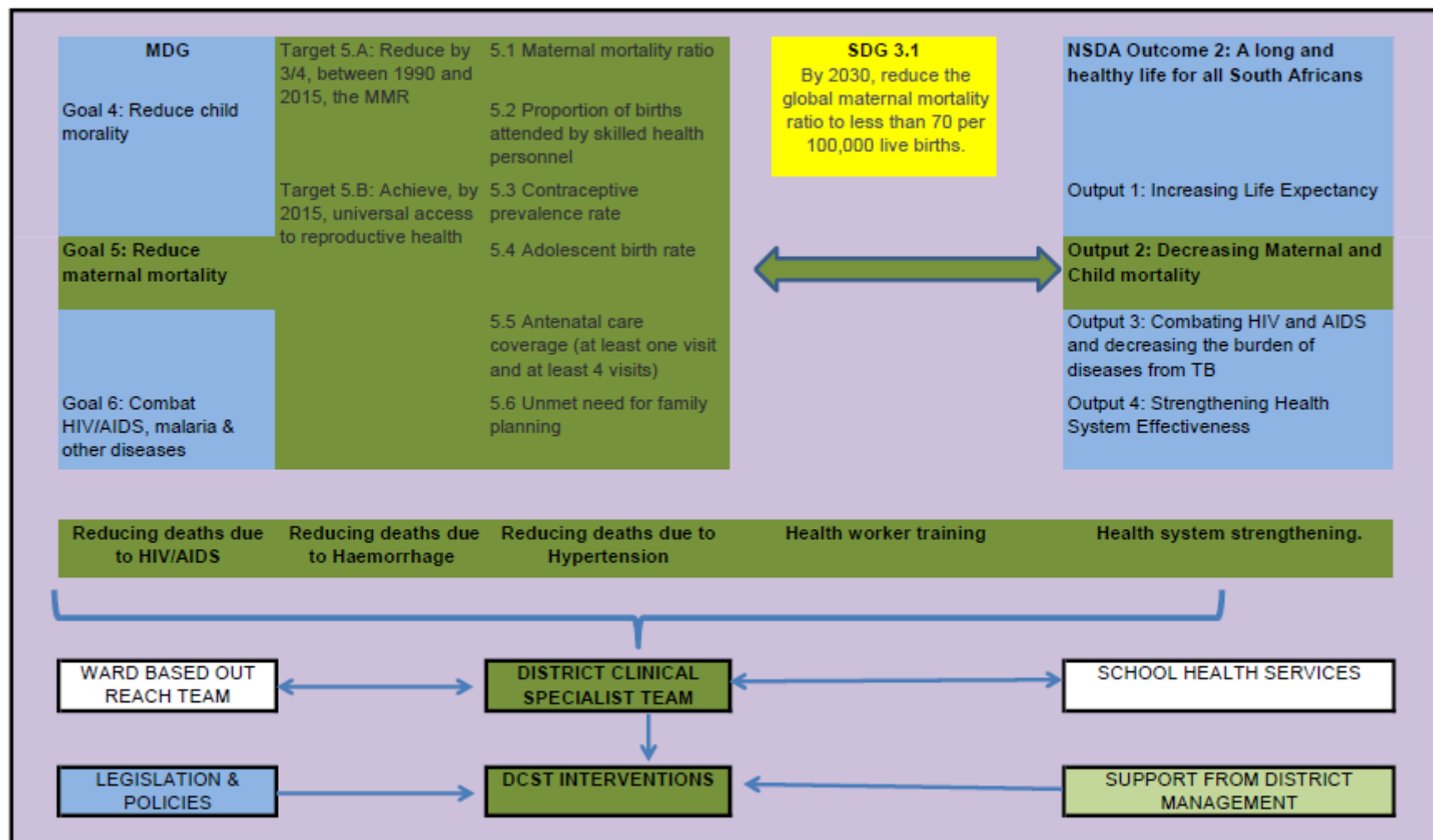


Figure 1.1 Conceptual framework

1.8 SUBSEQUENT CHAPTERS OF THE REPORT

Thus far, in this report, the motivation for the research had been discussed and the objectives defined. The subsequent chapters will focus on:

Chapter 2: Literature review

This Chapter focuses on the review of relevant legislation, policies, and guidelines in the context of maternal health services in South Africa from 1994 to date.

Chapter 3: DCST interventions

The roles and responsibilities of DCST is explained in this chapter. In addition, the setting of the study is also described in the context of DCST.

Chapter 4 Research methodology for analysis of quantitative data

This chapter describes the research methodology used to conduct the quantitative component (DHIS indicators and maternal mortality related indicators) as well as an analysis of DCST interventions. The methods and techniques pertaining to these components of the study are also dealt with in this chapter.

Chapter 5 Results from analysis of quantitative data

Chapter 5 contains the analysis of the findings from the quantitative component (DHIS indicators and maternal mortality related indicators) in terms of its aims and objectives.

Chapter 6 Results from analysis of DCST Interventions:

This Chapter contains the analysis of the findings from the study related to the analysis of DCST interventions.

Chapter 7 Research methodology for qualitative data

This Chapter describes the research methodology used to conduct the qualitative component of this study. The methods and techniques pertaining to this component of the study are also dealt with in this chapter.

Chapter 8 Results from analysis of qualitative data

This Chapter contains the analysis of the qualitative component of the study.

Chapter 9: Discussion

In this chapter, the findings of the reviewed literatures are integrated with the results obtained from the analysis and are deliberated in order to address the aims and objectives of this study.

Chapter 10: Conclusions and recommendations

This forms the final part of the report and draws conclusions from the research related to the aims of this study, and suggests areas for future research into practice.

1.9 SUMMARY OF CHAPTER 1

This introductory chapter described the background of this study, the motivation for the research, the research question and the aims and objectives. The next chapter will focus on review of legislation, policies, guidelines, and reports that are relevant to maternal health in South Africa. This will contextualise the background for the establishment of DCSTs in 2012.

CHAPTER 2

REVIEW OF LITERATURE, LEGISLATION AND POLICIES

In this chapter, relevant legislation, policies, strategies, and guidelines in the context of maternal health services in South Africa from 1994 to date are appraised. In addition, published literature associated with these documents are reviewed.

2.1 INTRODUCTION

The major transformations have taken place over the past two decades in health legislation, health policy and delivery of health services in South Africa. In this section, these changes in maternal health policies and changes in key areas of maternal health are described.

Under apartheid, the public sector health system in South Africa was fragmented and characterised by geographical and racial inequalities. There were no comprehensive reproductive health policies available. Women's health consisted mainly of maternal and child health services (Holloway, 1994). In 1990, the African National Congress (ANC) established a health commission aimed at transforming the health sector into a single system with an equitable distribution of resources and expanded service delivery (Klugman, Stevens, Van den Heever, et al, 1998). Two major international events, (the International Conference on Population and Development (ICPD) in Cairo (1994) and the 1995 Fourth World Conference on Women (FWCW) in Beijing (1995)) were held, which influenced policy development on maternal health in South Africa.

In 1994, the new National Department of Health, in collaboration with national and international stakeholders embarked on a rapid assessment of reproductive health services and conducted a national workshop to develop recommendations on research priorities and policy formulation (Rees, 1994). At the same time, the NDoH adopted the primary health care (PHC) approach as the structural orientation of the South African health care system, which emphasised health as a human right. Equitable resource distribution, expanded access, decentralised services aimed at promoting local health needs, community involvement through the district health service (DHS), and preventive and promotive health care were the main focus of the national health system recommendations (Cooper, et al, 2004).

More than two decades have passed since then. Because of efforts by government and other national and international stakeholders, a number of laws and policies affecting reproductive

health have been enacted in South Africa (Table 2.2). These laws and policies were accompanied by a major restructuring of health programmes and administration. Directorates of Mother, Child and Women's Health were established within the national and provincial departments of health. The objectives were to increase women's access to appropriate health services, to ensure that approaches to health service delivery were consistent with the goal of increasing gender equality, and to provide services to women and men that facilitated the achievement of optimal reproductive and sexual health (National Progressive Primary Health Care Network, 1997). Subsequently, most of the 52 districts in South Africa established similar structures. In addition, a 'National Department of Women, Children and People with Disabilities' was established in 2009 (National Department of Women, Children and People with Disabilities, 2013).

This chapter documents the current policy framework for the establishment of DCSTs in the context of maternal health policies in South Africa from 1994 to date. These policies should not work in isolation, but rather function in synergies to improve maternal health outcomes through responsive, effective, and efficient health systems, consisting of all organizations, people, and actions whose primary interest is to promote, restore or maintain health. The WHO 'Health Systems Building Blocks' (WHO, 2007), provided a framework, which could be used for categorisation of different maternal health policy documents. This categorisation could assist in better understanding of the link between different maternal health policies with their overall outcomes.

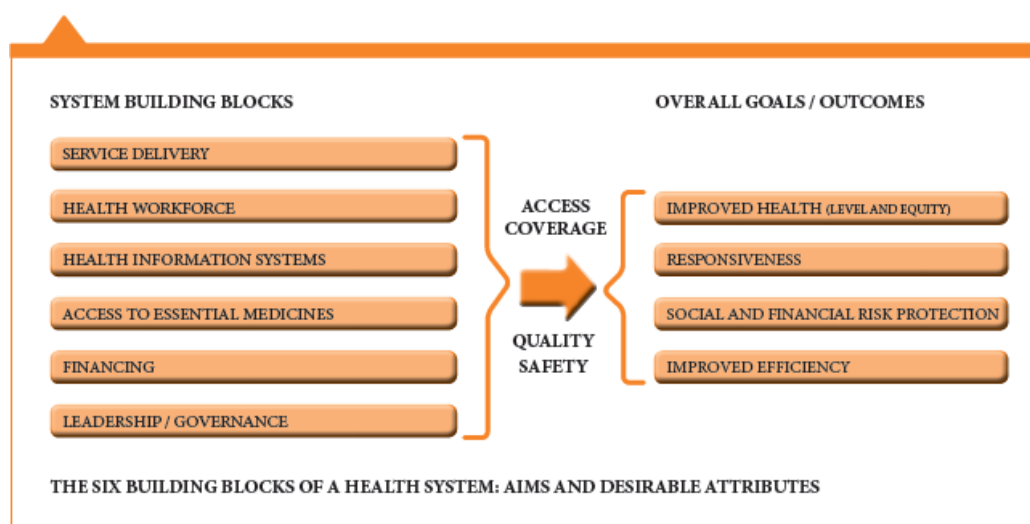


Figure 2.1 WHO Health Systems Building Block (WHO, 2007)

2.2 POLICIES AND LEGISLATIONS

The purpose of this section was to create a conceptual structure summarising the policy framework guiding maternal health services in South Africa. This was expected to assist in the identification of the key factors that might have an influence on the establishment of DCSTs. This was based on an analysis of existing legislation, regulations, policies, and guidelines published in South Africa from 1994 till date.

This narrative review of existing legislation, regulations, policies and guidelines published in South Africa focused on the period January 1994 to March 2021 (final search undertaken in March 2021). 1994 was a watershed year in South Africa due to the end of apartheid and the election of the first all-inclusive democratic government. This review involved four steps. First, the databases of Departments of Health (national and provincial) were searched using a range of relevant key words (Table 2.1). Some additional documents were also identified through manual searches of relevant departments.

Table 2.1 Search terms and inclusion criteria

Search terms: Act; OR legislation; OR Regulation; OR Policy; OR Guideline; OR AND Matern* OR Pregnant* AND "South Africa"
Inclusion criteria, steps 2-3: • Published in English • Full document accessible • Maternal health policy focus
Exclusion Criteria: • Not focusing on maternal health
Inclusion criteria, steps 3-4: • Primarily focuses entirely or mainly on policy change for improvement of maternal health

Secondly, listings for the initial set of identified documents were checked and documents not meeting the inclusion criteria (Table 2.1) were excluded. Thirdly, the remaining documents were reviewed to provide a broad mapping of some of their features and to identify the final set of 118 documents to analyse in more detail. At this stage, documents adopting broader views on maternal health were excluded, as the focus of this study was to determine the background to the formation of the DCST. Fourthly, the final set of 102 documents were analysed by the researcher to provide a map of their purposes, as well as their link to the formation of DCST. The results were categorised according to the WHO Health Systems

Building Blocks. (WHO, 2007).

2.2.1 HEALTH SERVICES

Good health services are those services, which deliver effective, safe, good quality, personal and non-personal health interventions to those who need them, when and where needed, with minimum waste of resources (WHO, 2007). Components of maternal health services should include: number of facilities and their locations providing good quality integrated maternal services such as anti-natal, intra-natal and post-natal care, secondary and tertiary care, intensive care and theatre services, family planning, termination of pregnancy, PMTCT, at primary, secondary and tertiary levels with good referral systems, ambulances, and emergency transport services (Blaauw and Penn-Kekana, 2010).

Soon after South Africa's first democratic election in April 1994, the African National Congress (ANC) published its National Health Policy for South Africa (ANC, 1994). In 1997, this plan formed the basis of the *White Paper for the Transformation of the Health System in South Africa* (NDoH, 1997b), and later the *National Health Act* (Republic of South Africa, 2004a; Republic of South Africa. 2013a.). In the White paper for the Transformation of the Health Systems in South Africa, NDoH (1997b) proposed that:

'Maternal, child and women's health (MCWH) services should be accessible to mothers, children, adolescents and women of all ages, the focus being on the rural and urban poor and farm workers. MCWH services should be comprehensive and integrated. Clear objectives and targets should be set at the national, provincial, district and community levels in accordance with the goals of the Reconstruction and Development Programme (RDP), the health sector and the United Nations Convention on the Rights of the Child. ... MCWH services should be efficient, cost-effective and of a good quality. Women and men will be provided with services which will enable them to achieve optimal reproductive and sexual health'.

A number of legislations, policies and guidelines were created against this background (Table 2.2).

Table 2.2 Documents linked to health services

Types	Documents
Legislation	Choice of termination of pregnancy Act as amended (Republic of South Africa, 1996b; Republic of South Africa, 2004b; Republic of South Africa, 2008), Sterilization Act as amended (Republic of South Africa, 1998a; Republic of South Africa, 2005). National Health Act as amended (Republic of South Africa, 2004a; Republic of South Africa, 2013a); Domestic violence Act (Republic of South Africa, 1998b); Sexual offences and related matters Amendment Act (Republic of South Africa, 2007a).
Policy and Strategy	Human Development Cluster: Health: Government's programme of action: Ten-point Plan (NDoH, 2009); Negotiated Service Delivery Agreement: A long and healthy life for all South Africans (NDoH, 2010a); Integrated school health Policy (NDoH and NDoBE, 2012); National adolescent sexual and reproductive health and rights framework Strategy 2014–2019 (National Department of Social Development, 2015); National sexual & reproductive health and rights Policy (NDoH, 2019a);
Guideline	National cervical cancer screening Guideline (NDoH, 2000), National contraception Policy Guideline (NDoH, 2003a); Basic antenatal care Guideline (Pattinson, 2007); Guidelines for maternity cares in South Africa: A manual for clinics, community health centers and district hospitals as amended (NDoH, 2007a); Basic antenatal care Handbook (Pattinson, 2007); Every death counts. Saving the lives of mothers, babies, and children in South Africa (NDoH, 2008); Clinical Guidelines: Prevention of Mother-to-Child Transmission (NDoH, 2010b); A monograph of the management of postpartum hemorrhage (NDoH, 2010c); National contraception policy Guideline (NDoH, 2003a; NDoH, 2013c); South African Antiretroviral Treatment Guidelines: National consolidated guidelines for the prevention of mother-to-child transmission of HIV and the management of HIV in children, adolescents and adults (NDoH, 2015b); Guidelines for maternity care in South Africa (NDoH, 2016a); National policy for patient safety incident reporting and learning in the public health sector of South Africa (NDoH, 2016b); Essential steps in the management of obstetrics emergency (NDoH, 2014c); Basic antenatal care plus Handbook (Pattinson, Buchman, 2016); Guideline for the Prevention of Mother to Child Transmission of Communicable infections (NDoH, 2019b); National contraception clinical guidelines (NDoH, 2019c); National clinical guideline for implementation of the choice of termination of pregnancy Act (NDoH, 2019c); National contraception clinical guidelines (NDoH, 2019d); National clinical guidelines for safe conception and infertility, 2019 (NDoH, 2020b)
Programme	Launch of PMTCT programme in Western Cape (1999) and Gauteng (2001), Nationwide ART roll out (NDoH, 2003b), HIV post-exposure prophylaxis (NDoH, 2003c); Ideal clinic Programme (NDoH, 2013b)

The National Health Act as amended (Republic of South Africa, 2004a; Republic of South Africa, 2013a) described all aspects of the health system in South Africa including the DHS. It mentioned that a DHS should provide equitable, efficient, comprehensive, and accessible health services, which should be based at local and community levels.

The Ten-Point Plan (NDoH, 2009), Negotiated Service Delivery Agreement (NDoH, 2010a) recognized the importance of maternal health and highlighted the reduction of maternal and child mortality as a key priority. This was expected to be performed through improved service

delivery especially at the level of PHC. For example, the *Ideal Clinic Programme* was introduced to improve service delivery at a PHC level (NDoH, 2013b).

The *Integrated School Health Policy* document (NDoH and NDoBE, 2012) focused on school going children up to grade 12. It emphasised different aspects of children's' health, which should be integrated into the school curriculum. School activities should include nutrition, exercise, hygiene, chronic illnesses, prevention and management of child abuse and sexual and reproductive health of school children.

The *Ideal Clinic Programme* (NDoH, 2013b) in South Africa was an initiative that was started in July 2013 to systematically improve the quality of care of PHC facilities. This programme identified an *Ideal Clinic* as a clinic with good infrastructure, adequate staff, adequate medicine and supplies, good administrative processes, and sufficient adequate bulk supplies, which should provide integrated clinical services.

The *Choice on Termination of Pregnancy Act* (CTOP) assisted in the legalization of abortion and allowed for safe access to abortion services in both public and private health facilities. This Act was promulgated to improve access to free termination of pregnancy (TOP) services and has resulted in measurable improvements in women's health status resulting in significant reductions in maternal mortality and morbidity (Reproductive Rights Alliance, 2002). This Act was subsequently updated in 2008 (Republic of South Africa, 2008) to incorporate some changes (such as improved accessibility and task shifting by allowing trained registered nurses other than midwives) to perform first-trimester abortions. Subsequently, a clinical guideline was published for implementation of the CTOP Act (NDoH, 2019c).

Similarly, the Sterilization Act and its amendments were enacted to assist women to improve access to this service. This Act dealt with the circumstances under which sterilisation and in particular, sterilisation of persons who were incompetent or incapable of consenting due to mental disability might occur (Republic of South Africa, 1998a and Republic of South Africa, 2005).

The *National Cervical Cancer Screening Guideline* (NDoH 2000) provided a comprehensive guide for the screening method to identify cervical epithelial changes in an early stage, which could prevent progression to cervical cancer. This was subsequently updated in 2015 to incorporate vaccination for *Human Papilloma Virus* (HPV) (Botha and Dreyer, 2015). It is important to note that cervical cancer remains as one of the commonest causes of cancer among South African women (NDoH, 2000; Botha and Dreyer, 2015).

The *National Contraception Policy Guideline* (NDoH, 2003a) and its amendments (NDoH, 2013c; NDoH, 2019d) have been instrumental in identifying problems in contraceptive services, such as limited method choice, provider coercion, overly restrictive approaches to contraceptive initiation, the exclusion of men and lack of services for youth. It provided a comprehensive framework for contraceptive care for both men and women. Since 1994, in keeping with the PHC approach, public sector contraceptive services have been integrated into general primary care services (Cooper, et al, 2004), such as the approval for use of mifepristone (RU486) and introduction of sub-dermal implants in 2014 (NDoH, 2013c; NDoH, 2014d). A new *National Clinical Guideline for Safe Conception and Infertility* (NDoH, 2020b) was formulated to provide further direction in this field.

The Prevention of mother-to-child transmission of HIV (PMTCT) programme was first launched in South Africa in Western Cape (1999) and Gauteng (2001) followed by nationwide ART roll out in 2003 (NDoH, 2003b) and provision of HIV post-exposure prophylaxis (NDoH, 2003c). Subsequently, a number of initiatives were taken to reduce HIV related complications and mother-to-child transmission). These included: *Clinical Guidelines for Prevention of Mother- to-Child Transmission* (NDoH, 2010b), which were subsequently amended (NDoH, 2015b; NDoH. 2019b) to provide newer medicines.

Guidelines for maternity care in South Africa provided detailed information on management of antenatal care in clinics, community health centres and district hospitals, which are aimed to reduce maternal morbidity and mortality. *Management of obstetric hemorrhage* was outlined in detail in a monograph of the management of postpartum hemorrhage. (NDoH, 2010c)

Essential Steps in Managing Obstetric Emergencies (ESMOE) was an initiative organised by the South African Medical Research Council (MRCSA), which capacitated health care workers to manage obstetrics emergencies. The main purpose of ESMOE was to reduce maternal deaths in South Africa (NDoH, 2014c; UP Centre for Maternal, Fetal, Newborn and Child Health. 2021)

Sexual and Reproductive Health and Rights were also received attention and two strategies were formulated during this period namely the *National Sexual and Reproductive Health and Rights Policy* (NDoH, 2019a) and one specifically for adolescents (National Department of Social Development, 2015).

A number of other guidelines were also introduced for improving management of maternal health [such as the Basic Antenatal Care Handbook (Pattison, 2007), Basic Antenatal Care

Plus Handbook (Pattison, Buchman. 2016), HIV/ AIDS (NDoH, 2010b; NDoH, 2015a; NDoH, 2019b), cancer [such as National Cervical Cancer Screening Guideline (NDoH, 2000), and the launch of various programmes such as the PMTCT programme in Western Cape (1999) and Gauteng (2001), nationwide ART roll out (NDoH, 2003b), and HIV post-exposure prophylaxis (NDoH, 2003c).

2.2.2 HEALTH WORKFORCE

A well-performing health workforce is one, which works in ways that are responsive, fair, and efficient to achieve the best health outcomes possible, given available resources and circumstances, e.g., there are sufficient numbers and mix of staff, fairly distributed; and are competent, responsive, and productive (WHO, 2007).

Table 2.3 Documents linked to health work force

Types	Documents
Legislation	Traditional Health Practitioners Act (Republic of South Africa, 2007b) The Health Professions Amendment Act (Republic of South Africa, 2007c); Regulations defining the scope of practice of clinical associates (NDoH, 2015b)
Policy and Strategy	Human Development Cluster: Health: Government's Programme of Action: Ten-point Plan (NDoH, 2009); Human Resources for Health for South Africa: 2030 (NDoH, 2011f); Primary Health care re-engineering Policy: District Clinical Specialist Team (DCST) (NDoH, 2011a)

Whereas the *Health Professions Amendment Act* (Republic of South Africa, 2007c) provided a legal framework for medical and nursing and other health professionals in South Africa, the *Traditional Health Practitioners Act* (Republic of South Africa, 2007a) provided a regulatory framework to ensure the efficacy, safety, and quality of traditional health care services. For example, it defined the scope of practice for traditional birth attendants, such as the physical or mental preparation of an individual for pregnancy and childbirth. This clarification of roles was expected to help as a considerable number of South Africans still sought medical care from traditional practitioners (Nemutandani, Hendricks, Mulaudzi, 2016). Furthermore, the regulations were promulgated defining the scope of clinical associates, a new cadre of health professionals (NDoH, 2015b).

A policy framework for the *Management and Development of Human Resources* in the Health Sector was developed (Human Resources for Health for South Africa: 2030 (NDoH, 2011f)

‘the NDoH have a vision to improve access to health care for all and health outcomes in the short and medium term, with a particular focus on improving maternal and child health and NDoH recognized that it would require the human resources to implement re-engineered Primary Health Care’.

This policy acknowledged the necessity to develop and employ new professionals and cadres to meet policy and health needs, to increase workforce flexibility to achieve this objective, to improve the working lives of the existing workforce, to improve retention, to increase productivity and to revitalise aspects of education, training, and research. The document also projected the human resource requirements for various professionals including specialist obstetricians and gynaecologists, and midwives. The *PHC re-engineering Policy* (NDoH, 2011a) was formulated against this background for deployment of medical specialists and nursing staff in every district in South Africa as the DCST. Their role was expected to improve both the quality of health care and health outcomes for mothers, newborns and children.

2.2.3 HEALTH INFORMATION SYSTEMS

A well-functioning health information system is one that ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, health systems performance and health status (WHO, 2007).

Table 2.4 Documents linked to health information system

Types	Documents
Legislation	National Health Act (Republic of South Africa, 2004a)
Policy and Strategy	District Health Management Information System (DHMIS) Policy (NDoH, 2011g)
Programme	MomConnect (NDoH, 2015c); Health Patient Record System (NDoH, 2018a)
Guideline	DCST standardized format (NDoH, 2014e); National Indicator Data Set: Data Element (NDoH, 2017)
Report	Maternal death as a notifiable condition (NDoH, 1997a); Health Data Advisory and Co-Ordination Committee (HDACC) Report (NDoH, 2011d)

The National Health Act (Republic of South Africa, 2004a) demarcated the role of national, provincial and district in terms of management of the National Health Information System. Section 74 of the Act stipulated the role of the NDoH in terms of the co-ordination of the health information system at every level of health (including the private sector) in order to create a comprehensive national health information system. It empowered the Minister of Health to prescribe kinds of data to be compiled and reported to the NDoH. Section 75 of the Act made the relevant member of the Executive Council responsible to establish, maintain, facilitate, and implement the health information systems contemplated in the Section 74. Lastly, Section 76

of the Act stated the duties of district health councils and municipalities to establish and to maintain a health information system. The NDoH had formulated a *Policy for a District Health Management Information System* (DHMIS), which was last updated in 2011 to provide direction in this regard (NDoH, 2011g), which led to the collection and reporting of more than large amount of data elements on maternal health on a monthly basis from all the 52 districts in South Africa. However, the quality of data remained questionable, while using the data for decision making at district and sub-district levels remained a challenge. This led to the formation of a Health Data Advisory and Co-Ordination Committee (HDACC) in October 2011 by the NDoH. The reports published by this Committee were expected to provide reasonably acceptable baseline data for monitoring health systems in South Africa. For example, the estimation of maternal mortality varied widely, although it was declared a notifiable condition in 1997 (NDoH, 1997a). The Committee provided an estimated MMR of 210 (NDoH, 2011e).

The NDoH also introduced a standard data set called *National Indicator Data Set* (NIDS), which was last updated in 2017, as well as a standardized format for DCST reporting on maternal and childhood indicators (NDoH, 2014e).

Besides these efforts, the NDoH attempted to improve the communication system through the launch of a programme called MomConnect in 2014. This programme aimed to register all pregnant women who used cell phones. This would allow the NDoH to capture their details and to keep track of their progress. Additionally, MomConnect was expected to regularly send messages regarding various pregnancy related issues to pregnant mothers. Pregnant mothers would be able to call the *National MomConnect helpline* for any advices and complaints. This information could be triangulated with the routinely collected data to improve quality on a real time basis (NDoH, 2015c).

Lastly, the NDoH took a bold step for establishment of a uniform Health Patient Record System for all South African as a part of the NHI rollout plan (NDoH, 2018a).

2.2.4 ESSENTIAL MEDICAL PRODUCTS, VACCINES AND TECHNOLOGIES

A well-functioning health system ensures equitable access to essential medical products, vaccines and technologies of assured quality, safety, efficacy and cost-effectiveness, and their scientifically sound and cost-effective use (WHO, 2007).

Table 2.5 Documents linked to essential medical products, vaccines, and technologies

Types	Documents
Legislation	Pharmacy Amendment Act (Republic of South Africa, 2000); Medicines and Related Substances Amendment Act (Republic of South Africa, 2002); National Health Act (Republic of South Africa, 2004a); Establishment of South African Health Product Regulatory Authority (Republic of South Africa, 2015).
Policy and Strategy	Ideal clinic Programme (NDoH, 2013b)
Guideline	District Hospital service package for South Africa (NDoH, 2002); Standard treatment guidelines and essential medicines list for South Africa: primary health care and hospital level (NDoH, 2014f); Guidelines for Maternity care in South Africa (NDoH, 2016a); Standard treatment guidelines and an essential medicines list: Primary Health Care level (NDoH, 2018b); Standard treatment guidelines and an essential medicines list: Hospital level adults (NDoH, 2019e)

The National Health Act (Republic of South Africa, 2004a), provided direction for the development, procurement and use of health technology at a national, provincial and district level. An Act for the establishment of a *South African Health Product Regulatory Authority* (SAHPRA) was promulgated. The roles and responsibilities of SAHPRA included monitoring, evaluation, regulation and control of medicines, scheduled substances, clinical trials, medical devices, and In-vitro diagnostics (Republic of South Africa, 2015).

In addition, the *Pharmacy Amendment Act* (Republic of South Africa, 2000) was formulated to allow non-pharmacists to own pharmacies, with the aim of improving access to medicines. The *Medicines and Related Substances Amendment Act* (Republic of South Africa, 2002) was expected to make drugs more affordable and to provide for transparency in the pricing of medicines.

Standard treatment guidelines and an Essential Medicines List for South Africa had been published regularly to provide guidance on the availability of drugs at PHC and hospital levels (excluding the tertiary and central hospitals) (NDoH, 2014f), and were last updated in 2018 and 2019 respectively (NDoH, 2018b; NDoH, 2019e). *Ideal Clinic Programme* (NDoH, 2013b) and *Guidelines for Maternity Care in South Africa* (NDoH, 2016d; NDoH, 2016a) provided lists of essential equipment for PHC clinics. Similar lists were available for district hospitals in the *Guideline for District Hospital Services* (NDoH, 2002).

2.2.5 HEALTH FINANCING SYSTEM

A health system should be capable of raising adequate funds to ensure access to services. It should also protect the users from financial catastrophe or impoverishment associated with

having to pay for health care (WHO, 2007).

Table 2.6 Documents linked to health care financing

Types	Documents
Legislation	Medical Schemes Act (Republic of South Africa, 1998c); Medical Schemes Amendment Act 62 of 2002 (Republic of South Africa, 2002b); National Health Act (Republic of South Africa, 2004a); National Health Insurance Bill (Republic of South Africa, 2019); Medical Scheme Amendment Bill (Republic of South Africa, 2018a)
Policy and Strategy	Free health services for pregnant women and children under the age of 6 years (Republic of South Africa, 1994); Human Development Cluster: Health: Government's Programme of Action: Ten-point Plan (NDoH, 2009); National Health Act (Act 61 of 2003): Policy on National Health Insurance (NDoH, 2011d); National Health Insurance (NHI) - Green Paper (Republic of South Africa, 2012a), National Health Insurance (NHI) – White Paper (Republic of South Africa, 2015d);

Based on the National Health Plan for South Africa (ANC, 1994), one of the first policies of the Republic of South Africa was to introduce free health services for pregnant women and children under the age of six years (Republic of South Africa, 1994), except members of medical aid schemes and their dependents and persons receiving compensation for compensable occupational diseases (Republic of South Africa, 2004a). The *Medical Schemes Act* (Republic of South Africa, 1998c) also stated clearly that no medical scheme could discriminate directly or indirectly against any person on one or more arbitrary grounds such as gender and pregnancy. The Minister of Health recently introduced the Medical Scheme Amendment Bill to abolish co-payments (Republic of South Africa, 2018a).

Based on the National Health Plan for South Africa formulated by the African National Congress in 1994 (ANC, 1994), the ex-Minister of Health, Dr A Motsoaledi introduced the National Health Insurance (NHI) Ten-point Plan (NDoH, 2009). As a part of the drive towards universal health coverage, the Republic of South Africa published four policy documents: *Policy on National Health Insurance* (NDoH, 2011D), a *Green Paper* (NDoH, 2012c), and *White Paper* (NDoH, 2015d) and recently, *National Health Insurance Bill* (Republic of South Africa, 2019). The NHI is a health financing system that is designed to pool funds to provide access to good quality, affordable personal health services for all South Africans based on their health needs, irrespective of their socioeconomic status. The NHI is intended to ensure that the use of health services does not result in financial hardships for individuals and their families (Republic of South Africa, 2019).

2.2.6 LEADERSHIP AND GOVERNANCE

Appropriate leadership and governance are an essential building block within a health system to provide effective oversight, coalition-building, formulation of appropriate regulations and incentive, providing attention to system-design, and accountability (WHO, 2007).

Table 2.7 Documents linked to leadership and governance

Types	Documents
Legislation	New South African Constitution (Republic of South Africa, 1996a); National Health Act (Republic of South Africa, 2004a), Establishment of the Office of Health Standard Compliance (Republic of South Africa, 2013a)
Policy and Strategy	ANC. A national health plan for South Africa (ANC, 1994); Ratification of the United Nations Commission on the elimination of allforms of discrimination against women (CEDAW) (Republic of South Africa, 1995); Maternal Child and Women Health Draft Policy (NDoH, 1995a); A policy for the Development of a DHS in South Africa (NDoH, 1995b); Establishment of the Standing Committee for Confidential Enquiries into Maternal Deaths (NDoH, 1997c); White Paper for the Transformation of the Health System in South Africa (NDoH, 1997b); Population Policy (Republic of South Africa, 1998d); Formation of South African National AIDS Council (Republic of South Africa, 1998e); Launch of Patients' Rights Charter (NDoH, 1999); District Hospital service package for South Africa (NDoH, 2002); National Development Plan: Vision for 2030 (Republic of South Africa, 2011); Policy document on Primary Health care Re-engineering (NDoH, 2011a); Policy on categories of hospitals (NDoH, 2011h). Policy on the management of hospitals (NDoH, 2011i); National Strategic Plan for maternal, newborn, child and women's health and nutrition 2012-2016 (NDoH, 2012b); South Africa's National Strategic Plan for a Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMA) (NDoH, 2013d), Strategic Plan of Department of Health: 2014/15 to 2018/19 (NDoH, 2014d); Strategic Plan of Department of Health: 2020/21 to 2024/25 (NDoH, 2020a); National maternal, perinatal, and neonatal Health policy (NDoH, 2021) and its Annexure (NDoH, 2021b).
Guideline	Provincial guidelines for the implementation of the three streams of PHC re-engineering (NDoH. 2011b)
Report	Expanded terms of reference from the maternal, child and women's health committee (NDoH, 2014g); Committed to maternal, women and child health (NDoH. 2014h); National Committee for Confidential Enquiries into Maternal Deaths in South Africa: 1st report (NCCEMDSA, 1998); 2 nd report (NCCEMDSA, 1999); 3 rd report (NCCEMDSA, 2005); 4 th report (NCCEMDSA, 2009); 5 th report (NCCEMDSA, 2012a); 6 th report (NCCEMDSA, 2014); 7 th Report (2014-2016) (NCCEMDSA, 2018); 8 th Report Saving Mothers and Babies Report (2017-19) (NCCEMDSA, 2020)

The South African Constitution (Republic of South Africa, 1996a) adopted in 1996, recognized the right to health of its citizens. Subsequently various legislations and policies [such as the White Paper for the Transformation of the Health System in South Africa (NDoH, 1997b), Population Policy (Republic of South Africa, 1998d), Patients' Rights Charter (NDoH, 1999),

National Health Act (Republic of South Africa, 2004a), National Development Plan: Vision for 2030 (Republic of South Africa, 2011), a document (Presidential Health Compact), based on the recommendations of Presidential Health Summit for strengthening the South African health system towards an integrated and unified health system (Republic of South Africa, 2019b)] were formulated to deliver health services enshrined in the Constitution. For example, the Patients' Rights Charter recognized the need to make provisions for the special needs of vulnerable groups such as infants, children, pregnant women, the aged, people with disabilities and people living with HIV/AIDS (NDoH, 1999). It was further elaborated by the South African Human Rights Commission during the Public Inquiry: Access to Health Care Services: 'a woman's state of health is especially sensitive when she is pregnant or giving birth, but women are also vulnerable because of gendered roles, which result in women usually assuming a primary role of caregiver, partner, parent or domestic worker'. It was noted that women were also particularly vulnerable because of gender-related violence (South African Human Rights Commission, 2009). The National Department for Women, Children and People with Disabilities also stressed the need for prioritisation of children and adolescents at particular risk in education programmes, such as pregnant adolescents (National Department for Women, Children and People with disabilities, 2013).

The Population Policy (Republic of South Africa, 1998d) provided a multi-sectoral framework for addressing population issues. It represented an important shift, from population control to empowerment of women, active involvement of men in reproductive health, and the need for both women and men to make informed reproductive decisions (Cooper, et al, 2004).

The formation of the South African National AIDS Council (Republic of South Africa, 1998e), and the establishment of the Standing Committee for Confidential Enquiries into Maternal Deaths (NDoH, 1997c), were expected to provide leadership in the arena of HIV/AIDS and maternal health care, respectively. The National Committee for Confidential Enquiries into Maternal Deaths had so far published eight reports (NCCEMD, 1998; NCCEMD, 1999; NCCEMD, 2005; NCCEMD, 2009; NCCEMD, 2012; NCCEMD, 2014; NCCEMD, 2018, NCCEMD, 2020). The sixth reports of this committee were summarized into **5Hs** (**HIV**, hemorrhage, hypertension, health professional training and health system strengthening and **5Cs** (**c**are: commitment to quality, **c**overage, **c**aesarean section safety, **c**ontraception, and **c**ommunity involvement). The last two Hs (**h**ealth worker training and **h**ealth system strengthening) are part of the three Basic Building Blocks of a health system that are essential to achieve success in the management of the first three Hs (**HIV**, **h**emorrhage, and **h**ypertension). The five Cs are expected to give implementation strategies to move from the **2Hs** (Basic Building Blocks of the health system) to achieve the 3Hs (reduction in maternal

deaths due to HIV and TB, hemorrhage, and hypertension (NCCEMD, 2014). In its eighth and last report, it highlighted the emergence of medical and surgical conditions associated death as a major underlying cause (16.91%), as the other conditions had decreased in frequency (NCCEMD, 2020).

The creation of the Office of Health Standard Compliance was expected to improve the quality of health care through compliance of all health establishments with minimum standards through an independent entity (Republic of South Africa, 2013).

A number of strategic plans were formulated to steer the maternal health services in South Africa, such as the National Strategic Plan for Maternal, Newborn, Child and Women's Health and Nutrition 2012-2016 (NDoH, 2012b) and an updated version in 2021 (National maternal, perinatal, and neonatal Health policy) (NDoH, 2021a; NDoH, 2021b), South Africa's National Strategic Plan for a Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMMA) (NDoH, 2013d), Strategic Plan of Department of Health: 2014/15 to 2018/19 (NDoH, 2014d) and 2020/21 – 2024/25 (NDoH, 2020a). Based on these documents, the provincial departments of health in the nine provinces regularly formulated their strategic plans and annual performance plans. In addition, each of the 52 districts is also obliged to formulate district plans on an annual basis (Republic of South Africa, 2004a).

Policies on District Hospital service packages for South Africa (NDoH, 2002), categorization of hospitals into five categories (district, regional, tertiary, central and specialized mental health) (NDoH, 2011h) were expected to provide guidance towards services in the various categories of public hospitals, whereas the policies on the Management of hospitals (NDoH, 2011i) were expected to streamline leadership and management of these hospitals.

Lastly, the policy document on PHC re-engineering (NDoH, 2011a; NDoH, 2011b) to convert DoH as a service-related organization, which could 'take services to the people to improve and to maintain their health in all aspects, of communities and individuals; to create a motivated, enthusiastic committed health workforce in sufficient numbers and appropriately skilled to achieve this and to create an environment where all available resources are used including academia & private sector with all its human resources'. It would require the South African health system to make evidence-based decisions using objective information, which had to be synthesised, analysed, and interpreted (Barron, 2012). In its approach to PHC re-engineering the NDoH has focused on three priorities ("streams") namely: (a) PHC outreach teams with at least one team for each electoral ward (WBOTs); (b) strengthening school health services and (c) district based clinical specialist teams with an initial focus on improving

maternal and child health (see Table 2.7). Later, a fourth stream was added: contracting of private health practitioners at non-specialist level (NDoH, 2015d).

Table 2.8 Three streams of PHC re-engineering

Streams	Services
Municipal Ward Based Primary Health Care Outreach Team	• Know the demography of the catchment population • Know the epidemiology • Health promotion and prevention (household and community) • Screening and referral of people identified with high risk • Palliative care • Social mobilization • Linking resources to community needs to improve health outcomes
School Health Services	• Mandate is to cover all students and schools in an incremental way starting with quintile 1 and 2 • NDoH and NDoBE have finalized core package of services for schools for early childhood developments as well as primary and secondary schools • Screening, health education/promotion; some service delivery • Need to employ more school health nurses/teams and deploy them • Strengthen M/E to show impact of school health • Need to prioritize certain grades for screening and health promotion interventions. • Sexuality and reproductive health education are highest priority (to prevent HIV and avoid other sexually transmitted infections (STIs) and pregnancy).
District Clinical Specialist Team	• To work with institutional based specialists. • To adopt a population-based focus and participate in outreach activities for the development and support of all health facilities in the district. • Primary function to develop and to support an acceptable standard of clinical care throughout each District for which they are responsible. • Not to be used to cover staff shortages in the regional hospitals. • Primary purpose is to improve maternal, women and children health.

Since South Africa had committed itself to the CARMMA campaign and MDGs, its primary healthfocus had been to reduce maternal and child deaths. Therefore, the members of the DCST were appointed to improve maternal and child health at a district level which would translate into reduction of deaths at higher levels. They were deployed at every health district and each of these teams was expected to be composed of: an obstetrician and gynaecologist, a paediatrician, an anaesthesiologist, a family physician, an advanced midwife, an advanced paediatric nurse, and a PHC nurse (NDoH, 2011c).

2.2.7 HEALTH OUTCOMES AND GOALS

The articulation of these documents in relation to health outcomes needs further exploration:

Health outcomes

Although the introduction of various legislations (such as CTOP Act), guidelines (such as maternal care, ESMOE, contraceptive, cervical screening and PHC re-engineering) provided excellent frameworks for improving maternal services, high maternal mortality in South Africa might be related to poor implementation of these policies at a facilities level probably due to lack of leadership and governance (Cooper, 2004; Daniels, et al, 2008). The DCST could be a vehicle for proper implementation of these policies and guidelines by providing strong leadership and clinical governance, which should assist South Africa to achieve its target in development goals such as sustainable development goals (SDG).

Maternity care guidelines were widely disseminated throughout South Africa. These guidelines seemed to have improved the knowledge of health care providers for maternal, newborn, child and women's health services. It was evident by increased numbers of pregnant women attending antenatal care (NDoH, 2020a; NDoH. 2021a), although no direct evidence was documented about their effectiveness at a facility level.

Essential Steps in Managing Obstetric Emergencies (ESMOE) guidelines for managing acute obstetrics emergencies were expected to improve skill of health care workers although universal implementation by all health care workers seemed to be still lacking (NDoH, 2014c).

The various versions of the *National Contraceptive Guidelines* showed their usefulness as a comprehensive tool to assist the health care providers for provision of family planning by slow improvement in couple year protection rate (CYPR). However, it did not measure the acceptability of family planning methods by end-users (NDoH, 2003a; NDoH, 2013c; NDoH, 2019d)

The *National Cervical Cancer Screening Guidelines* aimed at early detection of any cervical abnormality in order to prevent cervical cancer. Cervical cancer still remains the second most common cancer among women in South Africa, hence putting the implementation of this guideline in question. (NDoH, 2000)

The *PHC Re-engineering Policy* was structured to promote preventive medicine, so that conditions were detected at an early stage and effectively managed at the PHC level. School health services, WBOTs and DCSTs are integral components of PHC re-engineering. School health services might have had some positive impact for school children and adolescents, as there was a reduction of adolescent delivery rate. However, it had space for further

improvement in adolescent health, as maternal deaths among adolescent pregnant women remained relatively high (Baxter and Moodley, 2015). This policy provided a framework for restructuring the entire healthcare system to improve its management, quality of healthcare, human resource management, infrastructure revitalization and lastly, to create a framework for introduction of NHI. Point three of the NDoH *Ten-Point Plan* focused on quality of healthcare services, which were meant to improve on five key issues in health care. These were safety and security of patients, cleanliness of health facilities and infection control, attitudes of staff as experienced by patients and time taken in queues either before seeing a health worker or receiving medication and the availability of drugs. An assessment and monitoring process had been initiated to monitor implementation of this Ten-point plan at all health facilities, which might be able to produce a positive change regarding five critical issues in health care. The DCST could play an assisting role in implementation of point three of the Ten-point plan. (NDoH, 2009).

The *Ideal clinic system* was created with an aim to assist PHC clinics to achieve good infrastructure, staff adequacy, adequate medicine and supplies, proper administrative processes and adequate bulk supplies that use clinical policies, protocols, and guidelines to emphasise the provision of quality health services to the community. It has a dashboard indicator system, which determines if a clinic is ideal or not. It also has a well-established monitoring system, which encourages the clinic to improve in order to achieve ideal clinic status. This system may have improved the quality of health care at some clinics but its universal implementation might need major financial input from the government (NDoH, 2013b).

Responsiveness

There have been numerous excellent legislations, guidelines and acts in South Africa but there might be overlap and a lack of integration of different policies, which might hinder their implementation. Increased responsiveness to changing health policies is necessary for implementation. Representatives of stakeholders comprising government, health and allied health professionals, labour, business, community, academics and researchers, statutory councils, traditional health practitioners, and public health entities had spent recent months in intensive consultation with their constituencies and met in 2018 to create the *Presidential Health Compact*. It is an agreement consented to by government and key stakeholders, whose work would impact on the health system. The *Compact* placed the accountability on stakeholders to meet the commitments made within the allocated timeframe. The parties to this document were committed to implementing this *Compact*, the results of which should be

visible to all in the country. (Republic of South Africa, 2018b)

Improve efficiency

The NCCEMD has reported that about 60% of all maternal deaths had been associated with potentially modifiable factors such as delay in seeking care, inter-facility transport, or poor quality of clinical care. It recommended that clinical governance and clinical forums could play a vital role in ensuring improvement of efficiency from a clinical perspective. (NCCEMD, 2018). The NCCEMD in its eight report made some critical recommendations, which are listed below (NCCEMD, 2020).

Table 2.9 NCCEMD recommendations for DCST

Health system building blocks	Recommendations
Service delivery	<u>Contraception services</u>: Contraception services need to be expanded to include postpartum IUCD insertion and Long-Acting Reversible Contraception (LARC); and ensuring contraceptive availability at all facilities caring for women and at high-risk medical clinics. <u>Establish On-site Midwife run Birthing Units (OMBUs)</u>: OMBUs to be established at all large district, regional and tertiary hospitals (conducting large numbers of births for women with no risk factors). <u>Referral system</u>: 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. <u>Postnatal care</u>: Postnatal care especially too early discharge of and lack of follow-up of patients was found to be a major problem that was overlooked in the past. Prior to discharge from a ward and facility, specific criteria must be met and documented.
Leadership and Governance	<u>Expert Group</u>: Set up an expert group to recommend on improving management of early pregnancy and its complications: miscarriage and ectopic management, early pregnancy counselling service and access to safe TOP, earlier initiation of antenatal care after pregnancy diagnosis, screening for mental health issues and identifying women at risk of suicide. <u>Labour ward management</u>: Establish a Safe Labour criteria and evaluation programme like the Safe Caesarean Delivery (surgery and anaesthesia) programme and maintain focus on the Safe CD programme.
Health Information system	<u>Communication</u>: Ensure functional communication channels exist for consultation with and referral to higher levels of care e.g., by using the 'Vula App' ®.
Access to essential medicine	Implement the updated PMTCT protocol for better HIV management and TB detection

Health system building blocks	Recommendations
Health workforce	<u>ESMOE and EOST</u> : Ensure ESMOE (including anaesthetic ESMOE) training for all new staff and two-yearly updates for existing staff. Emergency Obstetrics Simulation Training (EOST) (popularly known as Fire drill) 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.

Based on that, the NDoH in its current five-year *Strategic plan for 2020/21- 2024/25* decided to take initiatives to improve efficiency through strengthening clinical governance and creation of a learning and collaborative culture for empowering clinicians and administrative staff across levels of care (NDoH, 2020a).

Social and financial risk protection

Health expenditure should be affordable by all and it should not create a financial risk to the service users. South Africa has made major progress in this area. Free health care for pregnant women was introduced in 1994, which has protected pregnant women from undergoing financial crises during pregnancy. The Act has also improved women's ability to attend regular antenatal care, which should translate into better pregnancy outcomes. The recently introduced bill on National Health Insurance (Republic of South Africa, 2019); and Medical Scheme Amendment Bill (Republic of South Africa, 2018a) were expected to protect South Africans from financial risks.

2.3 SUMMARY OF THE CHAPTER

Over the last two decades, South Africa had developed excellent maternal and child health policies. However, implementation of these policies remained a major challenge (Human Rights Watch, 2011). Free health care for pregnant women and children, the National Health Act, PHC re-engineering, NHI, NCCEMD reports and DCST systems are probably the most relevant health interventions related to maternal health in South Africa. Legislations, policies and guidelines do not always translate to improved efficiency, unless they are implemented at the facility level by all health care workers. Chopra et al (2009) as well as the NCCEMD proposed that much was needed to be performed to improve efficiency, which should stem from increased responsiveness towards health policies. Improved efficiency, then, could lead to increased implementation leading to improvement of the health of the mothers and women in South Africa. As South Africa adopted the DHS, there is an urgent need to provide an

integrated platform at a district level for effective and efficient implementation of these legislation and policies. The DCST based at districts could play a pivotal role to improve the efficiency of health care workers at district level by providing clinical governance and clinical mentoring.

The following chapter will describe the DCST more in details about its formation and the specific roles and responsibilities and will introduce the DCST in the setting of the study i.e., Ekurhuleni District.

CHAPTER 3

DISTRICT CLINICAL SPECIALIST TEAM

In this chapter, the concept of the DCST is described in detail followed by presenting the setting and scope of this study.

3.1 DISTRICT CLINICAL SPECIALIST TEAM

3.1.1 DISTRICT CLINICAL SPECIALIST TEAM AS A CHANGE AGENT WITHIN MATERNAL AND CHILD HEALTH SERVICES

The implementation of DCSTs has broadened the availability of specialist doctors and nurses at primary health care (PHC) within the DHS and could be considered as a broader change management process of PHC re-engineering to improve maternal, newborn, child and women's health (MNCWH) services in South Africa. Change is an ongoing process in any organization (Wells, 2012). Organizational change is a complex phenomenon, where human dimension is a critical quality to be managed (Portoghese, Galletta, Battistelli, et al, 2011; Pomare, Churruca, Long, et al, 2019). Moreover, the complexity of healthcare systems (Lipsitz, 2012) requires framing the concept in a more targeted manner. Accordingly, change in the specific field of healthcare *"requires a vision and understanding of the core functions of the system and infrastructure supporting those core functions"* (Heward, Hutchins, Keleher, 2007). The accomplishment of a new change agent, such as DCST, would depend on the development of implementation strategies clarifying the roles of key stakeholders. Otherwise, change actions could fail because of the failure of leaders to consider the role of these stakeholders (Choi and Ruona, 2011) (such as DHMT as well as existing staff working with the MNCWH at the health facilities, sub-district, district, province, and national levels) and their behaviours and attitudes towards the change agents (such as DCST) (Cunningham Woodward, Shannon, et al, 2002; Jones, Jimmieson, Griffiths, 2005; Meyer, Srinivas, Lal, et al, 2007). Therefore, to implement a successful organizational change, organizations must make allowances for the psychological process experienced by the middle managers (Wooldridge, Schmid, Floyd, 2008) (such as district MNCWH management), who cover a leading role in developing strategy process and could express passive resistance to change, the dissent that is more likely than an open rejection to change (Giangreco and Peccei, 2005).

A hospital within a health system is characterized by a particular model that draws upon the power of its high-skilled clinical staff, who are in charge, to fulfil operational tasks in a professional and specific way. Their autonomy (Walshe and Chambers, 2010) enables them

to operate in an environment where their knowledge and professional skills guide decisions (Andreasson, Ljungar, Ahlstrom, et al, 2018) and allows them to take unrestricted clinical decisions as a part of the complexity of their job and the challenges of measuring outcomes (Huppertz, Strosberg, Burns, et al, 2014). However, a similar system often does not exist outside hospitals in a primary health care setting, where services are mostly rendered by the nursing staff and managed by mid-level managers. These managers often cannot handle complex medical problem-solving processes due to their lack of knowledge and skill sets that would require prolonged periods of training and apprenticeship (Huppertz et al. 2014). This uneven distribution that managers having power but little clinical knowledge and health professionals having knowledge but no power, must be managed for a successful change management process (Schultz and Pal, 2004) within a District Health System (DHS). In this sense, a more specific process of interpretation should be outlined to understand the relationship between innovation and change in the healthcare context and identification of factors that initiate change. It is important to note that both external and internal factors may trigger the need of change in healthcare organizations. For instance, the failure to achieve the MDG targets for MNCWH probably provoked a shifting of need of NDoH towards changing in the health care organizational framework. As a result, introduction of three streams of PHC re-engineering including DCST was developed (NDoH, 2011a; NDoH, 2011b).

3.1.2 FORMATION OF DISTRICT CLINICAL SPECIALIST TEAM

In South Africa, the introduction of the DCSTs came about after the then Minister of Health Dr Aaron Motsoaledi visited Brazil in 2010, in a bid to draw on other health systems' experiences to address current challenges (NDoH, 2011c). In 1995, Brazil introduced the family health program called '*Programa de Saude da Familia*' (PSF) teams responsible for a specified catchment area to extend access to care by providing services mainly in health promotion and prevention as well as provision of treatment if necessary. These teams comprise of one family physician, one nurse, two auxiliary nurses and four to six community health agents (Peres, Andrade, Dal Poz, et al, 2006).

Similar models exist in other countries such as Canada, Cuba, and England as part of their efforts to improve access to quality health care and strengthen health systems for effective and efficient delivery of PHC services and thereby improve health outcomes. However, there are differences in each country's model in terms of team composition and their roles and responsibilities (Hirschhorn, Baynes, Sherr, et al, 2013). Cuba pioneered the concept, beginning in the mid-1980s, by introducing '*the Family Doctor Program*' in which a physician lives and works in a neighbourhood and acts as a public health advocate, while remaining a

part of the larger health care system (Gilpin, 1989; Benjamin, Haendel, 1991). In Canada, family health teams were initially launched by the Ministry of Health and Long-Term Care in Ontario in 2005, which provides coordination of health care for patients and comprises of doctors, nurses, nurse practitioners, and other health professionals. (Soklaridis, Oandasan, Kimpton, 2007; Brown and Ryan, 2018). In England, primary care groups/ trusts were initiated in 1998, each covering a population of about 100,000 patients, and are responsible for resource allocation to general practice, an advisory role on hospital and specialist care, as well as clinical governance. Each of these groups includes about 50 general practitioners (Wilkin, Gillam, Leese, 2000; Campbell, Sheaff, Sibbald, et al, 2002). In India, an Employees' State Insurance (ESI) Scheme was introduced in 1952 as a social security scheme for workers and most of their dependants, in the organized sector, where all insured persons and dependants are entitled to free, full, and comprehensive medical care under the scheme. This provides social and medical/health protection through a network of general practitioners contracted to ESI Corporation, who are living near the family (Jayaprakash, Raju, Thanuja, 2011). In 2009, five countries in Africa (Ghana, Mozambique, Rwanda, Tanzania, and Zambia) introduced varied large scale and long-term health systems' strengthening interventions focusing on reforming primary health care (Mutal, Chintu, Amoroso, et al, 2013; Mutale, Cleary, Olivier, et al, 2018). These examples highlighted the implementation of health system reforms in both developed and developing countries across the world as different institutional designs might have varying influences on desired health outcomes across different countries (Hirschhorn, et al, 2013).

Subsequently, the NDoH established a Ministerial Task Team, which recommended the creation of DCSTs and proposed its roles and responsibilities to '*ensure clinical services; provide clinical training, monitoring and evaluation, support district-level organizational activities, support health systems and logistics, collaboration, communication, and reporting, teaching and research activities*' (NDoH, 2011c). It also proposed that the DCST should report and account to the district manager, while for clinical matters, they would report to provincial specialists in their respective disciplines (NDoH, 2011c; NDoH, 2013e)

3.1.3 DISTRICT CLINICAL SPECIALIST TEAMS AND THE DISTRICT HEALTH SYSTEM

The implementation of DCSTs into the DHS has broadened the availability of specialist doctors and nurses at a PHC level and could be considered as a broader change management process of PHC re-engineering to improve MNCWH services in South Africa. This new and innovative role of the DCST was expected to offer an opportunity for internal system diagnosis

and had the potential to support realization of global goals such as the MDGs and SDGs. (Republic of South Africa, 2013b) This was also expected to redirect specialists from a hospital-based model to an '*inclusive PHC model*' as a part of PHC re-engineering. This was expected to develop the capacity of clinical governance at a district level as a part of strengthening the DHS in preparation for the introduction of the NHI system in South Africa. In addition, this would hopefully assist the DHS to respond to changes in disease patterns and challenges in human resources as well as in improving quality through effective implementation of clinical governance systems especially in the field of MNCWH. It was expected that the new clinical governance role of the DCST could help in ensuring quality in service delivery for South Africa to move its human resource strength towards universal health coverage (Oboirien, Harris, Goudge, et al, 2018). The DCST members were designed to serve as an interface between the various levels of the healthcare system from national through provincial to the district levels for achieving health outcomes and goals, which forms the basis of the DCST activity plan. The DCST innovation could provide an opportunity to promote institutional entrepreneurship in a South African context, because it was expected to influence change and should be applicable to other health systems.

The DCST initiative also provides an opportunity to enhance collaboration and teamwork and the introduction of much needed skilled work-force at a PHC level through the creation of an enabling environment for resolving challenges that involve clinical care, management support and integration of PHC and hospital services could improve both corporate and clinical governance within DHS in South Africa. It was anticipated that DCST might be able to serve as an interface between the different levels of the healthcare system from national through provincial to district levels. The DCST could work within the DHS to strengthen the PHC service delivery system. (NDoH. 2011c). However, the effectiveness of DCSTs would depend on its ability to function as a team and its integration within a well-established DHS.

Managing such an organisational configuration implies facing three distinct organisational issues: Firstly, as aforementioned, discretion might lead the focus away from the patient's and organisational needs; Secondly, fitting stable environments and professional bureaucracies tend to render '*processes as predictable and routine as possible*'; possible barriers to innovate in such a context; Finally, the problem of coordination occurs due to a considerable autonomy that impedes the ability of managers to pursue efficiency and effectiveness of care processes' coordination (Huppertz et al, 2014).

This change management process would require contextualization of its role and responsibilities at a system-wide level (Oboirien, et al. 2018). For example, there were well-

established units responsible for management of MNCWH services at sub-district, district, provincial and national levels. At a district level, the roles, and responsibilities of the pre-existing MNCWH units and newly introduced DCST should be integrated to provide an efficient and effective service. In addition, there might also be nuanced differences between individual members within a DCST team, which would require development of team management to maximize their contribution within a district (Oboirien, Goudge, Harris, et al, 2019).

3.1.4 ROLES AND RESPONSIBILITIES OF THE DISTRICT CLINICAL SPECIALIST TEAM

In terms of the Handbook of the DCST (NDoH, 2014a), in each district, the DCST was expected to be responsible for the following areas of work which would become the basis of their annual performance assessments (NDoH, 2014b) (Table 3.1):

Table 3.1 Responsibility of DCST and its alignment with WHO Health Systems Building Block

DCST responsibilities	WHO Health System Building Block
Improving the quality of clinical services	Health outcomes
Supporting district level organisational activities	Responsiveness
Supporting health systems and logistics	
Ensuring collaboration, communication and reporting	
Teaching and research activities	Improve efficiency
Providing clinical training and monitoring and evaluation	

These activities form part of the broader principles of clinical governance, which is defined as clinical leadership and accountability, as well as the organisation's culture, systems and working practices that ensure that quality assurance, quality improvement and patient safety, which are central components of all activities of the health care organisation (NDoH, 2014b). The following section discusses the principles and practice of clinical governance as it applies to the role of DCST. The four pillars of DCST Policy framework provide the framework for the improvement of quality of care of MNCWH services to the community as outlined in Table 3.2.

Table 3.2 DCST Policy framework

Pillars	Components	Activities
Clinical effectiveness	Clinical standards Clinical audits Clinical indicators	Review of clinical records. Ensure the availability of the skilled health worker at the point of service delivery. Promote accessibility of higher level of care through the establishment of effective patient transport systems. Promote the use of early warning charts in order to facilitate relevant and prompt referral to the next level of care.
Clinical risk management	Risk to patient Risk to health care provider Risk to organization	Identify risks. Assess the credentials of staff qualifications and quality of training. Analyse incidents – critical events, complaints, reviews. Develop plan, do, study, act (PDSA) cycle from the morbidity and mortality meetings. Recommend improvement plans to prevent the recurrence of deaths due to the avoidable factors.
Professional development and management	Continuing professional development Competency standards	In service training. On site staff mentoring. Identify opportunities and needs for formal education. Monitor the coverage on mandatory trainings and arrange appropriate trainings. Motivate and coordinate operational research within the facilities.
Improve accountability for MNCWH	Evaluation of services through satisfaction surveys Service user participation	Liaise with WBOT on health preventative and promotional activities. Liaise with health communication officers and health promoters on the development of health messages to the community.

The DCST pillars mentioned above are well-aligned with the WHO Health Systems Building Blocks (WHO, 2007), demonstrating that the DCST could play a significant role in strengthening maternal health services in South Africa if it fulfils its mandate within the DHS.

Table 3.3 DCST pillars and WHO Health Systems building blocks

WHO Health Systems Building Blocks	DCST Pillars
Service delivery	Clinical effectiveness; Clinical risk management;
Health Workforce	Professional development and management
Health Information system	Clinical effectiveness;
Access to essential Medicine	Clinical effectiveness;
Financing	Improve accountability for MNCWH
Leadership and Governance	Improve accountability for MNCWH

In addition, NCCEMD in its 7th report made some specific recommendations for roles and responsibilities of DCSTs for improvement of quality of care during the antenatal, intranatal, and postnatal periods for reduction of potentially preventable maternal deaths (NCCEMD, 2018).

Table 3.4 DCST pillars and NCCEMD recommendations

Pillars	NCCEMD recommendations
Clinical effectiveness	<u>Establishment of high-risk antenatal clinics</u>: These clinics should be accessible to all pregnant women requiring their services: This will require innovations; such as specialist outreach clinics or family practitioners/advanced midwife run high-risk clinics in rural areas. <u>Caesarean section</u>: Introduction of safe caesarean section package: This might involve consolidation of services within the district. This includes a safe anaesthetic service. <u>Postpartum haemorrhage (PPH) protocol</u>: Implementation of new protocols (including non-pneumatic anti-shock garments, balloon tamponade and tranexamic acid).
Clinical risk management	<u>Emergency obstetric simulation training (EOST)</u>: Obstetric and neonatal emergency drills (EOST exercises) are conducted at least monthly as maternal deaths due to obstetric haemorrhage and hypertension were thought to be possibly and probably preventable in 89% and 67% of cases respectively <u>Maternal and perinatal death review meetings</u>: Action plans for preventing recurrence of maternal and perinatal deaths should be made at these meetings and must be followed up at the next meeting. <u>EMS</u>: Negotiate for priority inter-facility emergency transport for pregnant women. Efficient transports between facilities are essential.
Professional development and management	<u>ESMOE</u>: Maternity units having more than 80% of their staff trained in ESMOE as 60% of the maternal deaths were thought to be possibly or probably avoidable; ESMOE has been shown to improve knowledge and skills of health care professionals and has been associated with a reduction in maternal and neonatal deaths.
Accountability for MNCWH	<u>Basic and comprehensive emergency obstetric and neonatal signal functions</u>: Monitoring of implementation of these functions in health facilities in collaboration with district managers to ensure pregnant women have access to the signal functions in the district. <u>On-site Midwife run Birthing Units</u>: Motivate for establishment of these units at large regional and provincial tertiary hospitals.

3.1.5 DISTRICT CLINICAL SPECIALIST TEAM MONITORING AND EVALUATION FRAMEWORK

At the beginning, when the DCST was introduced in July 2012, there was no standardised reporting format for monitoring and evaluation of DCST activities. Subsequently, the NDoH (2014e) formulated a standardized format for reporting of the interventions performed by the DCST on a quarterly basis. It was stated that the DCST in each district would be responsible for the following areas of work, forming the basis of quarterly and annual performance assessments, as part of broader principles of clinical governance (NDoH, 2014b): (a) Clinical effectiveness (b) Clinical risk management (c) Professional development and management and (d) improve accountability for MNCWH (Table 3.1). However, the format has changed over the last eight years; two other sections were added namely health systems and monitoring, evaluation, and reporting. (Appendix C3). In addition, a DCST field visit template

was designed to document field trips undertaken by the DCST members (Appendix C4).

3.2 SETTING AND SCOPE OF THE STUDY

3.2.1 INTRODUCTION TO EKURHULENI DISTRICT

The setting of this study was the Ekurhuleni (means '*place of peace*' in Tsonga) Health District. It is one of the five districts of the Gauteng Province. The total area of the District is 2000 Km², divided into three sub-districts: East, North and South. (Figure 3.1)



Figure 3.1 Ekurhuleni District and its three sub-districts

The spatial distribution of the District (area 1975 km²) and its three sub-districts is described in Table 3.5 (Ekurhuleni Health District. 2019).

Table 3.5 Ekurhuleni Spatial and Population Distribution

Characteristics	Ekurhuleni	East	North	South
Population	3,688,406	1,000,085	1,352,017	1336304
Municipal wards	112	40	30	42

There are six hospitals (one district hospital, four regional hospitals and one tertiary hospital), eight community health centers (CHC) and 88 PHC clinics. The distribution of these facilities is described in Table 3.6 (Ekurhuleni Health District, 2019).

Table 3.6 Health facilities in Ekurhuleni and its three Sub-districts

	Ekurhuleni	East	North	South
PHC clinics	81	24	26	31
CHCs	8	3	2	3
Hospitals	6	3	1	2

These hospitals provide a 24-hours service to pregnant women, non-pregnant women, men, newborn, and children. There is a 24-hour obstetric emergency and labour (delivery) ward service at these hospitals. Antenatal clinics run on weekdays from 8 am to 4 pm in all hospitals. Additionally, women's health services including family planning and cervical cancer screening are also available at all hospitals.

The CHCs are health facilities where obstetric emergencies and delivery services are available for 24 hours a day. They also provide ANC and postnatal care (PNC) services from Monday to Friday. Additionally, women's health services including family planning and cervical cancer screening are also available at all CHCs. Complicated patients are referred to nearby hospitals from CHCs.

The PHC clinics provide ANC services and women's health services on Monday to Friday from 8 am to 4 pm. Uncomplicated low risk pregnant women are referred to CHCs for delivery. Complicated patients are referred to hospitals.

3.2.2 MATERNAL, NEWBORN, CHILD, AND WOMEN'S HEALTH SERVICES IN THE EKURHULENI DISTRICT

There is in existence of a number of structures at various levels responsible for providing MNCWH services, which are listed below (NDoH, 2014a NDoH, 2014g):

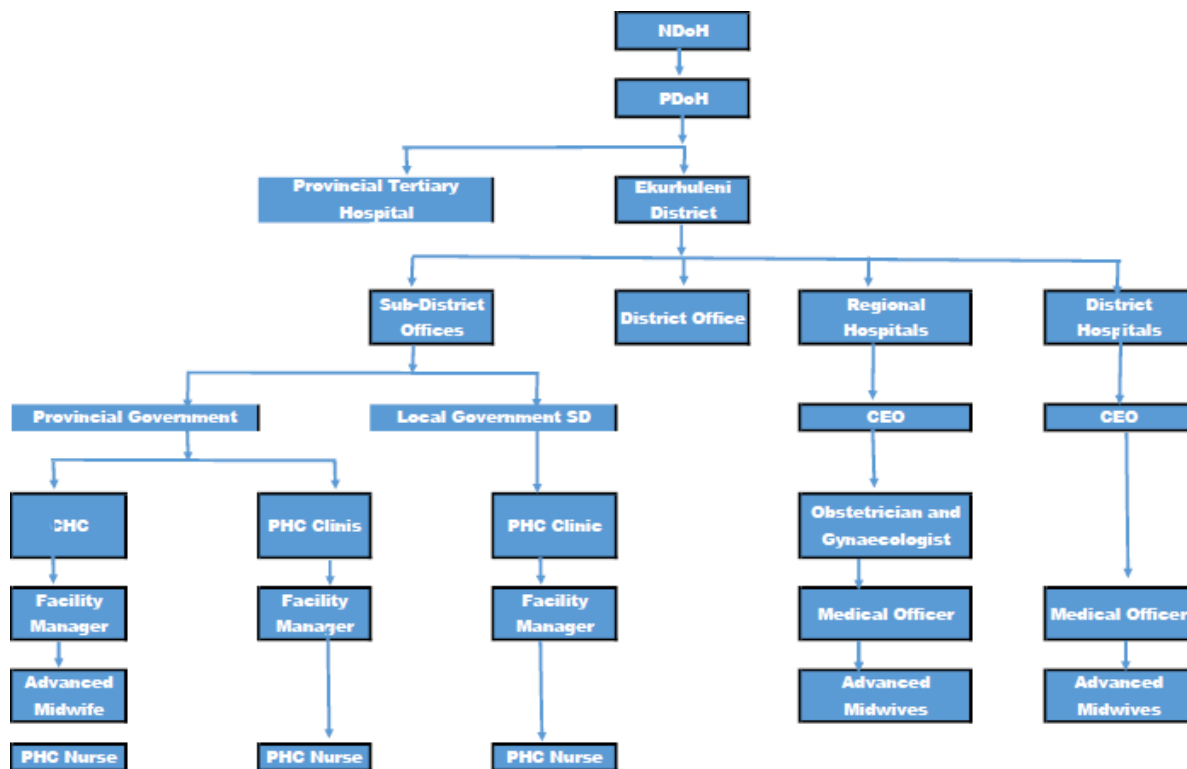


Figure 3.2 District Organogram of Maternal Child Health services

Firstly, MCWH programme was created after 1994 at national, province, district, and sub-district levels, which are headed by programme managers. Although it was later renamed as maternal, newborn, child and women's health (MNCWH), both the terminologies (MCWH and MNCWH) are currently used interchangeably.

Secondly, at the metropolitan districts such as Ekurhuleni, there are parallel structures existing from Gauteng Provincial Department of health (GDoH) and Local Government (City of Ekurhuleni) at district and sub-district levels.

Thirdly, in these metropolitan districts, (such as Ekurhuleni) the majority of the PHC clinics are operated by the Local Government. In these settings, the provincial managers manage the programmes at the CHCs (including Midwifery Obstetrics Unit or MOUs) rendering antenatal, intranatal and postnatal services and provincial PHC clinics. On the other hand, the Local Government programme managers manage only PHC clinics, which render antenatal and postnatal services. Therefore, the majority of antenatal and postnatal services are rendered by the Local Government, whereas intranatal services are offered solely by the provincial management.

Fourthly, the services at the PHC clinics and CHCs are rendered by midwives and advanced

midwives. A sampling framework was developed (see Chapter 7) to interview these key stakeholders for the qualitative component of the study.

Fifthly, there are three levels of hospitals in Ekurhuleni: district (Bertha Gxowa Hospital), regional (Far East Rand Hospital, Pholosong Hospital, Tambo Memorial Hospital and Thelle Mogoerane Hospital), and a provincial tertiary hospital (Tembisa Provincial Tertiary Hospital). These hospitals are unevenly distributed in the sub-districts creating challenges in referral pathways (Figure 3.3) (Ekurhuleni Health District, 2019). For example, Bertha Gxowa Hospital also refers to Charlotte Maxeke Johannesburg Academic Hospital.

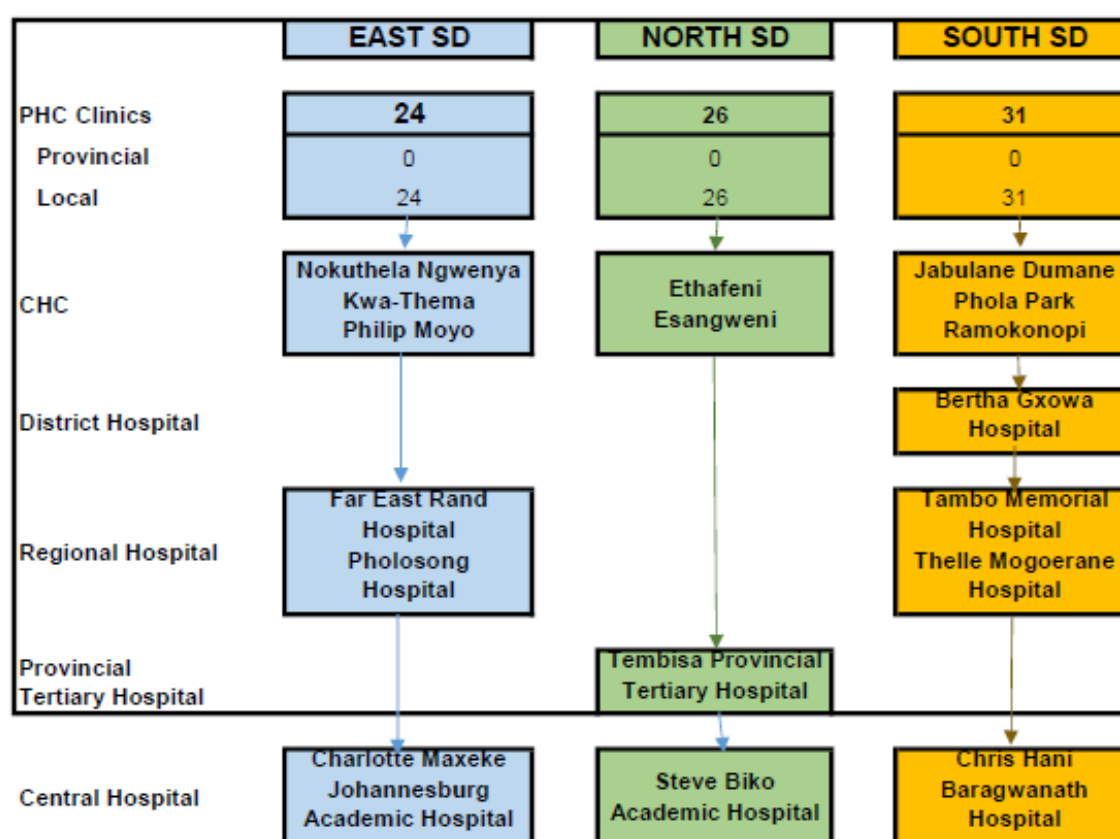


Figure 3.3 Referral pathways

Sixthly, a district hospital is managed by medical officers, whereas a regional hospital is managed by specialist Obstetricians and Gynaecologists and Paediatricians and a provincial tertiary hospital is managed by sub-specialists. The above structure showed the complexities of the management of MNCWH services in the Ekurhuleni District.

3.3 DCSTs IN THE EKURHULENI DISTRICT

3.3.1 DCSTs ORGANIZATIONAL STRUCTURE IN EKURHULENI

The DCST in the Ekurhuleni District comprised of an obstetrician and gynaecologist, a paediatrician, a family physician, an advanced midwife, a paediatric nurse and a primary health care nurse. They had been working in dyads: (i) maternal and women's health: obstetrician and gynaecologist, and advanced midwife (ii) child and newborn health: paediatrician and paediatric nurse (iii) primary health care: family physician, and primary health care nurse. The structure of the team remained stable in the District and no change was reported during the study period (2012-2020) (Table 3.4)

Table 3.7 DCST Team composition in the Ekurhuleni District

Member	Expected number	Actual number
Family Physician	1	1
Primary Health Care Nurse	1	1
Anaesthesiologist	1	0
Obstetrician and Gynaecologist	1	1
Advanced Midwife	1	1
Paediatrician	1	1
Paediatric Nurse	1	1
Total	7	6

These dyads in the Ekurhuleni District had been working since its inception in July 2012. They were expected to function within the policy framework for its establishment (NDoH, 2011c) and to fulfil its mandate described in Section 3.1. They had been reporting to the Chief Director of the District who was the head of the DHMT (NDoH, 2014a).

3.3.2 ROLE OF RESEARCHER

The researcher is an obstetrician and gynaecologist who has been working in the Ekurhuleni District from the inception of the DCST and her experience of working in the District provided the foundation for this study. She had been actively involved with all the four pillars of the DCST listed in the Table 3.2.

3.4 SUMMARY OF THE CHAPTER

The DCST was introduced in South Africa as a part of the policy decision of the South African Government as an innovative change management process to make MNCWH processes more efficient in line with other countries where senior clinicians were deployed as a part of their efforts to strengthen PHC services. This chapter highlighted the formation of DCST in South Africa as well as in the Ekurhuleni District. The following chapters will document the methodologies and findings of both quantitative and qualitative components of the study to investigate the concept of change and innovation associated with introduction of DCST within DHS as well as effect of a “*local ownership*” of the problems in the Ekurhuleni District.

CHAPTER 4

METHODOLOGY FOR QUANTITATIVE COMPONENTS

The methodology for this study was determined by the aims and objectives of this study. In this chapter, the setting, scope and study design, the selection of the participants and research tools for the quantitative components are covered. Furthermore, the collection of the quantitative data is described and the methods of data analysis and statistical testing are specified.

4.1 STUDY OBJECTIVE 1

To establish any change in the maternal health indicators for the last nine years (April 2011-March 2020) in three sub-districts in the Ekurhuleni District.

4.1.1 SPECIFIC OBJECTIVES

The purpose of this section was to present the maternal health indicators (Appendix B) in the Ekurhuleni District and its three sub-districts for nine years (from 2011 April to 2020 March) and to identify any changes in these indicators during the eight years after the introduction of the DCST in July 2012.

- To establish any changes in the maternal health indicators in the Ekurhuleni District during the nine year study period
- To compare these indicators among the three sub-districts in the Ekurhuleni District.

4.1.2 STUDY DESIGN

This was a cross-sectional study based on quantitative analysis of secondary data.

4.1.3 VARIABLES

The variables used for this section of the study were the routine maternal health and reproductive health indicators collected for District Health Information System (DHIS).

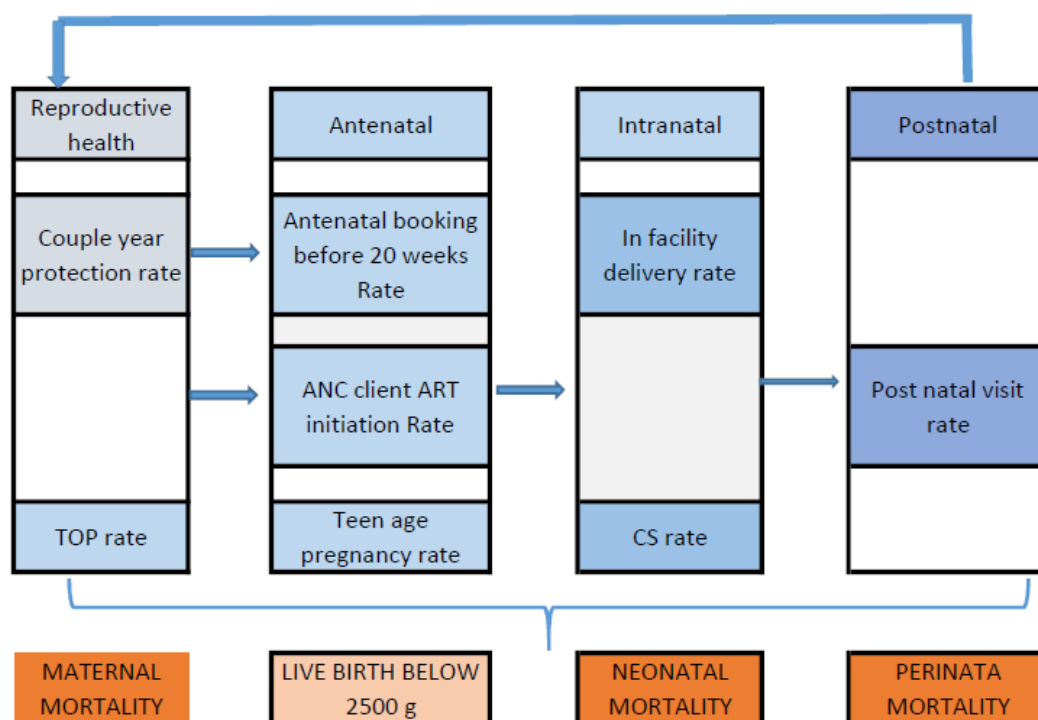


Figure 4.1 DHIS Maternal Health indicators

The variables used for this section of the study are described below in the Table 4.1

Table 4.1 List of variables for objective 1

Indicator	Type of data	Statistical test
Family Planning		Normally distributed: Mean (+ Standard deviation or SD) Not Normally distributed: Median (Inter Quartile Range or IQR)
<i>Couple year protection rate (CYPR)</i>	rate	
<i>Termination of pregnancy rate</i>	rate	
Antenatal indicators		
<i>Antenatal visits before 20 weeks rate</i>	rate	
<i>Antenatal patients initiated on ART rate</i>	rate	
Intra-natal indicators		
<i>Total in facility delivery</i>	number	
<i>Delivery in facility rate</i>	rate	
<i>Delivery in facility under 18 years rate</i>	rate	
<i>Delivery by caesarean section rate</i>	rate	
<i>Live birth to HIV positive women</i>	number	
Post-natal indicators		
<i>Postnatal visits within 6 days rate</i>	rate	
Outcome indicators		
<i>Maternal mortality in facility ratio</i>	ratio	
<i>Neonatal mortality in facility rate</i>	rate	
<i>Stillbirth in facility rate</i>	rate	
<i>Perinatal mortality in facility rate</i>	rate	
<i>Live birth under 2500g in facility rate</i>	rate	

The details of these indicators are described below:

(i) Reproductive health

Couple year protection rate (CYPR)

It is defined as women protected against pregnancy by using modern contraceptive methods, including sterilisation. The measure includes all contraceptive methods (modern and traditional), but it may include modern methods only. The indicator is calculated:

$$\frac{\text{an estimate of the duration of contraceptive protection}}{\text{the number of women 15–49 years using a contraceptive method}} \times 100$$

Numerator is calculated as: (couple year protection) are total of [(Oral pill cycles/ 15) + (Medroxyprogesterone injection / 4) + (Norethisterone enanthate injection / 6) + (IUCD x 4.5) + (Sub-dermal implant x 2.5) + (Male condoms distributed / 120) + (Female condoms distributed / 120) + (Male sterilisation x 10 and) + (Female sterilisation x 10)]

Denominator is calculated as sum of all Female (15-44 years and 45-49 years of age)

Termination of pregnancy rate (annualized) is calculated as:

$$\frac{\text{Termination of pregnancy performed}}{\text{Population estimated pregnant women (at 10 weeks)}}$$

(ii) Antenatal indicators

The *Antenatal visits before 20 weeks rate* is defined as:

$$\frac{\text{Antenatal 1st visit before 20 weeks}}{\text{Antenatal 1st visit total}}$$

Antenatal patients initiated on ART rate is calculated as follows:

$$\frac{\text{Antenatal client initiated on ART}}{\text{Antenatal client eligible for ART}}$$

(iii) Intra-natal indicators

Total in facility delivery (number) Delivery in facility rate is calculated as:

$$\frac{\text{Delivery in facility total}}{\text{Population estimated deliveries}}$$

Delivery in facility under 18 years rate is calculated as:

$$\frac{\text{Delivery in facility to woman under 18 years}}{\text{Delivery in facility total}}$$

Delivery by caesarean section rate is calculated as:

$$\frac{\text{Delivery by caesarean section}}{\text{Delivery in facility total}}$$

Live birth to HIV positive women (number)

(iv) Postnatal indicators

Postnatal visits within 6 days rate is calculated as:

$$\frac{\text{Mother postnatal visit within 6 days after delivery}}{\text{Delivery in facility total}}$$

(v) Outcome indicators

Maternal mortality in facility ratio is calculated as:

$$\frac{\text{Maternal death in facility}}{\text{Live birth in facility}} \times 100,000$$

Neonatal mortality in facility rate is calculated as:

$$\frac{\text{Inpatient neonatal death}}{\text{Live birth in facility}} \times 1000$$

Stillbirth in facility rate is calculated as:

$$\frac{\text{Stillbirth in facility}}{\text{Total births in facility}} \times 1000$$

Perinatal mortality in facility rate is calculated as:

$$\frac{\text{Stillbirths in facility plus Inpatient deaths early neonatal}}{\text{Total births in facility}} \times 1000$$

Live birth under 2500g in facility rate is calculated as:

Live birth under 2500g in facility X 1000
Live birth in facility

The targets for these indicators were set by the GDoH and changed periodically. For the purpose of this study, the target set for 2019-20 were used as reference.

4.1.4 DATA COLLECTION

The data were collected from the DHIS (Appendices E1). The DHIS data are reported on a quarterly basis during a financial year (April – March):

- Quarter 1: April- June
- Quarter 2: July- September
- Quarter 3: October- December
- Quarter 4: January – March in the following year

The study population included all pregnant and postpartum mothers who attended antenatal care and delivered in public health facilities in the three sub-districts within the Ekurhuleni District and attended postnatal clinics after delivery. In addition, women who attended reproductive health services such as family planning programmes were also included. The entire study population was included and no sampling was performed.

4.1.5 DATA ANALYSIS

The data from DHIS were exported to MS Excel and were analysed using the NCSS Statistical package ® (NCSS, 2021). These data were grouped into reproductive, antenatal, intranatal, postnatal and outcomes (Appendix E1). Group level analyses were performed at a sub-district level.

The following statistical tests were used for data analysis:

- Distribution of data: Normal or not-normal including skewness (left or right) and/or kurtosis[leptokurtic (more values in the distribution tails and close to the mean (i.e., sharply peaked with heavy tails) or platykurtic (Fewer values in the tails and close to the mean (i.e. the curve has a flat peak and has more dispersed scores with lighter tails))].
- Descriptive statistics, such as central tendency (mean or median), spread (standard deviation or inter-quartile range) were used to describe all variables listed in Table 4.1. Confidence intervals (CI) were reported at a confidence level of 95%.
- Analytical statistics: t-test or Mann-Whitney's U test and one-way analysis of variance (ANOVA) were used for comparing bivariate and multivariate analyses, respectively.

Thesetests were used to compare the data (listed above) among three sub-districts. Box-plots were used to present the data in graphical format. The sub-districts are managed by different managements and therefore, it was expected that there might be differences in indicators among them. All *p*-values were derived from two-sided tests. A post-hoc test (Tukey-Kramer Multiple-Comparison Test) was performed for results, which were statistically significant.

- Correlation tests (Pearson's coefficient and Spearman's correlation for continuous data with and without normal distribution respectively) were used to determine associations between indicators and time-period in quarters. A *p*-value of 0.05 or less was considered statistically significant. In addition, a linear regression model was developed for each of these indicators and coefficient of determination was calculated to measure how much of the variability of these indicators could be associated with change in time.

4.2 STUDY OBJECTIVES 2

To establish any change in the maternal death and their causes for the last eight years (July, 2012- March 2020) since the inception of DCST in three sub-districts in Ekurhuleni District

4.2.1 SPECIFIC OBJECTIVES

The purpose of this phase was to evaluate the maternal deaths in the Ekurhuleni District and its three sub-districts after the introduction of the DCST in the district;

- To establish any changes in the maternal deaths and their causes in the Ekurhuleni District during the nine-year period after introduction of the DCST.
- To compare these indicators among the three sub-districts in the Ekurhuleni District.

4.2.2 STUDY DESIGN

This was a cross-sectional study based on quantitative analysis of secondary data.

4.2.3 VARIABLES

The detailed information related to maternal death is not routinely collected except the total number of deaths. Therefore, the researcher decided to collect more detailed information as described below:

- (i) **Total maternal deaths** (available from 2011 April)
 - Maternal deaths in facility, which is further sub-divided into:

- Inpatient maternal death – Antenatal
 - Inpatient maternal death – During Labour
 - Inpatient maternal death - Postpartum
 - Maternal deaths outside facility
- (ii) **Primary causes of maternal deaths** (available from 2014 July).

The maternal deaths were further classified according to primary cause of death using the classifications followed in the NCCEMD. (NDoH, 2020).

- Gynaecological conditions (such as miscarriage, ectopic pregnancy, septic shock following miscarriage or termination of pregnancy).
- Hemorrhage (such as Antepartum Hemorrhage (APH), Intrapartum Hemorrhage(IPH), Postpartum Hemorrhage (PPH).
- HIV /AIDS related.
- Hypertension (such as pre-eclampsia, eclampsia, and Pregnancy Induced Hypertension(PIH).
- Medical and surgical causes (other than HIV and hypertension) (such as cardiac conditions, diabetes mellitus, epilepsy and acute maternal collapse, other medical and surgical disorders (M & S), adverse drug reactions, pulmonary embolism).
- Obstetrics causes (such as anaesthetic death, pregnancy-related sepsis including puerperal sepsis (PRS), anaesthetic complications).
- Others (such as burn, cancer, death on arrival (DOA), motor vehicle accident (MVA), trauma, suicide, para-suicide and acute collapse due to unknown cause).
- Unknown (where cause of death was not known).

4.2.4 DATA COLLECTION

Information for maternal deaths during a nine-year period (2011 April to 2020 March) was obtained from the DHIS (Appendix E1). In addition, the researcher attended the majority of the monthly maternal mortality and morbidity meetings conducted in the six hospitals and the quarterly district mortality and morbidity meetings for collecting information about maternal deaths.

The DCST Obstetrics dyad received monthly reporting of all maternal deaths (and their causes) from all facilities in the district from July 2014. These reports included detailed information using a reporting template designed by the DCST (Appendix G1). These data were collated on a quarterly basis following a financial year (April – March): as mentioned in section

4.1.4: Quarter 1: April- June; Quarter 2: July- September; Quarter 3: October- December; and Quarter 4: January – March in the following year. The researcher developed a data collection tool (Appendix G2) to extract data from these reports.

The study population included all pregnant and postpartum mothers who died in public health facilities in the three sub-districts at the Ekurhuleni District during the study period. The entire study population was included and no sampling was performed.

4.2.5 DATA ANALYSIS

The data were captured in MS Excel and were analysed using the NCSS Statistical package (NCSS, 2021). Group level analysis was performed at a sub-district level among three sub-districts namely, East, North and South Sub-districts. All the data were discrete. The statistical tests used for this objective are like the ones described in the Section 4.1.5.

4.3 STUDY AIM 3

To describe the various obstetric intervention measures undertaken by the DCST in the Ekurhuleni District over an eight-year period (2012– 2020) and to evaluate these interventions against the DCST policy framework. (see section 3.1,3 Table 3.2)

4.3.1 SPECIFIC OBJECTIVES

- To summarize all interventions undertaken by the DCST in the Ekurhuleni District.
- To review DCST quarterly reports submitted during the last eight years (from July 2012-March 2020).
- To compare the DCST interventions against the DCST Policy framework described inSection 3.1.3 (Table 3.2).

The purpose of this phase was to document these interventions and to compare them against the DCST policy framework (NDoH, 2014b). This included a review of the various intervention measures undertaken by the DCST in the Ekurhuleni District.

4.3.2 STUDY DESIGN

This was an analysis of existing provincial and district documents.

4.3.3 DATA COLLECTION

This was based on analysis of documents during the study period. The following source documents were used:

Firstly, a template for quarterly reports (Appendix I1) to be submitted to the Gauteng Province was introduced in 2014 ((NDoH, 2014g).

Secondly, a similar template was introduced for district quarterly reporting in the Ekurhuleni District. (Appendix I2). Both these templates were modified a few times during the study period. The latest templates were appended as Appendices I1 and I2 respectively.

Thirdly, DCST has been using a number of reporting templates (Table 4.2) for completing their monthly and quarterly reports to be submitted to the province and district. A number of these templates were designed by the DCST.

Table 4.2 List of templates designed by the DCST members

DCST pillars	Template	Appendices
Clinical effectiveness	Template for DCST support visits*	J1.1
Clinical risk	template for patient safety incidence committee agenda	J4.1
	template for patient safety incidence committee attendance register	J4.2
	template for facility maternal mortality and morbidity meetings: agenda*	J5.1
	template for facility maternal mortality and morbidity meetings: attendance register	J5.2
	template for Ekurhuleni District quarterly maternal mortality and morbidity meeting agenda*	J6
	template for Charlotte Maxeke Johannesburg Academic Hospital Cluster maternal mortality and morbidity meeting agenda	J7
	template for maternal mortality and morbidity meetings presentation for facilities*	J8
	template for emergency obstetrics simulation training (fire-drill) form	J9.1
	template for facilities reporting to sub district	J10
	template for facilities reporting to Tembisa sub-cluster	J11
Professional development	Post-training customer survey form*	J14
	template for Ekurhuleni district neonatal and obstetrics project meeting agenda*	J16.1

DCST pillars	Template	Appendices
Accountability for MNCWH	template for monthly reporting to Ekurhuleni district health management team*	J18.2
	template of Ekurhuleni district health council technical committee meeting agenda	J19

*designed by DCST

A data collection tool was developed to extract data from these documents (Appendix I3). This information was reviewed, summarized, and presented in the Appendix J.

4.4 PRETESTING OF ALL TOOLS

All study tools were pre-tested, and adjustments made accordingly. Tools for the audit were pre-tested in one health facility in the Johannesburg Health District with similar characteristics to the sampled health facilities.

4.5 ETHICAL CONSIDERATIONS

The project was approved by the Human Research Ethics Committee (Medical), University of the Witwatersrand and Ekurhuleni Health District Research Committee prior to conducting the study. Confidentiality was maintained by using participants' numbers and not their names. All patient identifiers were removed during the process of data capturing and analysis.

4.6 SUMMARY OF THE CHAPTER

This chapter documented the methodologies of the quantitative component of the study to investigate the concept of change and innovation associated with introduction of the DCST within DHS as well as the effect of a "*local ownership*" of the problems in the Ekurhuleni District. The next chapter will present the quantitative component of the study based on the analysis of DHIS indicators as well as data related to maternal death.

CHAPTER 5

RESULTS OF QUANTITATIVE COMPONENT OF THE STUDY

The results obtained from the analysis of the data are described in this chapter.

I. DISTRICT HEALTH INFORMATION SYSTEM INDICATORS

The data are presented in quarters from 2011-12 quarter 1 to 2019-20 quarter 4 as reported in the District Health Information System. The quarters are defined according to the financial year (April – March): Quarter 1: April-June, Quarter 2: July-September, Quarter 3: October-December and Quarter 4: January-March (following year). The detailed results are appended in Appendix F.

5.1 REPRODUCTIVE HEALTH INDICATORS

5.1.1 COUPLE YEAR PROTECTION RATE

The *Couple year protection rate* (CYPR) is described below (see also Appendix F1). The Gauteng Provincial target is 55%. The data for CYPR are not normally distributed (platykurtic). The median was 38.7% (IQR 25.5% - 47.8%). The minimum and maximum rates were 20.3% and 60.1% respectively.

Table 5.1 Couple Year Protection Rate in Ekurhuleni District

Quarters	Total	East	North	South
Median	38.7	37.3	30.2	41.0
Inter quartile range (IQR)	25.5-47.8	24.1-53.6	22.2-39.9	24.9-52.5
Minimum	20.3	20.6	19.7	20.5
Maximum	60.1	70.0	57.2	87.8

There was a significant increase in CYPR from 2011/12 (Spearman's correlation coefficient $\rho = 0.71$; $p < 0.0001$; $R^2 = 0.51$). However, the District could achieve the Provincial target (55%) only in three quarters. 2016-17-Q2, 2016-17-Q4, 2017-18-Q3.

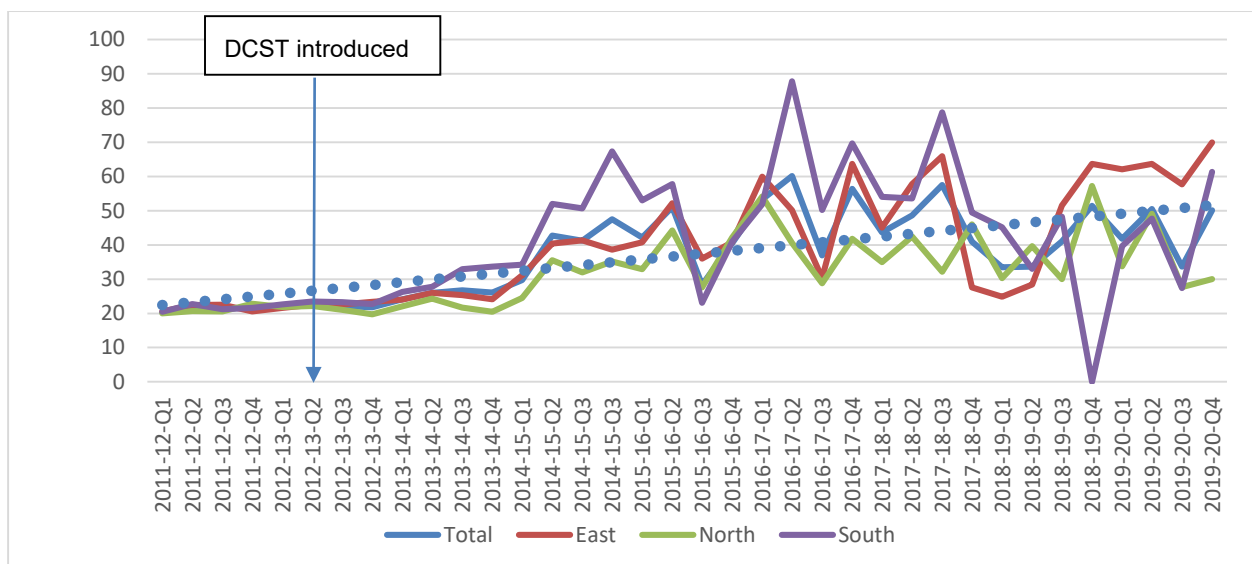


Figure 5.1 Couple Year Protection Rate (%) in Ekurhuleni and three sub-districts

A box plot was used to make comparison among the three sub-districts. There were no significant differences in the *CYPR* among the three sub-districts (One Way ANOVA, $p = 0.08$).

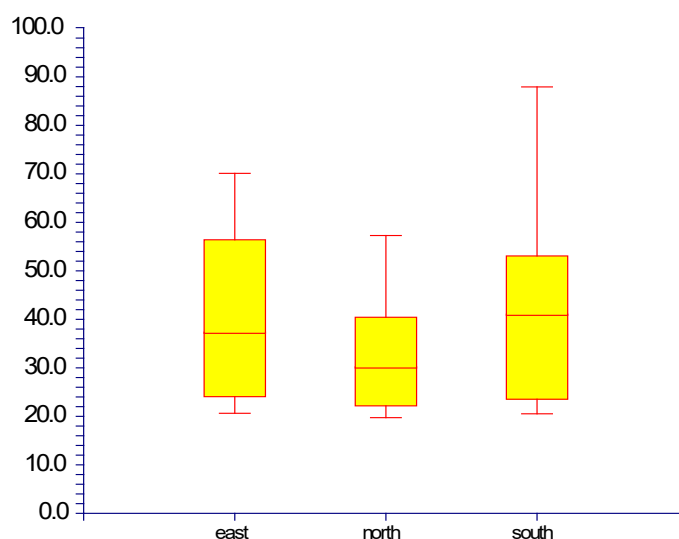


Figure 5.2 Box plot for Couple year protection rate (%) in three Ekurhuleni sub-districts

5.1.2 TERMINATION OF PREGNANCY RATE

Termination of pregnancy rate in the Ekurhuleni District is described below (see also Appendix F2). There was no target for the Gauteng Province. The data on *Termination of pregnancy rate* were not normally distributed (right skewed and platykurtic) implying few outliers (increased

TOP rates in 2012 and 2017). The median was 6.0% (IQR 5.3 - 7.5%). The minimum and maximum *Termination of Pregnancy* rates were 3.7% and 16.0% respectively.

Table 5.2 *Termination of Pregnancy* rate in the Ekurhuleni District

	Total (%)	East (%)	North (%)	South (%)
Median	6.0	4.9	4.9	8.3
IQR	5.3 - 7.5	0.1 – 6.1	3.7- 5.9	7.1 – 9.5
Minimum	3.7	0.0	2.0	5.8
Maximum	16.0	24.3	7.4	15.6

There was a significant decrease in *Termination of pregnancy* rate from 2011/12 (Spearman's correlation coefficient $\rho = -0.45$; $p < 0.001$; $R^2 = 0.21$).

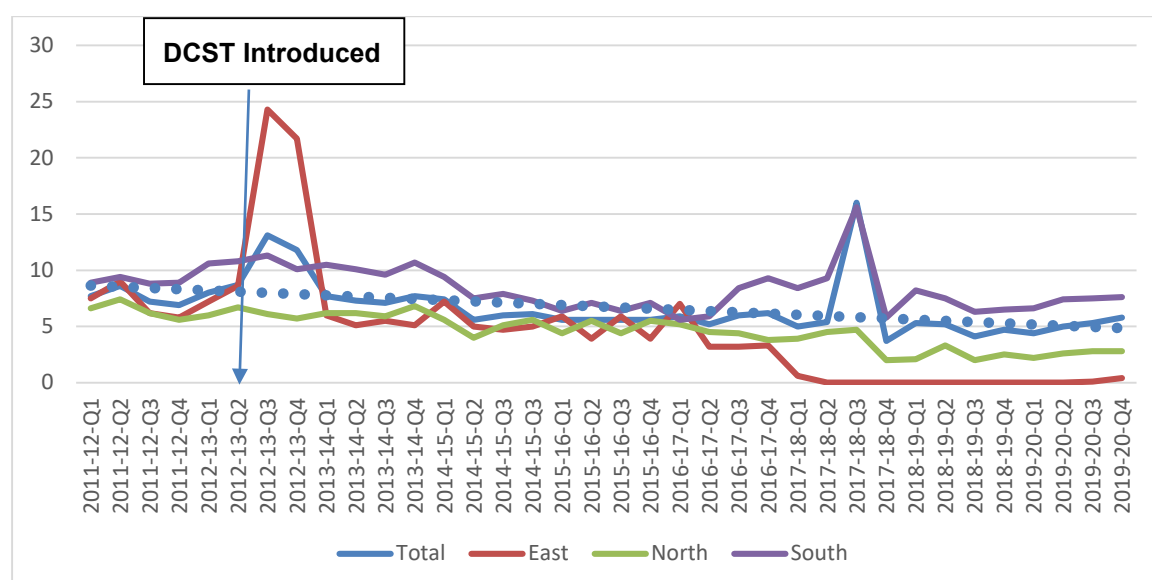


Figure 5.3 *Termination of pregnancy* rate (%) in the Ekurhuleni and three sub-districts

A box-plot among three sub-districts showed that there were significant differences in *Termination of Pregnancy* rate among the three sub-districts (One Way ANOVA, $p < 0.02$). The *Termination of pregnancy* rates in the North and East Sub-districts were significantly lower than South Sub-district (Tukey-Kramer Multiple-Comparison Test).

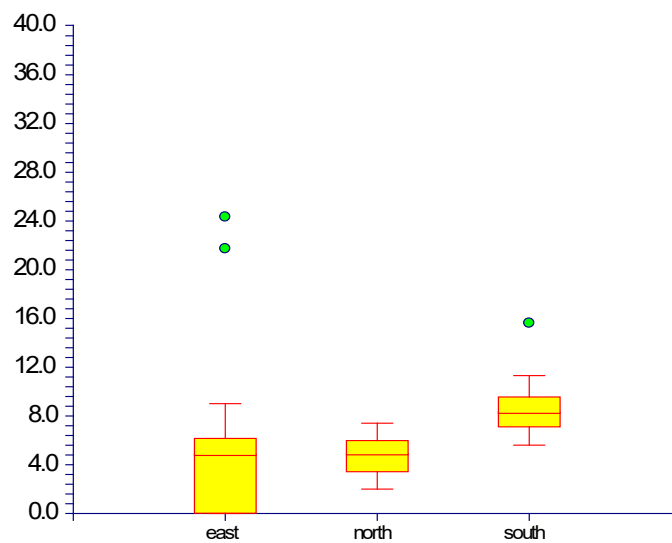


Figure 5.4 Box plot for *Termination of pregnancy rate (%)* in three Ekurhuleni sub-districts

5.2 ANTENATAL INDICATORS

5.2.1 ANTENATAL FIRST VISITS BEFORE 20 WEEKS

The Antenatal visits before 20 weeks rate is described below (see also Appendix F3). The Provincial target is 66%. The data on Antenatal First visit before 20 weeks rate were not normally distributed (platykurtic) implying few outliers (moderate increase in ANC first visit rates in 2016-2017). The median rate was 55.8% (IQR 45.4 – 62.8%). The minimum and maximum Antenatal First visit before 20 weeks were 32.6% and 67.7% respectively.

Table 5.3 Antenatal first visit before 20 weeks rate in the Ekurhuleni District

	Total (%)	East (%)	North (%)	South (%)
Median	55.8	55.4	54.1	57.2
Inter-quartile Range	45.4-62.8	47.5-66.4	41.5-62.9	46.9-61.9
Minimum	32.6	33.2	31.1	29.4
Maximum	67.7	69.8	70.0	68.4

There was a significant increase in the Antenatal First visit before 20 weeks rate (Spearman's correlation coefficient $p=0.98$; $p<0.0001$; $R^2 = 0.95$). The Figure 5.5 displayed that since 2018-19, the District could achieve / nearly achieve the Provincial target (66%).

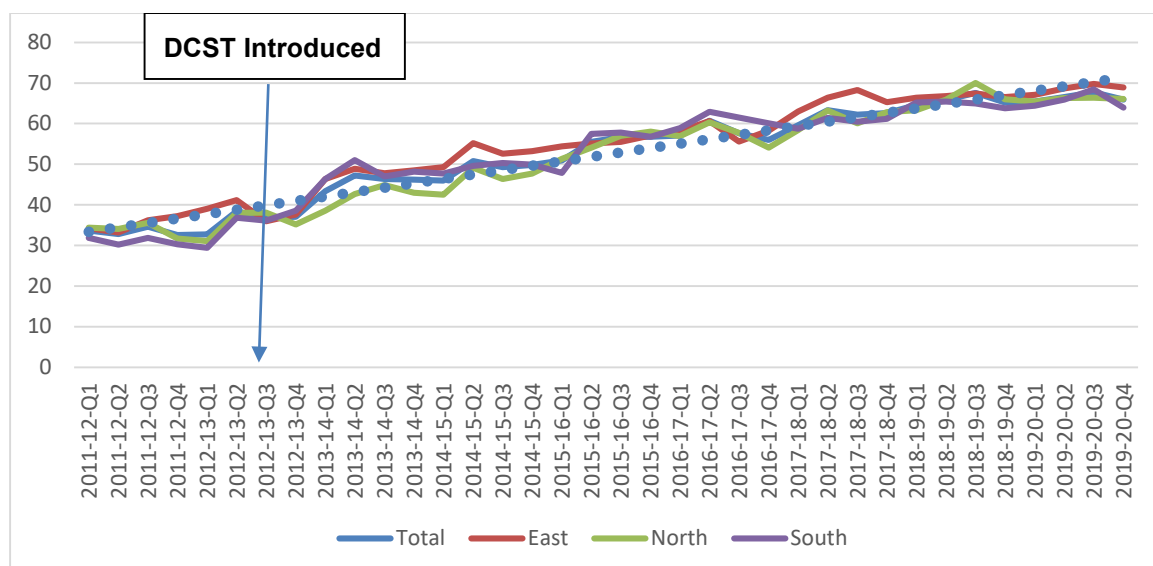


Figure 5.5 Antenatal first visit before 20 weeks rate in the Ekurhuleni and three sub-districts

A box plot (Figure 5.6) demonstrated that there were no significant differences in *Antenatal first visit rate* among the three sub-districts (One Way ANOVA, $p = 0.59$).

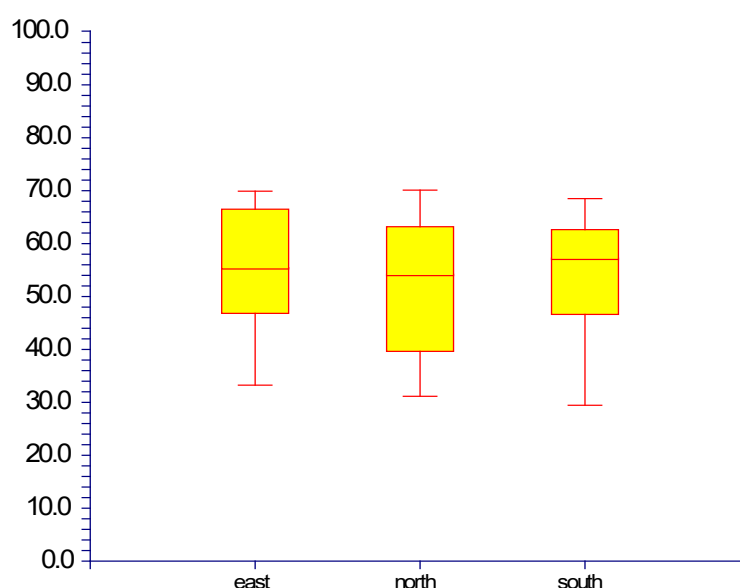


Figure 5.6 Box plot for Antenatal first visit before 20 weeks rate in three Ekurhuleni sub-districts

5.2.2 ANC PATIENTS INITIATED ON ART RATE

ANC patients initiated on ART rate in the Ekurhuleni District is described below (see also Appendix F4). The target for the GDoH is 90%. The data on *ANC patients initiated on ART rate* were not normally distributed. The median rate was 88.2% (IQR 66.6 – 93.3%). The

minimum and maximum rates were 25.9% and 103.0% respectively. The probable reason for exceeding 100% might be due to error in data collection or enrolling more than the target antenatal clients eligible for ART.

Table 5.4 ANC patients initiated on ART rate in the Ekurhuleni District

	Total (%)	East (%)	North (%)	South (%)
Median	88.2	94.1	87.4	85.2
IQR	63.6 – 93.3	66.4 – 98.2	62.2 – 92.3	61.8 – 96.6
Minimum	25.9	24.3	29.1	23.1
Maximum	103.0	100.7	105.8	103.9

There was a significant increase in the *ANC patients initiated on ART rate* (Spearman's correlation coefficient $\rho = 0.88$; $p < 0.0001$; $R^2 = 0.77$). Since, 2017-18, the District could achieve the provincial target (90%).

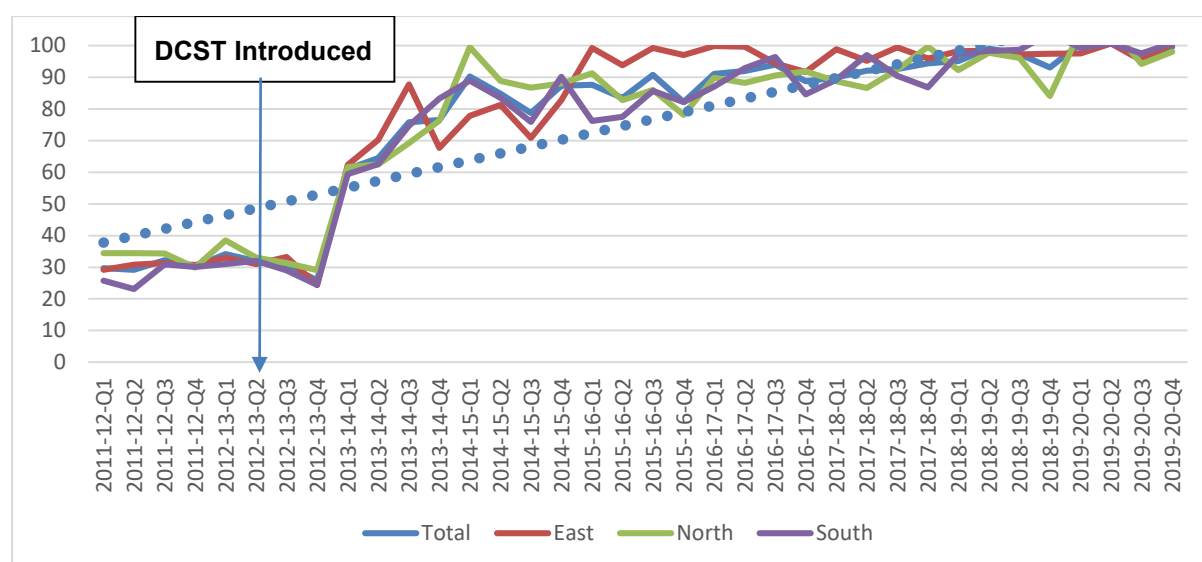


Figure 5.7 Antenatal patients initiated on ART rate in the Ekurhuleni and three sub-districts

A box plot showed that there were no significant differences in *ANC patients initiated on ART rate* among the three sub-districts (One Way ANOVA, $p = 0.89$).

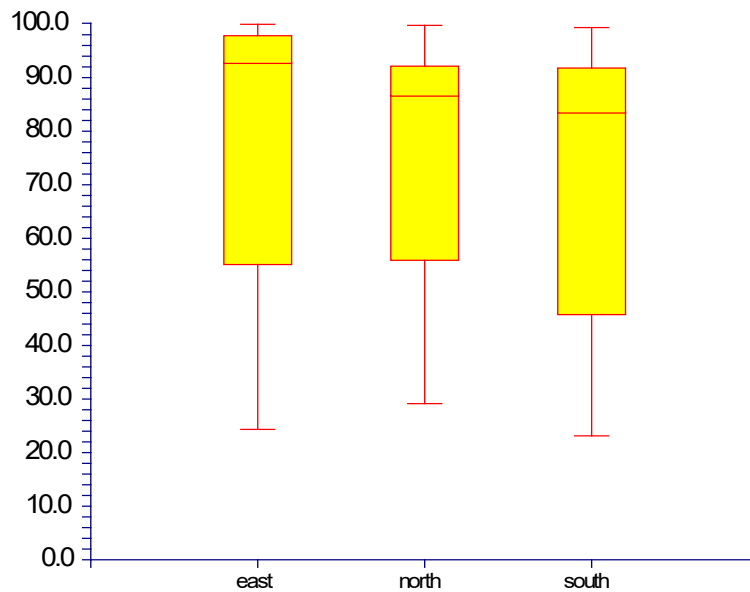


Figure 5.8 Box plot for *Antenatal patients initiated on ART rate* in three Ekurhuleni sub-districts

5.3 INTRA-NATAL INDICATORS

5.3.1 TOTAL DELIVERY IN FACILITY

Total delivery in facility in the Ekurhuleni District is described below (see also Appendix F5). The data on *Total delivery in facility* were normally distributed. The mean was 15,823 (SD 912). The minimum and maximum numbers were 14,226 and 17,459, respectively.

Table 5.5 *Total deliveries in facility in the Ekurhuleni District*

	Total (n)	East (n)	North (n)	South (n)
Mean	15,823	3,929	6,863	5,028
SD	912	328	579	240
Minimum	14,226	2,935	5,399	4,391
Maximum	17,549	4,539	7,951	5,405

There was a significant increase in the Total deliveries in facility (Pearson's correlation coefficient ($r = 0.71$; $p < 0.0001$; $R^2 = 0.51$)).

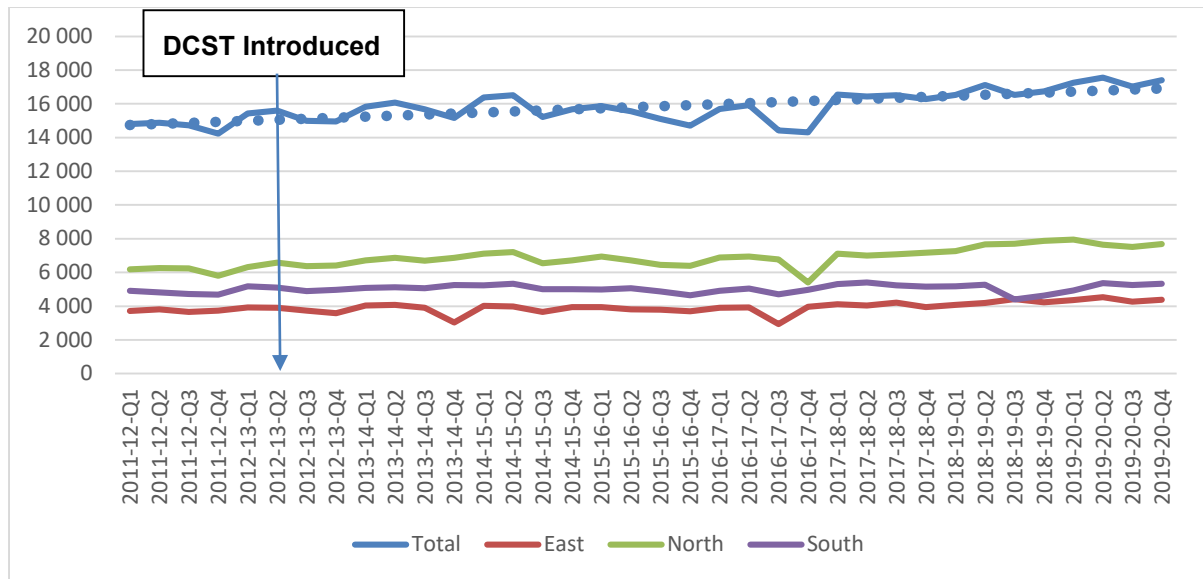


Figure 5.9 Total deliveries in facility in the Ekurhuleni and three sub-districts

A box plot demonstrated that there were significant differences in *Total delivery in facility* among the three sub-districts (One Way ANOVA, $p < 0.001$). The *Total delivery in facility* in the North Sub-district was significantly higher than the East and South Sub-districts (Tukey-Kramer Multiple-Comparison Test).

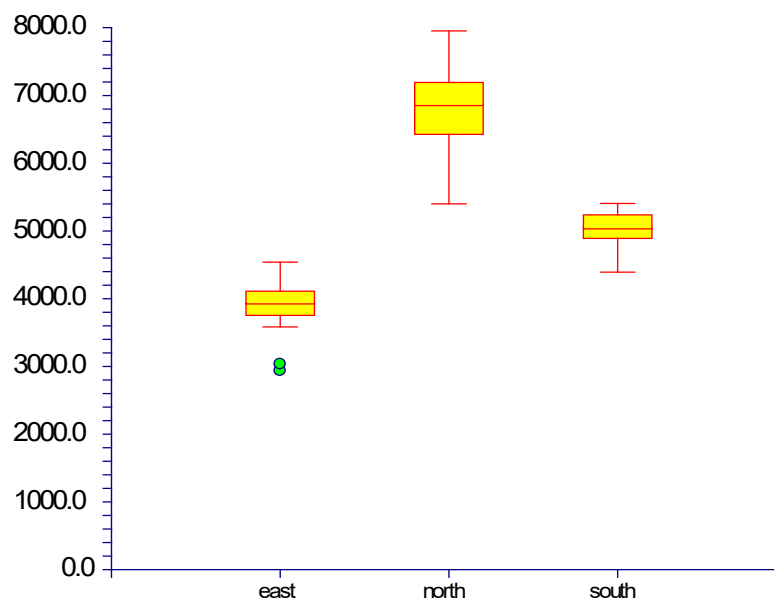


Figure 5.10 Box plot for Total deliveries in facility in three Ekurhuleni sub-districts

5.3.2 DELIVERY IN FACILITY RATE

Delivery in facility rate is described below (see also Appendix F6). The data on the *Delivery in facility rate* were often above 100% probably due to an incorrect estimation of the population estimated deliveries (denominator). The data was normally distributed. The mean rate was 101.7% ($\pm$ 8.8%). The minimum and maximum rates were 85.1% and 118.7% respectively.

Table 5.6 *Delivery in facility rate* in the Ekurhuleni District

	Total (%)	East (%)	North (%)	South (%)
Mean	101.7	95.5	120.5	88.0
SD	8.8	7.4	12.1	11.0
Minimum	85.1	76.0	87.8	66.6
Maximum	118.7	111.8	143.9	106.1

There was a significant decline in the *Delivery in facility rate* (Pearson's correlation coefficient $r = -0.42$; $p=0.01$; $R^2 = 0.1787$). However, it might be due to improving quality of data and resolving the data, which were often more than 100% in the past.

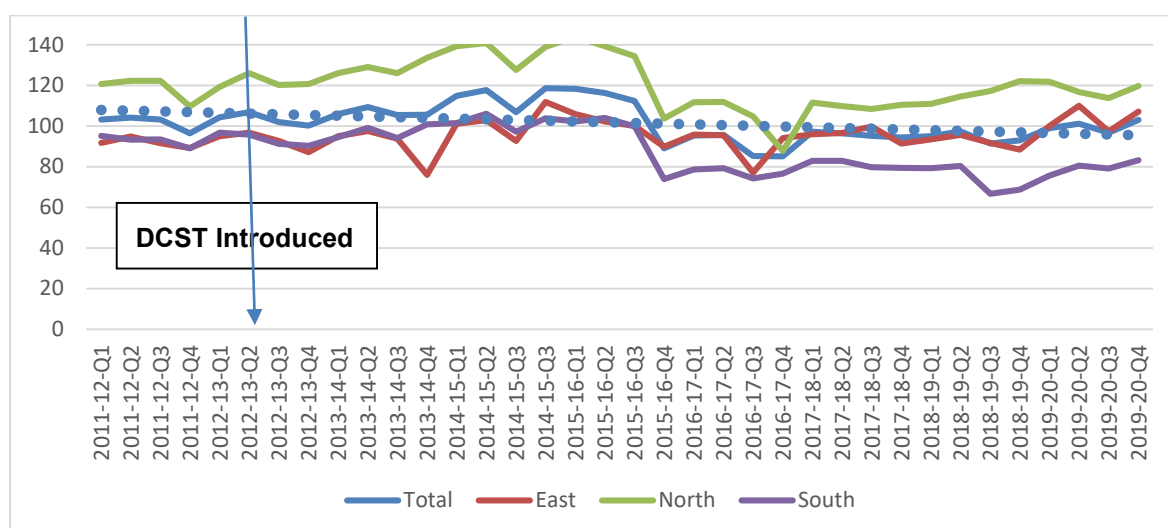


Figure 5.11 *Delivery in facility rate* in the Ekurhuleni and three sub-districts

There were significant differences in *Delivery in facility rate* among the three sub-districts (One Way ANOVA, $p < 0.001$). The *Delivery in facility rate* in the North Sub-district was significantly higher than the East and South Sub-districts (Tukey-Kramer Multiple-Comparison Test).

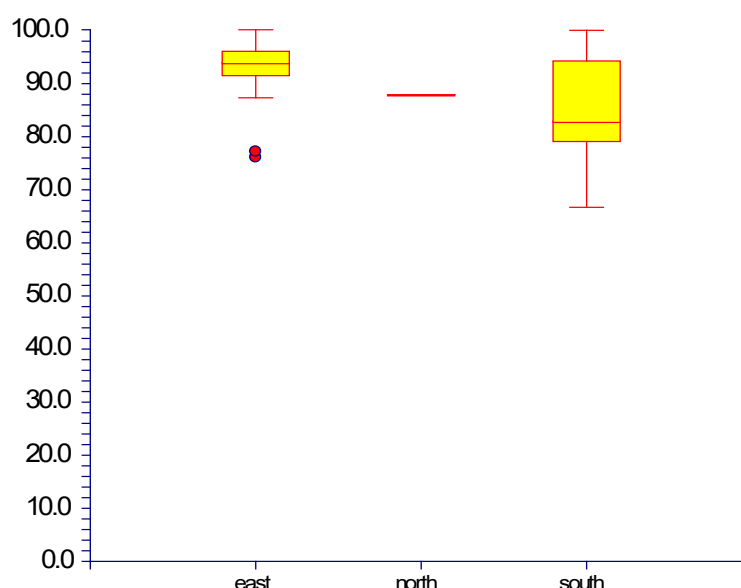


Figure 5.12 Box plot for *Delivery in facility rate (%)* in three Ekurhuleni sub-districts

5.3.3 DELIVERY IN FACILITY UNDER 18 YEARS RATE

Delivery in facility under 18 years rate is described below (see also Appendix F7). The Gauteng Provincial target is 4.4%. The data were not collected for a certain period (2015-16 Q4 to 2016-17 Q4) for unknown reason. The data on *Delivery in facility under 18 years rate* were normally distributed. The mean rate was 5.6% (SD $\pm$ 0.9%). The minimum and maximum rates were 4.4% and 7.7% respectively.

Table 5.7 *Delivery in facility under 18 years rate* in the Ekurhuleni District

	Total (%)	East (%)	North (%)	South (%)
Mean	5.6	7.8	4.3	6.2
SD	0.9	2.8	1.3	2.3
Minimum	4.4	3.8	1.7	3.8
Maximum	7.7	15.1	7.3	12.7

There was significant increase in the *Delivery in facility under 18 years rate* (Person's correlation coefficient ($r = 0.64$; $p < 0.001$; $R^2 = 0.43$) and it remained consistently higher than provincial target 4.4%.

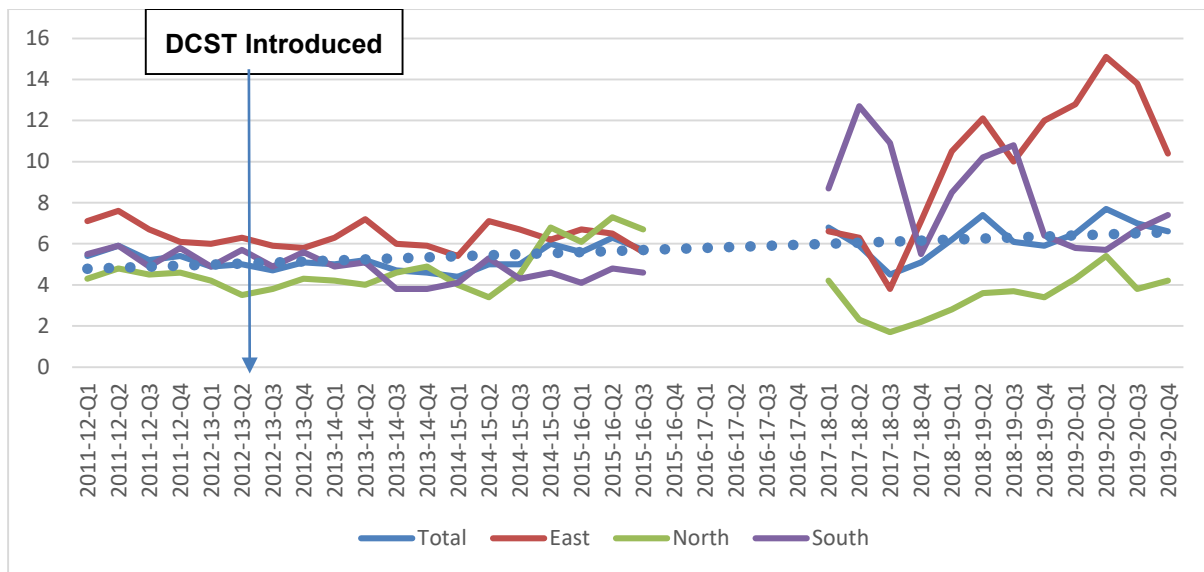


Figure 5.13 Delivery in facility under 18 years rate in the Ekurhuleni and three sub-districts

There were significant differences in *Delivery in facility under 18 years rate* among the three sub-districts (One Way ANOVA, $p < 0.001$). The *Delivery in Facility under 18 years rates* in the East and Sub-districts were significantly higher than the North Sub-district (Tukey-Kramer Multiple-Comparison Test).

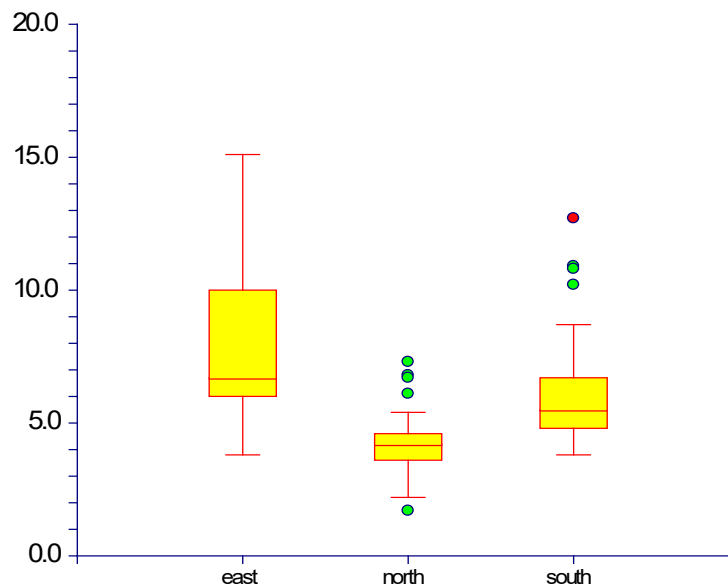


Figure 5.14 Box plot for Delivery in facility under 18 years rate (%) in three Ekurhuleni sub-districts

5.3.4 DELIVERY BY CAESAREAN SECTION RATE

Delivery by Caesarean section rate is described below (see also Appendix F8). The data on *Delivery by Caesarean section rate* was normally distributed. The mean rate was 25.4% ($\pm 2.5\%$). The minimum and maximum rates were 20.8% and 29.2% respectively.

Table 5.8 Delivery by caesarean section rate in the Ekurhuleni District

	Total (%)	East (%)	North (%)	South (%)
Mean	25.4	27.7	27.2	17.2
SD	2.5	3.9	3.0	3.0
Minimum	20.8	19.4	21.5	13.6
Maximum	29.2	34.4	33.4	25.7

There was a significant increase in the *Delivery by Caesarean section rate* (Pearson's correlation coefficient $r = 0.89$; $p < 0.0001$; $R^2 = 0.81$).

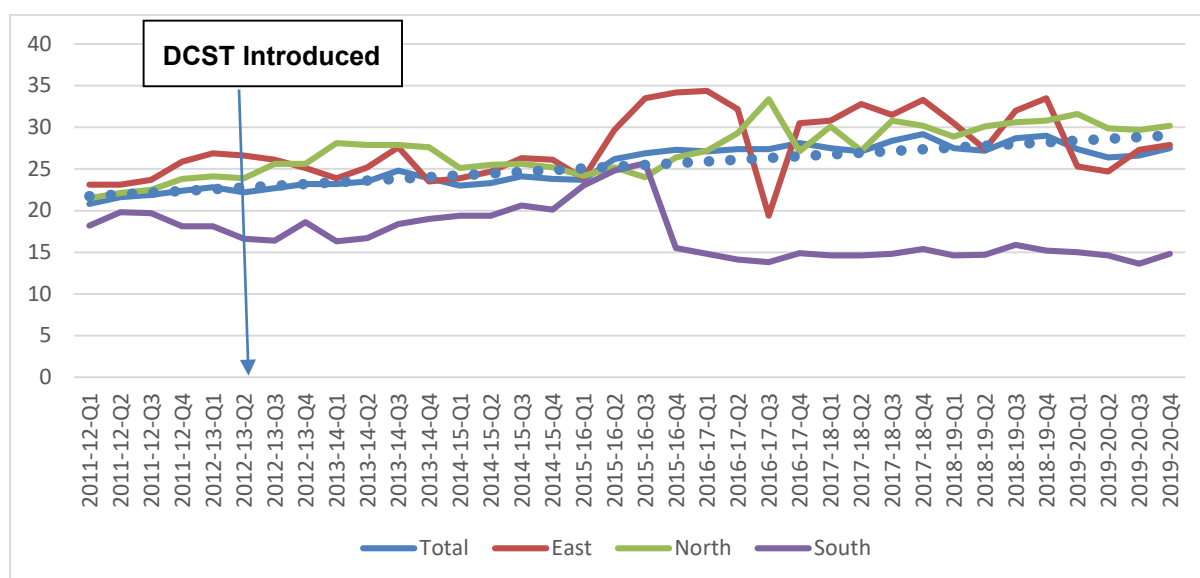


Figure 5.15 Delivery by Caesarean section rate in the Ekurhuleni and three sub-districts

A box Plot demonstrated that there were significant differences in the *Delivery by Caesarean section rate* among the three sub-districts (One Way ANOVA, $p < 0.001$). *Delivery by caesarean section rates* in the East and North Sub-districts were significantly higher than the South Sub-district (Tukey-Kramer Multiple-Comparison Test).

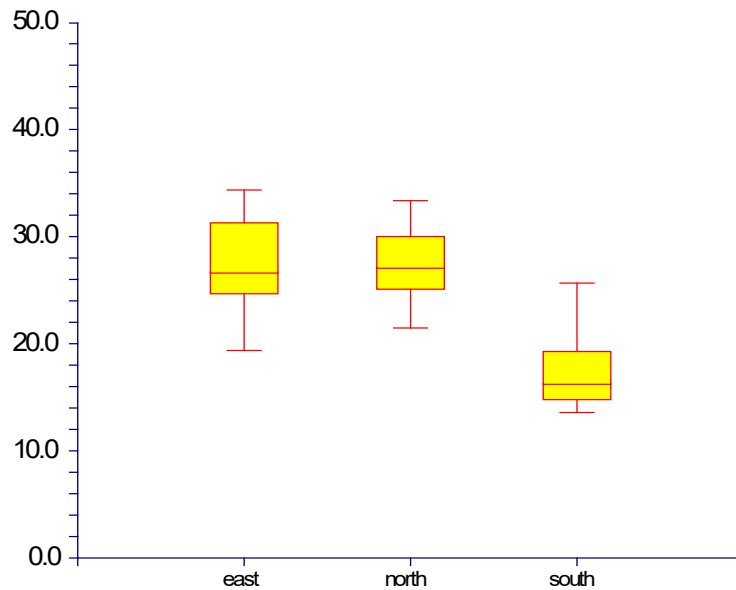


Figure 5.16 Box plot for *Delivery by Caesarean section rate (%)* in three Ekurhuleni sub-districts

5.3.5 LIVE BIRTH TO HIV POSITIVE WOMEN IN THE EKURHULENI DISTRICT

Live birth to HIV positive women in the Ekurhuleni District is described below (see also Appendix F9). The data on the *Live birth to HIV positive women* in the Ekurhuleni District were normally distributed. The mean was 4,302 ($\pm$ 251). The minimum and maximum numbers were 3,924 and 5,201, respectively.

Table 5.9 *Live birth to HIV positive patients* in the Ekurhuleni District

	Total (n)	East (n)	North (n)	South (n)
Mean	4,302	1,128	1,707	1,467
SD	251	104	190	80
Minimum	3,924	844	1,436	1,230
Maximum	5,201	1,298	2,519	1,618

There was a significant increase in the *Live birth to HIV positive women* (Pearson's correlation coefficient $r = 0.59$; $p < 0.001$; $R^2 = 0.35$).

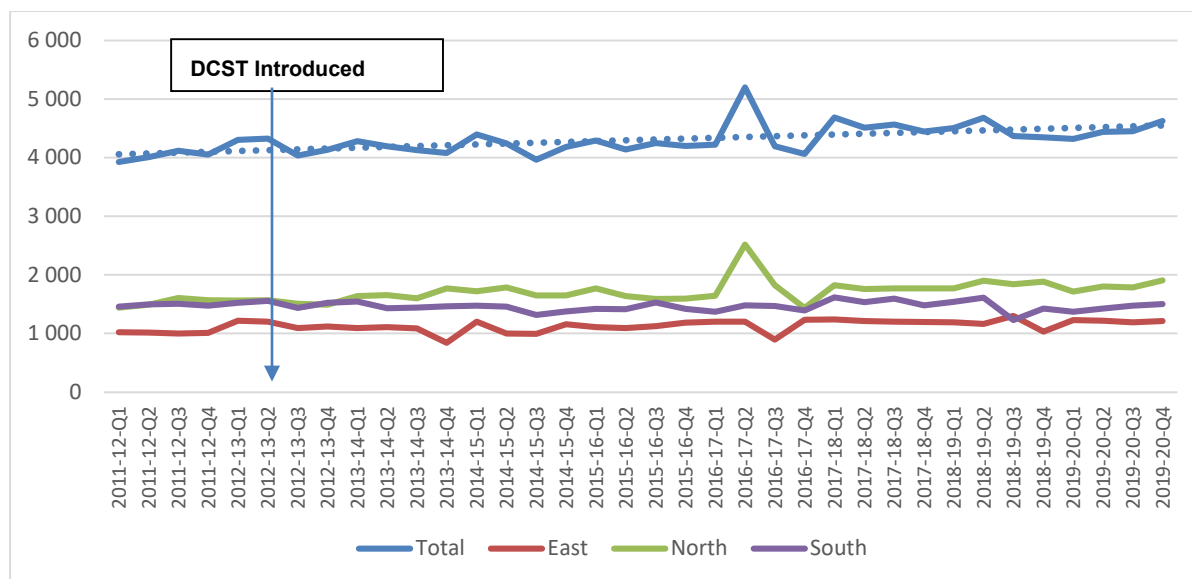


Figure 5.17 Live birth to HIV positive patients in the Ekurhuleni District and three sub-districts

A box plot demonstrated that there were significant differences in the *Live birth to HIV positive women* among the three sub-districts (One Way ANOVA, $p < 0.0001$). The *Live births to HIV positive women* in the Ekurhuleni District in the North and South were significantly higher than East Sub-district (Tukey-Kramer Multiple-Comparison Test).

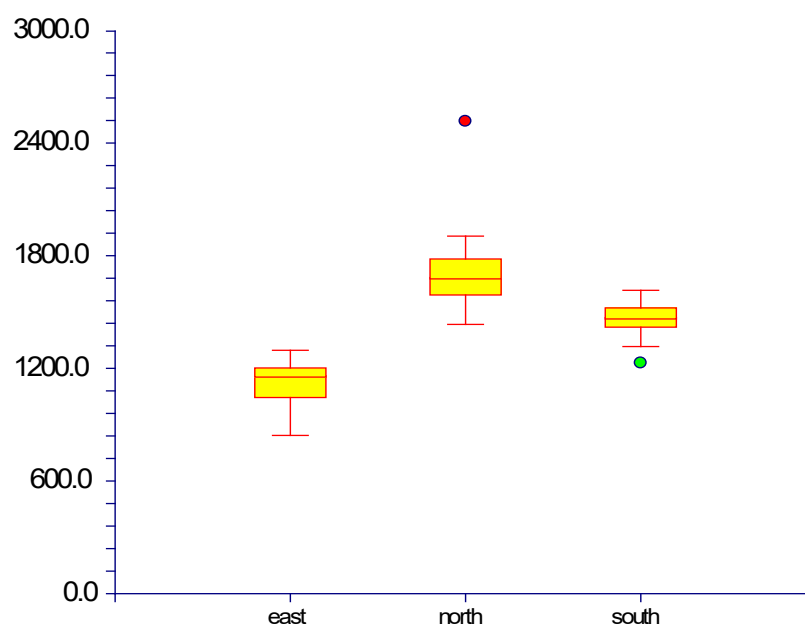


Figure 5.18 Box plot for Live births to HIV positive patients in three Ekurhuleni sub-districts

5.4 POST-NATAL INDICATORS

5.4.1 MOTHER POSTNATAL VISITS WITHIN 6 DAYS RATE

The *Mother Postnatal visits within 6 days rate* are described below (see also Appendix F10). The Gauteng Provincial target is 80%. The data on the *Mother Postnatal visits within 6 days rate* were often above 100% probably due to mothers' visiting facilities, which were non-designated for their postnatal check-up (denominator). This problem was predominantly in the South Sub-district. The data on the *Mother Postnatal visits within 6 days rate* were not normally distributed (leptokurtic) implying values were sharply peaked with heavy tails. The median rate was 77.2% (IQR 74.4 – 81.6%). The minimum and maximum rates were 45% and 111% respectively.

Table 5.10 *Mother Postnatal visits within 6 days rate* in the Ekurhuleni District

	Total (%)	East (%)	North (%)	South (%)
Median	77.2	78.8	69.8	118.6
IQR	74.4 – 81.6	73.5 – 87.8	64.2-80.6	95.1-126.4
Minimum	45	44	15	77
Maximum	111	139	155	227

There was a significant increase in the *Mother Postnatal visits within 6 days rate* (Spearman's correlation coefficient ($\rho = 0.39$; $p < 0.01$; $R^2 = 0.16$). In spite of that, the District could not achieve the Provincial target.

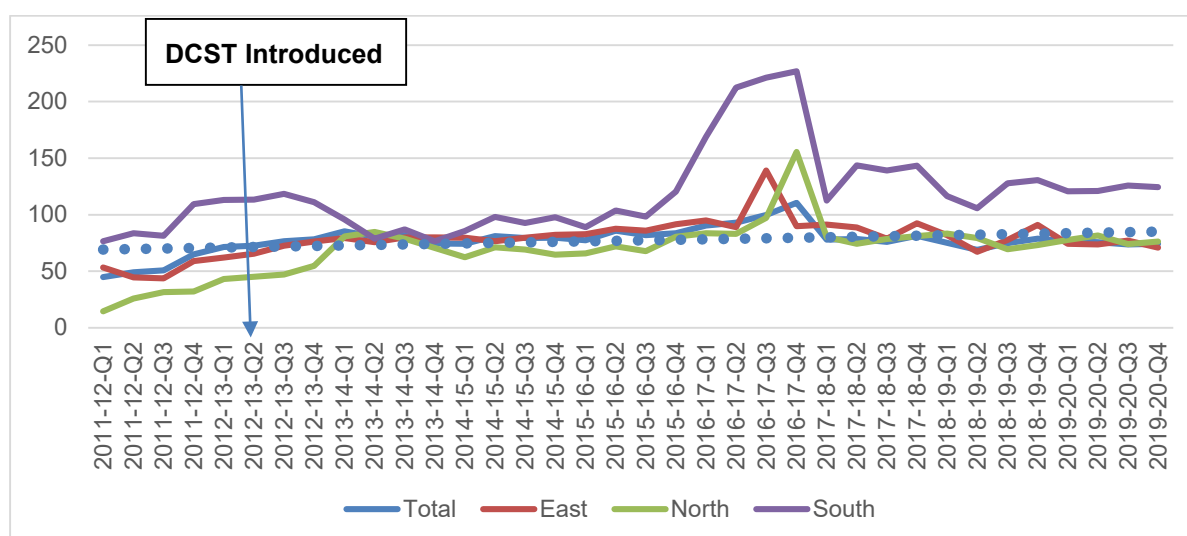


Figure 5.19 *Mother Postnatal visits within 6 days rate* in the Ekurhuleni and three sub-districts

A box plot demonstrated that there were significant differences in the *Mother Postnatal visits within 6 days rate* among the three sub-districts (One Way ANOVA, $p < 0.001$). The *Postnatal visits within 6 days rate* in the South Sub-district was significantly higher than the East and North Sub-districts (Tukey-Kramer Multiple-Comparison Test).

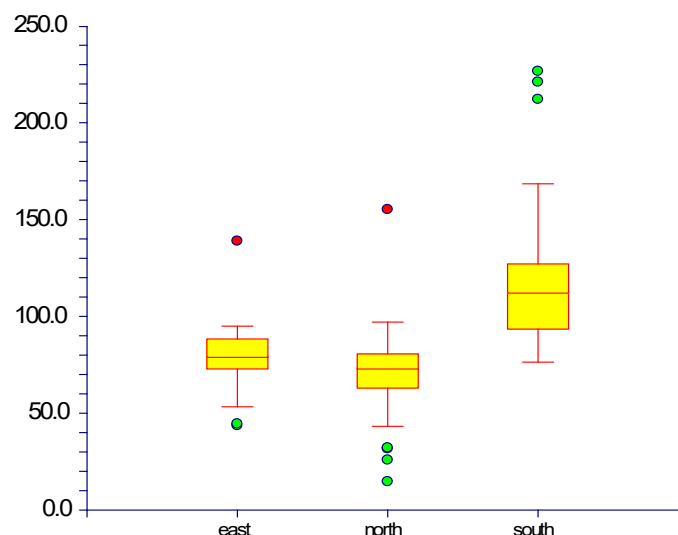


Figure 5.20 Box plot for *Postnatal visits within 6 days rate* in three Ekurhuleni sub-districts

5.5 OUTCOME INDICATORS

5.5.1 MATERNAL MORTALITY IN FACILITY RATIO

The *Maternal mortality in facility ratio* is described below (see also Appendix F11). The Gauteng Provincial target was less than 100 per 100,000 live births. The data on *Maternal mortality in facility ratio* (iMMR) were not normally distributed (skewed to the right). The mean ratio was 139 (IQR 120-180). The minimum and maximum ratios were 68 and 300, respectively.

Table 5.11 *Maternal mortality in facility ratio** in the Ekurhuleni District

	Total	East	North	South
Median	139	106	145	124
IQR	120-180	54-165	120-199	73-240
Minimum	68	0	30	12
Maximum	300	271	336	436

*per 100,000 live births

There was a significant decrease in the *iMMR* (Spearman's correlation coefficient $\rho = -0.68$; $p < 0.0001$; $R^2 = 0.48$). The District had managed to achieve the Gauteng Provincial target in the following quarters: 2016-17-Q1, 2017-18-Q3, 2018-19-Q3, 2019-20-Q1.

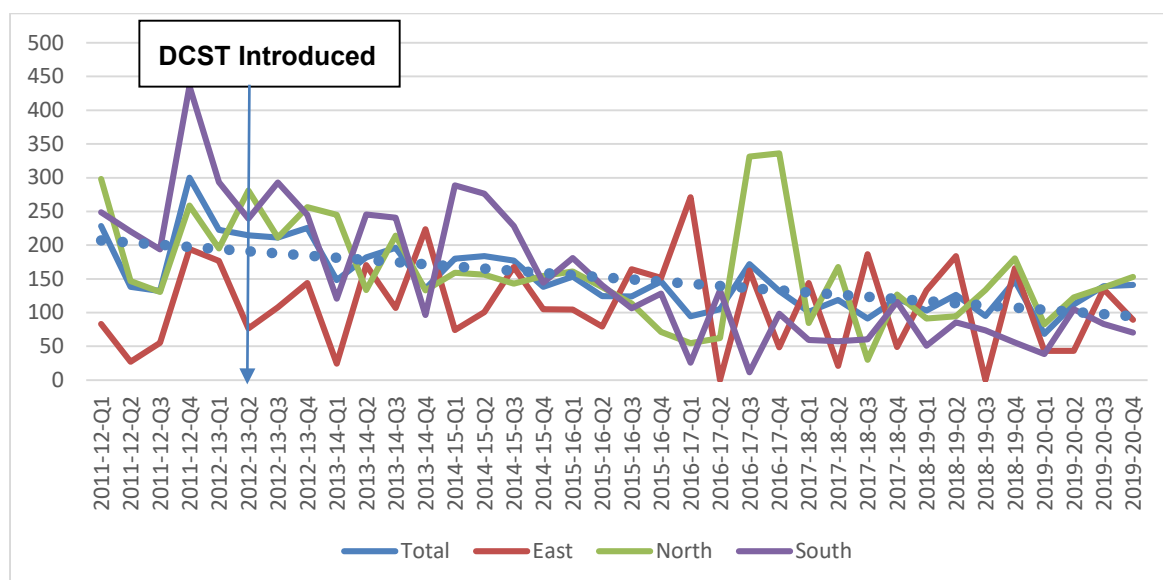


Figure 5.21 Maternal Mortality in facility ratio the Ekurhuleni and three sub-districts

A box plot demonstrated that there were significant differences in the *iMMR* among the three sub-districts (One Way ANOVA, $p < 0.05$). The *iMMR* in the East Sub-district was significantly lower than the North Sub-district (Tukey-Kramer Multiple-Comparison Test).

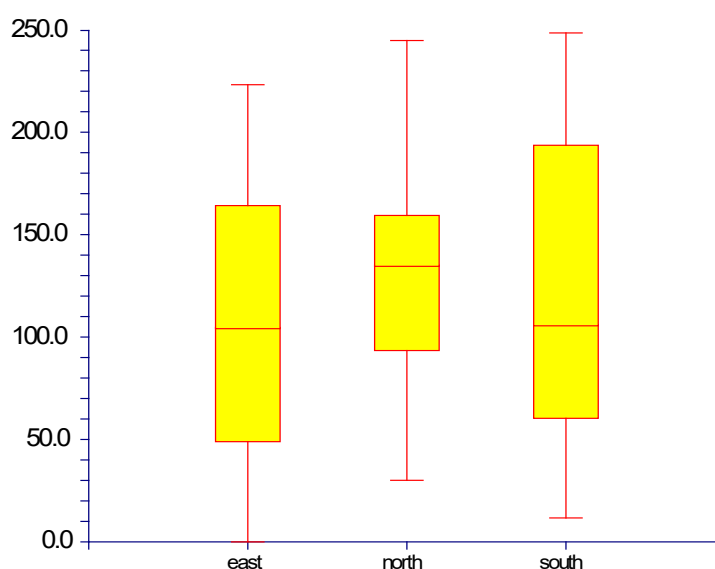


Figure 5.22 Box plot for Maternal Mortality in facility ratio in three Ekurhuleni sub-districts

5.5.2 STILLBIRTH IN-FACILITY RATE

Stillbirth rate (per 1000 total births) is described in Table 5.12 (see also Appendix F12). The data on *Stillbirth rate* were normally distributed. The mean *Stillbirth rate* was 20.0 (± 2.0). The minimum and maximum rates were 16.0 and 26.0, respectively.

Table 5.12 *Stillbirth rate in the Ekurhuleni District**

	Total	East	North	South
Mean	20	18	16	17
SD	2	4	6	4
Minimum	16	13	9	10
Maximum	26	33	38	27

*per 1000 births

There was a significant decrease in the *Stillbirth rate* (Pearson's correlation coefficient $r = -0.69$; $p < 0.0001$; $R^2 = 0.45$).

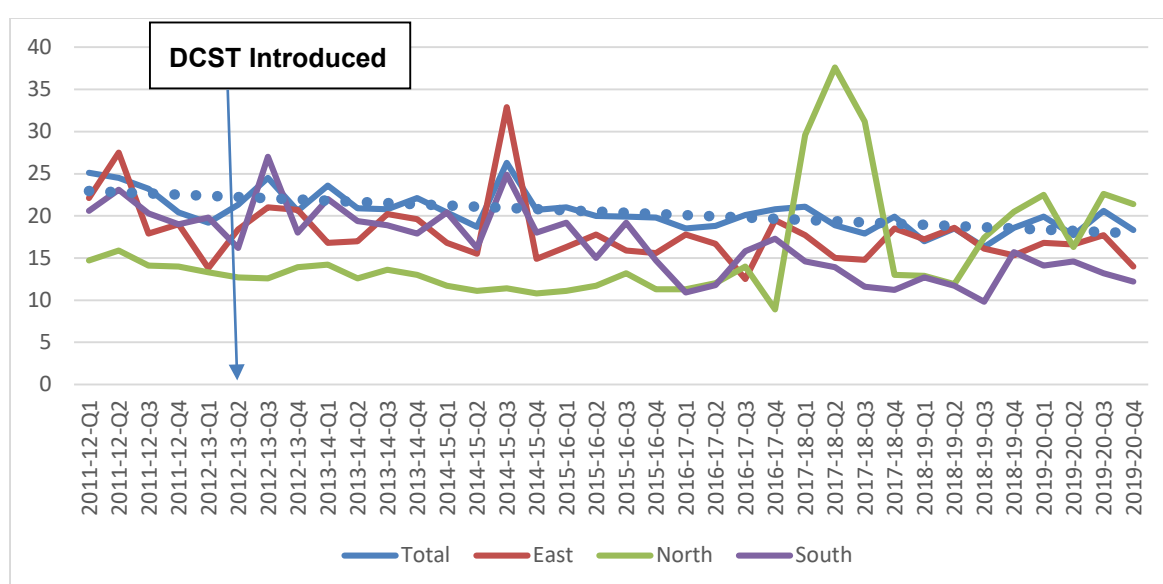


Figure 5.23 *Stillbirth rates* in the Ekurhuleni and three sub-districts

A box plot showed that there were no significant differences in *Stillbirth rate* among the three sub-districts (One Way ANOVA, $p = 0.12$).

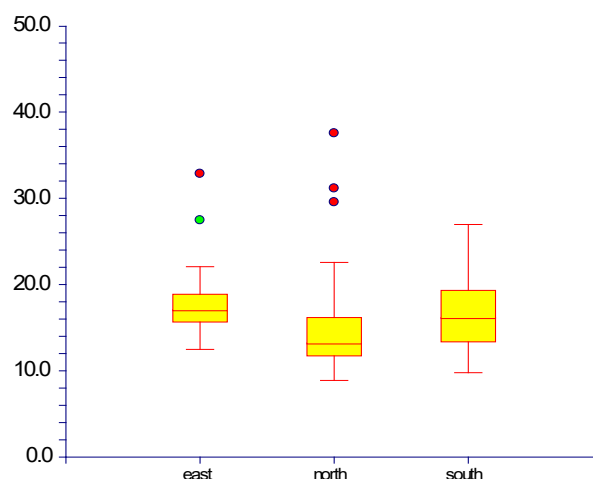


Figure 5.24 Box plot for *Stillbirth rate* in three Ekurhuleni sub-districts

5.5.3 NEONATAL MORTALITY IN FACILITY RATE

Neonatal mortality rate (per 1000 live births) is described in Table 5.13 (see also Appendix F13). The Gauteng Provincial target is <10 per 1000 live births. The data on *Neonatal mortality rate* were normally distributed. The mean rate was 14.0 ($\pm$ 2.0). The minimum and maximum rates were 6.0 and 18.0, respectively.

Table 5.13 *Neonatal mortality ratio* in the Ekurhuleni District

	Total	East	North	South
Mean	14	12	15	12
SD	2	3	4	5
Minimum	6	8	9	0
Maximum	18	28	24	22

*per 1000 live births

There was a significant decrease in the *Neonatal mortality rate* (Pearson's correlation coefficient $r = -0.41$; $p < 0.05$; $R^2 = 0.16$). However, the District had only been able to achieve the Gauteng Provincial target in 2019-20-Q2.

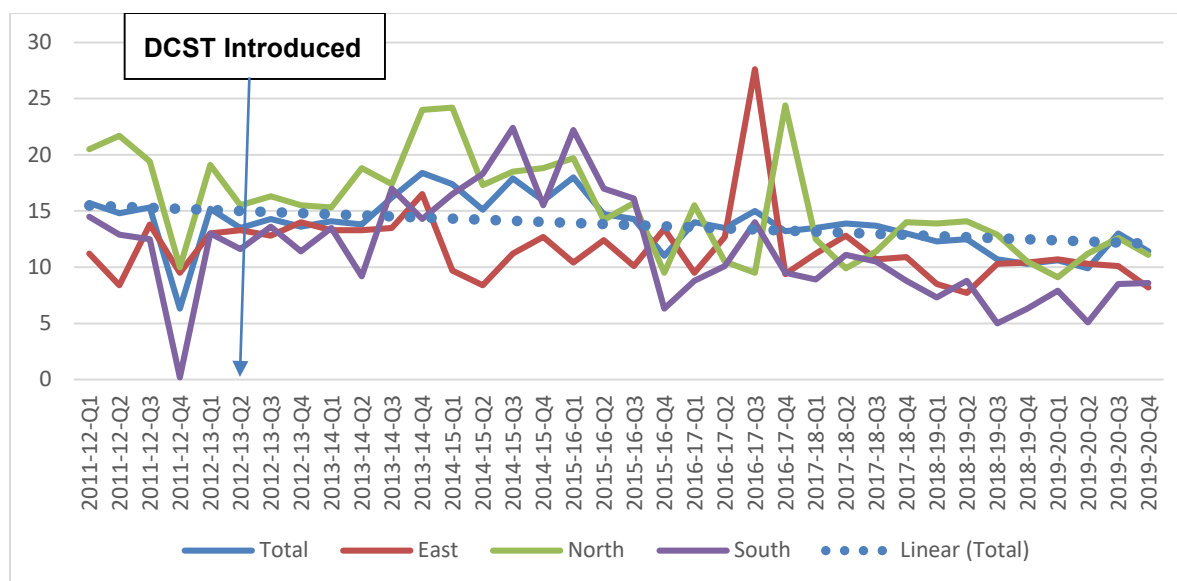


Figure 5.25 Neonatal mortality rate in the Ekurhuleni and three sub-districts

A box plot illustrated the significant differences in *Neonatal mortality rate* among the three sub-districts (One Way ANOVA, $p < 0.001$). The *Neonatal mortality rate* in the East and South Sub-districts were significantly lower than the North Sub-district (Tukey-Kramer Multiple-Comparison Test).

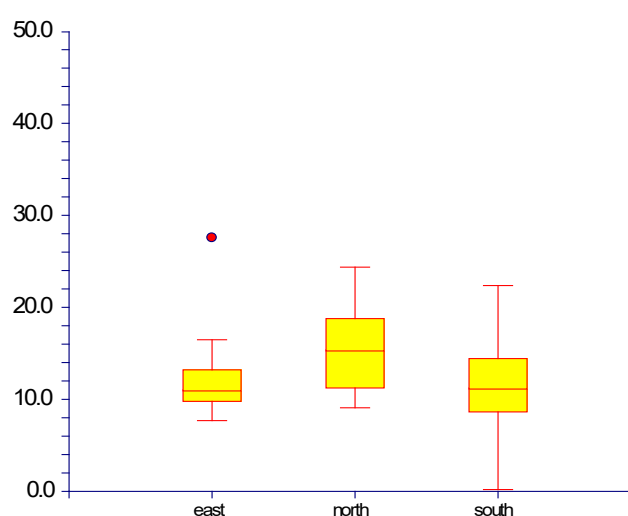


Figure 5.26 Box plot for Neonatal mortality rate in three Ekurhuleni sub-districts

5.5.4 PERINATAL MORTALITY IN FACILITY RATE

Perinatal mortality in facility rate (*per 1000 births*) is described in Table 5.14 (see Appendix F14). The data on *Perinatal mortality rate (per 1000 births)* were normally distributed. The mean rate was $32.0 (\pm 5.0)$. The minimum and maximum rates were 25.0 and 42.0, respectively.

Table 5.14 Perinatal mortality rates* in the Ekurhuleni District

	Total	East	North	South
Mean	32	26	40	27
SD	5	4	9	6
Minimum	25	19	25	15
Maximum	42	40	54	41

*Per 1000 births

There was a significant decline in the *Perinatal Mortality rate (per 1000 births)* (Pearson's correlation coefficient $r=-0.68$; $p<0.0001$; $R^2 = 0.46$).

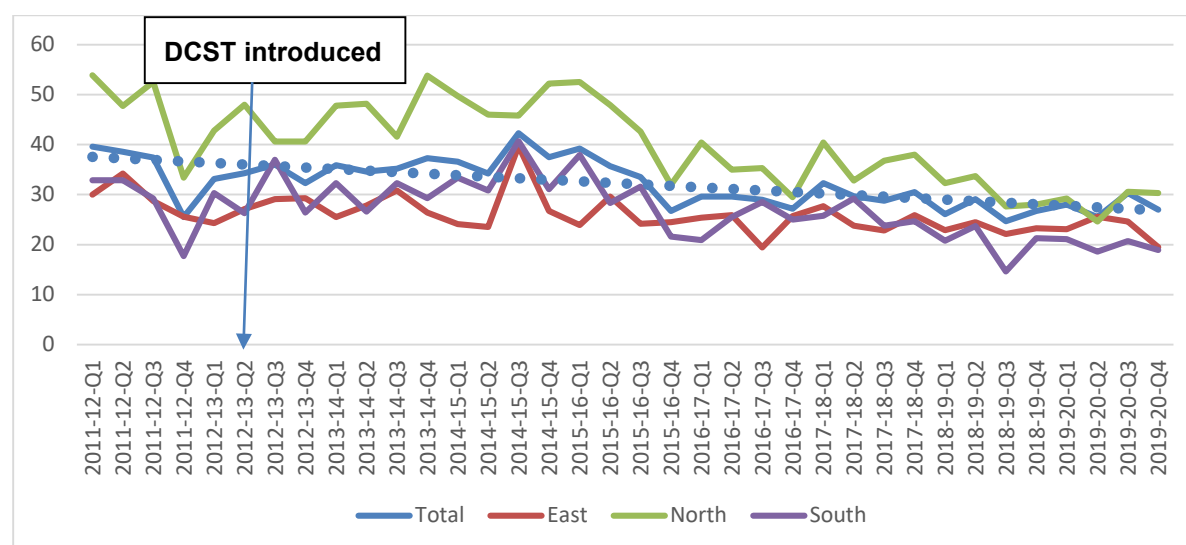


Figure 5.27 Perinatal mortality rates in the Ekurhuleni and three sub-districts

There were significant differences among the three sub-districts in terms of Perinatal mortality in facility rate (One Way ANOVA, $p < 0.001$). The *Perinatal mortality rates* in the East and South Sub-districts were significantly lower than the North Sub-district (Tukey-Kramer Multiple-Comparison Test).

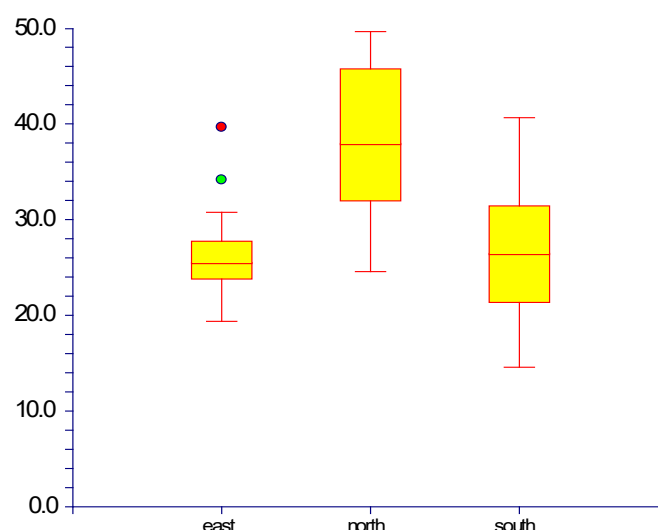


Figure 5.28 Box plot for *Perinatal mortality rate* in three Ekurhuleni sub-districts

5.5.5 LIVE BIRTH UNDER 2500G IN FACILITY RATE

The data on *Live birth under 2500g in facility rate* (per 1000 live births) is described below (see also Appendix F15). The data on *Live birth under 2500g in facility rate* were not normally distributed (skewed to the right). The median rate was 13.0 (IQR 12.0 – 14.0). The minimum and maximum rates were 7.0 and 21.0, respectively.

Table 5.15 *Livebirths under 2500 g in facility rate* * in the Ekurhuleni District

	Total (%)	East (%)	North (%)	South (%)
Median	13	13	13	12
IQR	12-14	12-13	11-14	11-13
Minimum	7	8	4	9
Maximum	21	16	38	18

*Per 1000 live births

There was no significant change in the *Live birth under 2500g in facility rate* (Spearman's correlation coefficient $p=0.11$, $p=0.51$; $R^2 = 0.02$).

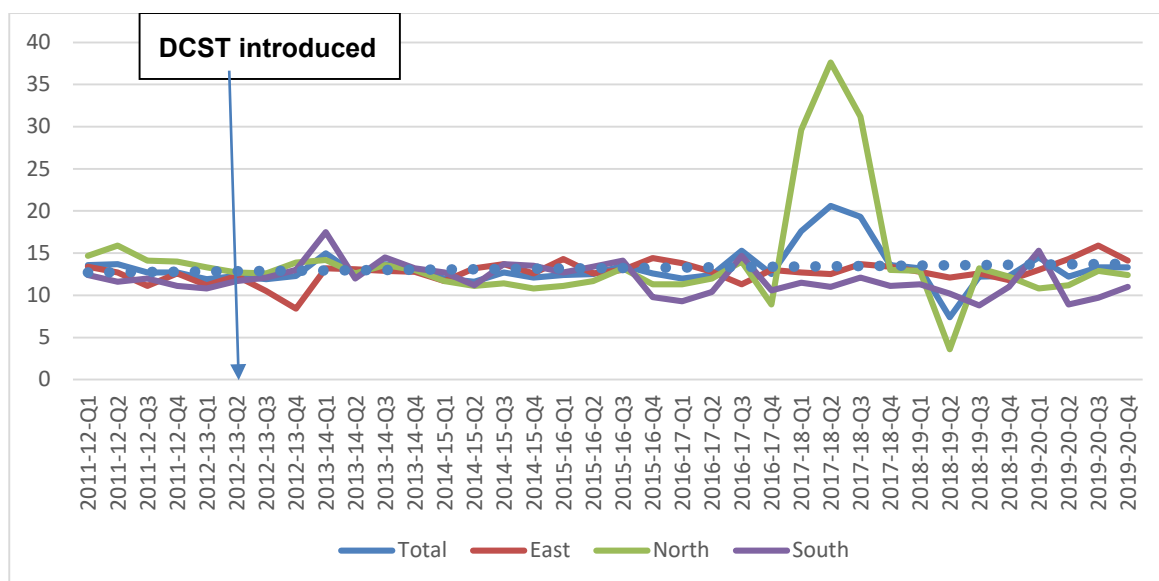


Figure 5.29 Live birth under 2500g in facility rate in the Ekurhuleni and three sub-districts

A box plot showed that there were no significant differences in *Live birth under 2500g in facility rate* among the three sub-districts (One Way ANOVA, $p=0.07$).

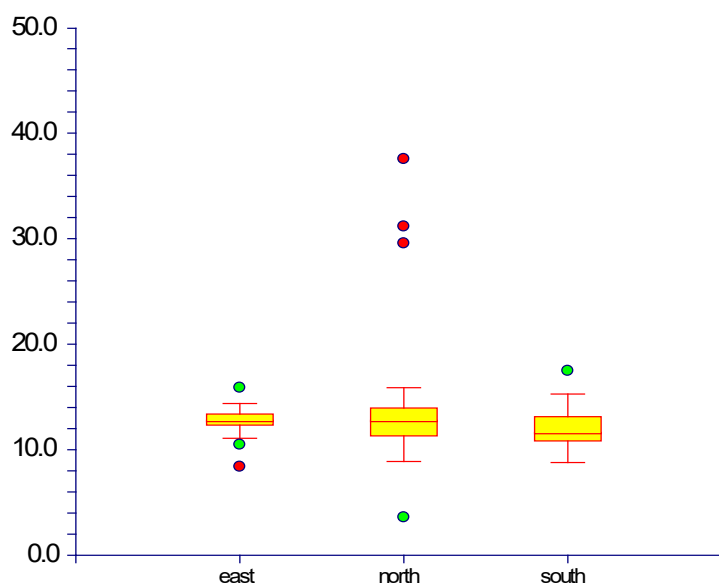


Figure 5.30 Box plot for Live birth under 2500g in facility rate in three Ekurhuleni sub-districts

5.6 SUMMARY OF ROUTINE DATA ANALYSIS

5.6.1 ROUTINE DATA ANALYSIS

Analysis of routine data from the DHIS showed the following:

Changes in the Maternal health indicators

There are improvements in the majority of these indicators, most importantly in the outcome indicators (iMMR, stillbirth, neonatal, perinatal mortality rates). During this period, there was also improvement in CYPR, although there was a deterioration in termination of pregnancy rate. Both the antenatal indicators (*Antenatal First visit before 20 weeks rate* and *ANC patients initiated on ART rate*) showed improvement. Among the intranatal indicators, *Total delivery in facility* and *Delivery by caesarean section rate* increased implying increasing workload in the public health facilities. There was a significant increase in the *Delivery in facility under 18 years rate*, which is of concern due to the deterioration from the past. Lastly, there was a significant increase in the *Live birth to HIV positive women*. In the postnatal period, a significant increase in the *Mother Postnatal visits within 6 days rate* showed improved services.

In terms of provincial targets, the majority of these indicators did not have provincial targets. The analysis showed that in spite of improvements, the District could not achieve the set provincial targets, which would require further exploration.

Table 5.16 Summary of changes in maternal health indicators in Ekurhuleni and three sub-districts

Indicators	Status	P value	Provincial target	achievement
Reproductive health				
<i>Couple year protection rate</i>	increased	<0.0001*	55%	2016-17-Q2, 2016-17-Q4, 2017-18-Q3.
<i>Termination of pregnancy rate</i>	declined	<0.001*	none	
Antenatal				
<i>Antenatal First visit before 20 weeks rate</i>	increased	<0.0001*	66%	since 2018-19
<i>ANC patients initiated on ART rate</i>	Increased	<0.0001*	90%	since 2017-18
Intranatal				
<i>Total delivery in facility</i>	increased	<0.0001*	none	
<i>Delivery in facility rate</i>	declined	0.01*	none	
<i>Delivery in Facility under 18 years rate</i>	increased	<0.001*	4.4%	not achieved
<i>Delivery by caesarean section rate</i>	increased	<0.0001*	none	
<i>Live birth to HIV positive woman</i>	increased	<0.001*	none	
Postnatal				
<i>Postnatal visits within 6 days rate</i>	increased	<0.01*	80%	not achieved
Outcome				
<i>Maternal mortality ratio</i>	declined	0.0001*	iMMR 100 per 100,000 live births	2016-17-Q1, 2017-18-Q3, 2018-19-Q3, 2019-20-Q1
<i>Stillbirth rate</i>	declined	0.0001*	none	
<i>Neonatal mortality rate</i>	declined	<0.05*	<10 per 1000 live births	2019-20-Q2.
<i>Perinatal mortality rates</i>	declined	0.0001*	none	
<i>Live birth under 2500g in facility rate</i>	unchanged	0.51	none	

green = improved; red = deteriorated

Difference among the three sub-districts

Table 5.17 summarizes the changes in the indicators and relative contributions to these changes by the three sub-districts. This demonstrated that the East Sub-district (SD) was performing relatively better than the other two sub-districts namely North SD and East SD.

Table 5.17 Summary of changes in maternal health indicators in Ekurhuleni and three sub-districts

Indicators	Changes during study period			Differences among sub-districts	
	East	North	South		P value
Reproductive health					
<i>Couple year protection rate</i>	increased	increased	increased	none	0.08
<i>Termination of pregnancy rate</i>	decreased	decreased	decreased	North SD and East SD < South SD	0.02*
Antenatal					
<i>Antenatal First visit before 20 weeks rate</i>	increased	increased	increased	none	0.59
<i>ANC patients initiated on ART rate</i>	increased	increased	increased	none	0.89
Intranatal					
<i>Total delivery in facility</i>	increased	increased	no change	North SD > East SD and South SD	<0.001*
<i>Delivery in facility rate</i>	no change	decreased	decreased	North SD > East SD and South SD	<0.001*
<i>Delivery in Facility under 18 years rate</i>	increased	no change	increased	North SD < East SD and South SD	<0.001*
<i>Delivery by caesarean section rate</i>	increased	increased	increased	increase	<0.001*
<i>Live birth to HIV positive woman</i>	increased	increased	no change	North SD and South SD > East SD	<0.0001*
Postnatal					
<i>Postnatal visits within 6 days rate</i>	increased	increased	increased	South SD > East SD and North SD	<0.001*
Outcome					
<i>Maternal mortality ratio</i>	no change	decreased	decreased	East SD < North SD	<0.05*
<i>Stillbirth rate</i>	decreased	decreased	decreased	none	0.12
<i>Neonatal mortality rate</i>	no change	decreased	decreased	East SD and South SD < North SD	<0.001*
<i>Perinatal mortality rates</i>	decreased	decreased	decreased	East SD and South SD < North SD	<0.001*
<i>Live birth under 2500g in facility rate</i>	decreased	no change	decreased	none	0.07

green = improved; red = declined

5.6.2 FACTORS INFLUENCING MATERNAL MORTALITY RATIO

The following indicators were changed significantly during the study period: *CYPR*, *Termination of pregnancy rate*, *Antenatal First visit before 20 weeks rate*, *ANC patients initiated on ART rate*, *Total deliveries in facility*, *Caesarean section rate*, *Delivery in facility under 18 years rate*, *Live birth to HIV positive women*, *Mother Postnatal visits within 6 days rate*. A Stepwise regression was performed to measure association of the changes in these indicators with iMMR.

The *ANC patients initiated on ART rate*, *Total deliveries in facility*, *Live birth to HIV positive women*, *Caesarean section rate* were excluded due to their collinearities. Collinearity between

predictors were defined as a correlation coefficient > 0.6. The following variables were selected for inclusion based on magnitude of effect and clinical relevance.

- *ANC patients initiated on ART rate* was strongly correlated with *Antenatal First visit before 20 weeks rate* ($r=0.92$; $p<0.001$). *ANC patients initiated on ART rate* would depend on ANC booking and therefore it was excluded.
- *Total deliveries in facility* were also strongly correlated with *Antenatal First visit before 20 weeks rate* ($r=0.85$; $p<0.001$). *Total deliveries in facility* would depend on early ANC booking and therefore, it was also excluded.
- *Caesarean section rate* was strongly correlated with *Antenatal First visit before 20 weeks rate* ($r=0.92$; $p<0.001$) and *Delivery in facility rate* ($r=0.61$; $p<0.001$). Because of dependency of *Caesarean section rate* on *Total deliveries in facility*, it was also excluded.
- *Live birth to HIV positive women* was strongly correlated with *Antenatal First visit before 20 weeks rate* ($r=0.74$; $p<0.001$), *ANC patients initiated on ART rate* ($r=0.65$; $p<0.01$) and *Delivery in facility rate* ($r=0.61$; $p<0.001$). Therefore, it was decided to exclude it.

Table 5.18 Summary of regression analysis

Indicators	p value
<i>Termination of pregnancy rate</i>	0.49
<i>Antenatal First visit before 20 weeks rate</i>	0.0001*
<i>Delivery in facility under 18 years rate</i>	0.73
<i>Delivery in facility rate</i>	0.18
<i>Mother Postnatal visits within 6 days rate</i>	0.10

The model found adjusted R^2 of 0.55, which was significantly associated with the *Antenatal First visit before 20 weeks rate*. This implies the improvement in *Antenatal First visit before 20 weeks rate* was important determinant associated with iMMR based on the findings of this study.

II. MATERNAL DEATH ANALYSIS

5.7 MATERNAL DEATH

5.7.1 TOTAL MATERNAL DEATHS

The total number of maternal deaths is described in Table 5.19 (see also Appendix H1). The total number of maternal deaths during the period was 869. The highest number of deaths are in the South Sub-district (376, 43%), followed by North Sub-district (328, 38%) and East Sub-district (165, 19%). The mean number of maternal deaths per quarter was 24 (± 7). The minimum and maximum number of total maternal deaths in a quarter were 12 and 42, respectively.

Table 5.19 Summary of number of maternal deaths in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Mean	24	5	9	10
SD	7	3	5	4
Minimum	12	1	1	3
Maximum	42	9	18	20

There was a significant decrease in *total maternal deaths* from 2011/12 (Pearson's correlation coefficient $r = -0.54$; $p < 0.001$; $R^2 = 0.29$).

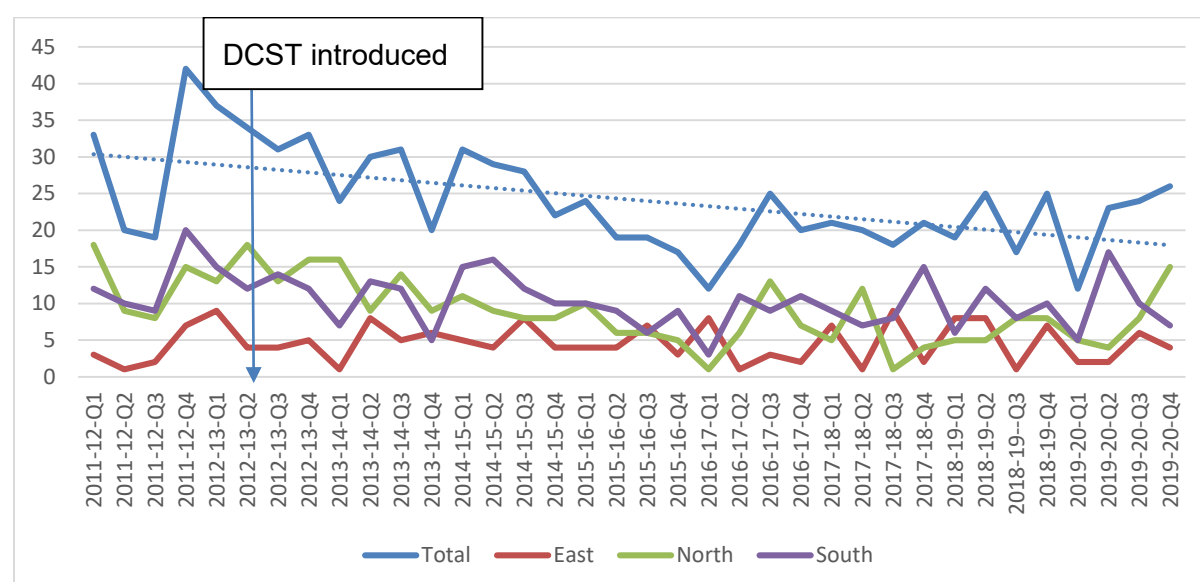


Figure 5.31 Number of total maternal deaths in the Ekurhuleni and three sub-districts

There were significant differences in *total maternal deaths* among the three sub-districts (One

Way ANOVA, $p < 0.0001$). The *Total Maternal deaths* in the East Sub-district was significantly lower than the North and South Sub-districts (Tukey-Kramer Multiple-Comparison Test)

5.7.2 IN-FACILITY MATERNAL DEATHS

The total number of *in-facility maternal deaths* is described in Table 5.20 (see also in Appendix H2). The total number of '*in-facility maternal deaths*' during the period was 847 (98% of total maternal deaths). The mean number of *in-facility maternal deaths* per quarter was 24 (± 7). The minimum and maximum number of total *in-facility maternal deaths* in a quarter were 12 and 42, respectively.

Table 5.20 Summary of number of *In-facility maternal deaths* in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Mean	24	4	9	10
SD	7	2	5	4
Minimum	12	1	1	3
Maximum	42	8	18	20

There was a significant decrease in *In-facility maternal deaths* from 2011/12 (Pearson's correlation coefficient $r = -0.57$; $p < 0.001$; $R^2 = 0.33$)

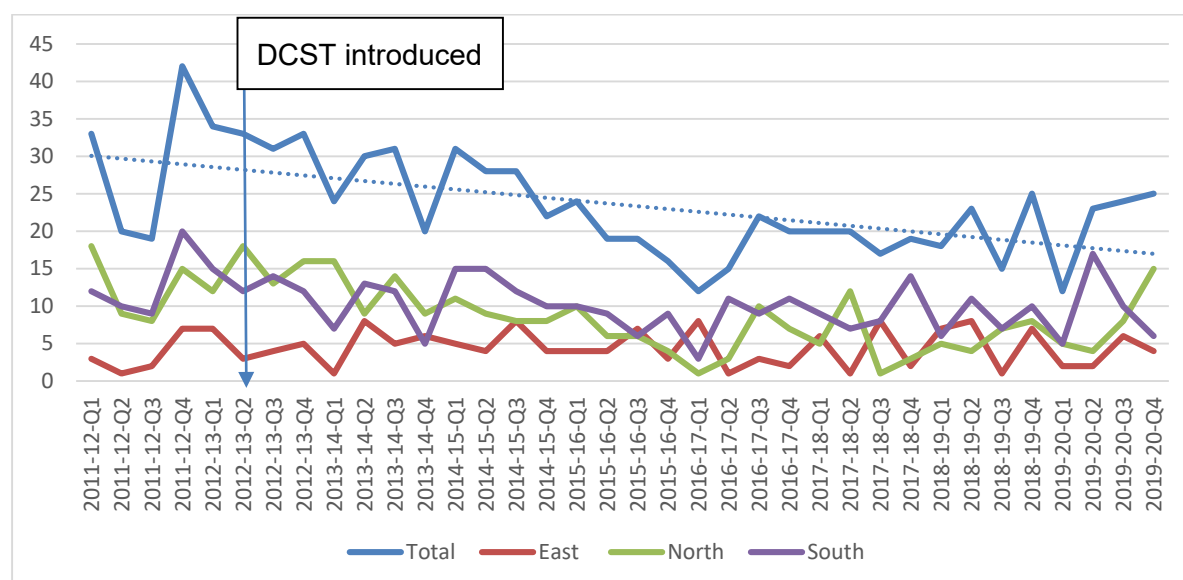


Figure 5.32 Number of *In-facility maternal deaths* in the Ekurhuleni and three sub-districts

There were significant differences in *in-facility maternal deaths* among the three sub-districts (One Way ANOVA, $p < 0.0001$). The *In-facility maternal deaths* in the East Sub-district were significantly lower than the North and South Sub-districts (Tukey-Kramer Multiple-Comparison Test).

5.7.3 MATERNAL DEATHS OUTSIDE HEALTH FACILITY

The total number of '*maternal deaths outside health facilities*' is described in Table 5.21 (see also Appendix H3). The total number of '*maternal deaths outside health facilities*' during the period was 22 (2% of total maternal deaths). The median number of '*maternal deaths outside health facilities*' per quarter was zero (IQR 0-1). The minimum and maximum number of '*maternal deaths outside health facilities*' in a quarter were zero and three, respectively.

Table 5.21 Summary of number of *maternal deaths outside health facilities* in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Median	0	0	0	0
Inter-quartile range	0-1	0	0	0
Minimum	0	0	0	0
Maximum	3	2	3	1

There was a slight increase in *maternal deaths outside health facilities* from 2011/12 (Spearman's correlation coefficient $\rho = 0.28$; $p = 0.09$; $R^2 = 0.04$), which is not significant.

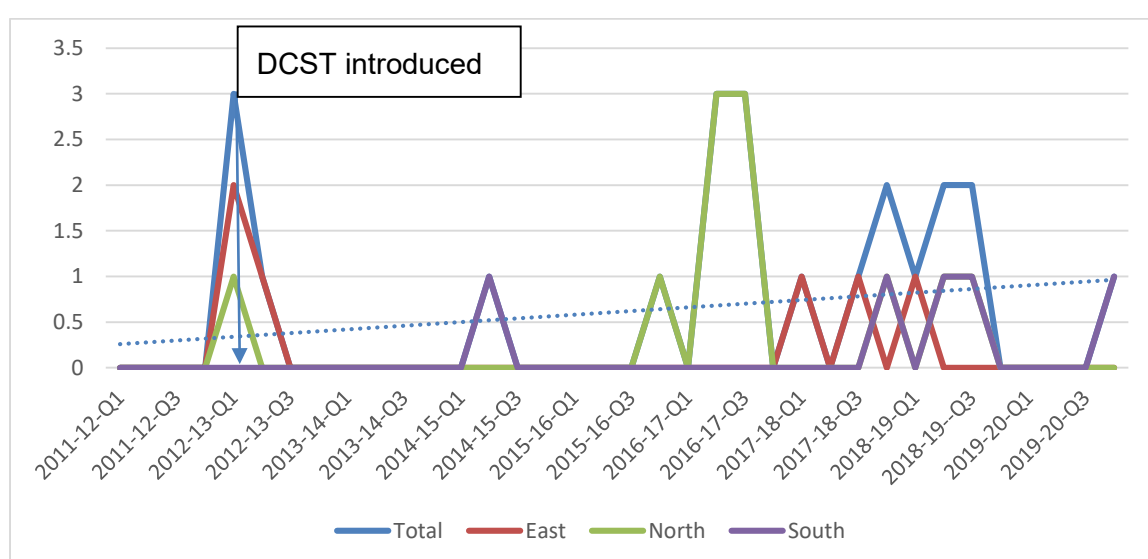


Figure 5.33 Number of *maternal deaths outside health facilities* in the Ekurhuleni and three sub-districts

There were no significant differences in number of '*Maternal deaths outside health facilities*' among the three sub-districts (One Way ANOVA, $p = 0.12$).

5.8 MATERNAL DEATHS IN DIFFERENT GESTATIONAL PERIODS

Eight hundred and sixty-nine maternal deaths occurred during the study period. Among them, gestational period was unknown for 39 cases (East Sub-district 15; North Sub-district 6; South Sub-district 18) (4% of total deaths).

5.8.1 MATERNAL DEATHS DURING ANTENATAL PERIOD

The total number of '*maternal deaths (during antenatal period)*' is described in Table 5.22 (see also Appendix H4). The total number of deaths during this period was 324 (39%). The mean number of '*maternal death (during antenatal period)*' per quarter was nine (± 3). The minimum and maximum number of '*maternal deaths (during antenatal period)*' in a quarter were four and 16, respectively.

Table 5.22 Summary of the number of *maternal deaths (antenatal)* in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Mean	9	1	4	4
SD	3	1	2	2
Minimum	4	0	0	0
Maximum	16	4	11	10

There was no significant decline in '*maternal deaths (during antenatal period)*' from 2011/12 (Pearson's correlation coefficient $r = -0.09$; $p = 0.52$; $R^2 = 0.01$).

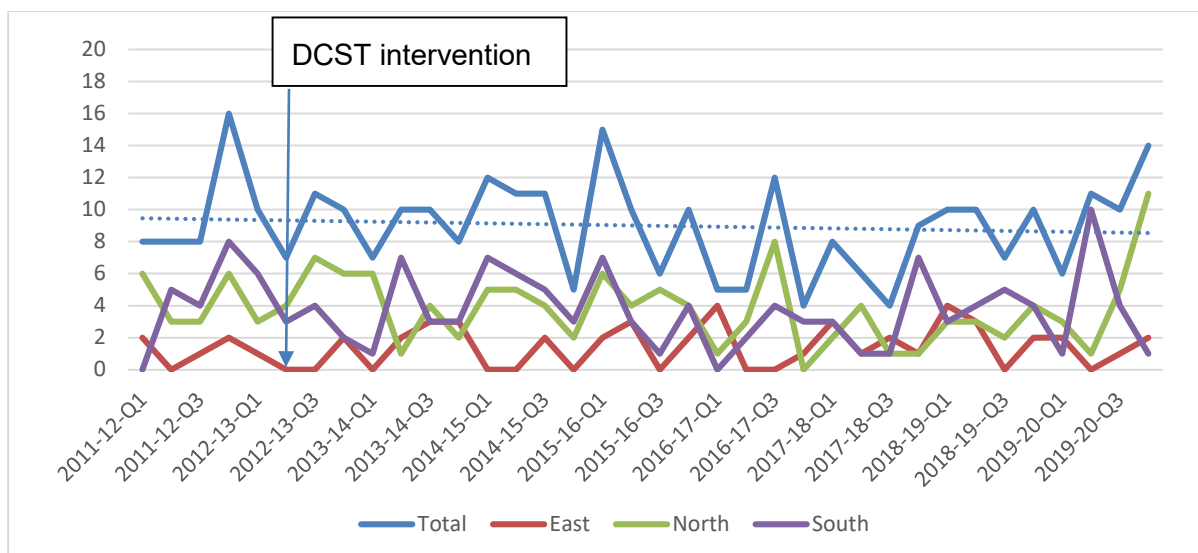


Figure 5.34 Number of *maternal deaths (antenatal)* in the Ekurhuleni and three sub-districts

There were significant differences in the '*maternal deaths (during antenatal period)*' among the three sub-districts (One Way ANOVA, $p < 0.0001$). The '*maternal deaths (during antenatal period)*' in the East Sub-district was significantly lower than North and South Sub-districts (Tukey-Kramer Multiple-Comparison Test).

5.8.2 MATERNAL DEATHS (INTRANATAL)

The total number of '*maternal deaths (during intranatal period)*' is described in Table 5.23 (see also Appendix H5). Total number of maternal deaths during this period was 23 (3% of total deaths). The median number of "*maternal death (during intranatal period)*" per quarter was zero (IQR 0-1). The minimum and maximum number of '*maternal deaths (during intranatal period)*' in a quarter were zero and three, respectively.

Table 5.23 Summary of the number of *maternal deaths (intranatal)* in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Median	0	0	0	0
IQR	0-1	0	0	0
Minimum	0	0	0	0
Maximum	3	1	3	2

There was a significant decline in '*Maternal deaths (intranatal period)*' from 2011/12 (Spearman's correlation coefficient $\rho = -0.41$; $p < 0.01$; $R^2 = 0.17$).

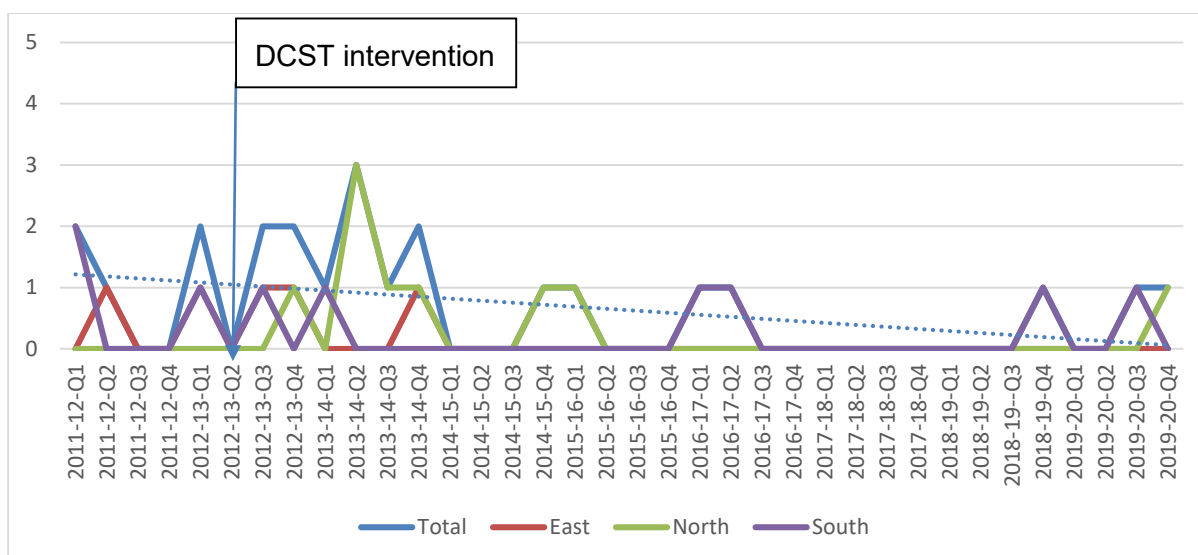


Figure 5.35 Number of *maternal deaths (intranatal)* in the Ekurhuleni and three sub-districts

There was no significant difference in *maternal death (during intranatal period)* among the three sub-districts (One Way ANOVA, $p=0.58$).

5.8.3 MATERNAL DEATHS (POSTNATAL)

The total number of '*maternal deaths (during postnatal period)*' is described in Table 5.24 (see also Appendix H6). The total number of maternal deaths during the period was 483 (58% of total maternal deaths during this period). It showed that the majority of maternal deaths happened during the postnatal period. The mean number of '*maternal deaths (during postnatal period)*' per quarter was 13 (± 6). The minimum and maximum number of '*maternal deaths (during postnatal period)*' in a quarter were five and 26, respectively.

Table 5.24 Summary of number of *maternal deaths (postnatal)* in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Mean	13	3	5	6
SD	6	2	3	3
Minimum	5	0	0	1
Maximum	26	7	14	12

There was a significant decline in '*maternal deaths (postnatal period)*' from 2011/12 (Pearson's correlation coefficient $r = -0.60$; $p < 0.001$; $R^2 = 0.37$).

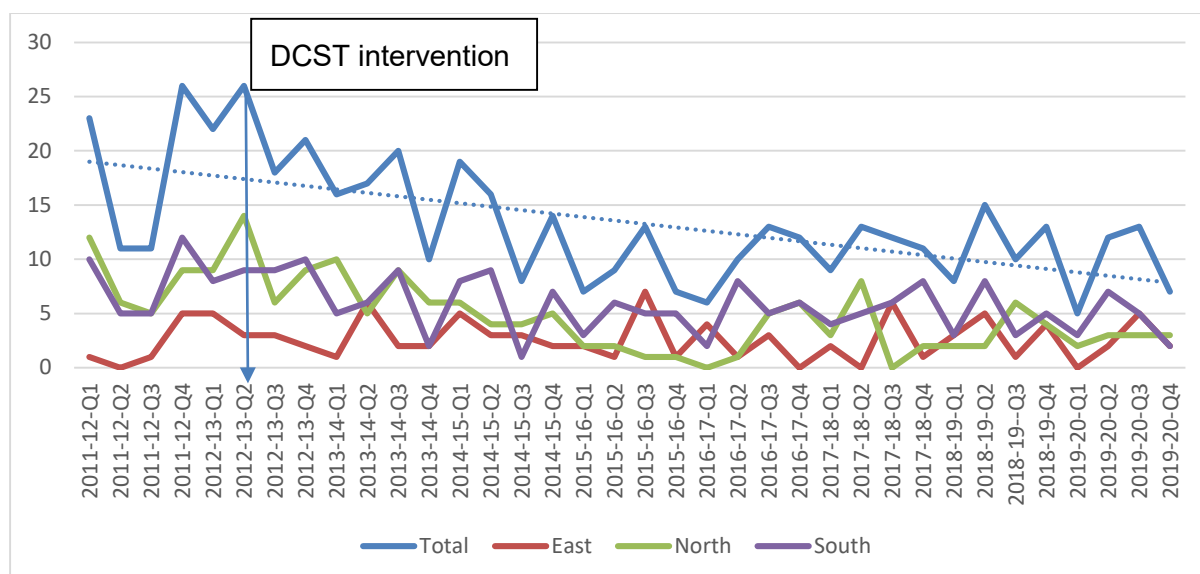


Figure 5.36 Number of *maternal deaths (postnatal)* in the Ekurhuleni and three sub-districts

There were significant differences in '*maternal death (during postnatal period)*' among the three sub-districts (One Way ANOVA, $p < 0.0001$). The '*maternal deaths (during postnatal period)*' in the East Sub-district was significantly lower than North and South Sub-districts (Tukey-Kramer Multiple-Comparison Test).

5.9 CAUSES OF MATERNAL DEATHS

The data for primary causes of maternal deaths were collected from the second quarter in 2014-15, as a part of the DCST intervention. The DCST members reviewed every maternal death (where files were available) and tried to identify primary causes of death. The total number of deaths during the period (2014-15 quarter 2 to 2019-20 quarter 4) was 484. The causes were unknown for 44 (9% of 484 cases (East Sub-district 13; North Sub-district 10; and South Sub-district 21) due to unavailability of files.

5.9.1 MATERNAL DEATHS DUE TO GYNAECOLOGICAL CONDITIONS

The total number of *maternal deaths due to gynaecological causes* is described in Table 5.25 (see also Appendix H7). The total number of deaths due to gynaecological causes was 36 (8%). Eighty-eight percent ($n=35$) had abortion related complications, 5% (2) had ectopic pregnancy. The median number of *maternal death due to gynaecological causes* per quarter was one (IQR 1-3). The minimum and maximum number of *maternal deaths due to gynaecological causes* in a quarter were zero and five, respectively.

Table 5.25 Summary of maternal deaths due to gynaecological causes in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Median	1	0	0	1
IQR	1-3	0	0-1	0-2
Minimum	0	0	0	0
Maximum	5	1	4	4

There was a significant increase in *maternal deaths* due to gynaecological causes from 2014/15 (Spearman's correlation coefficient $\rho = 0.53$; $p < 0.001$; $R^2 = 0.34$).

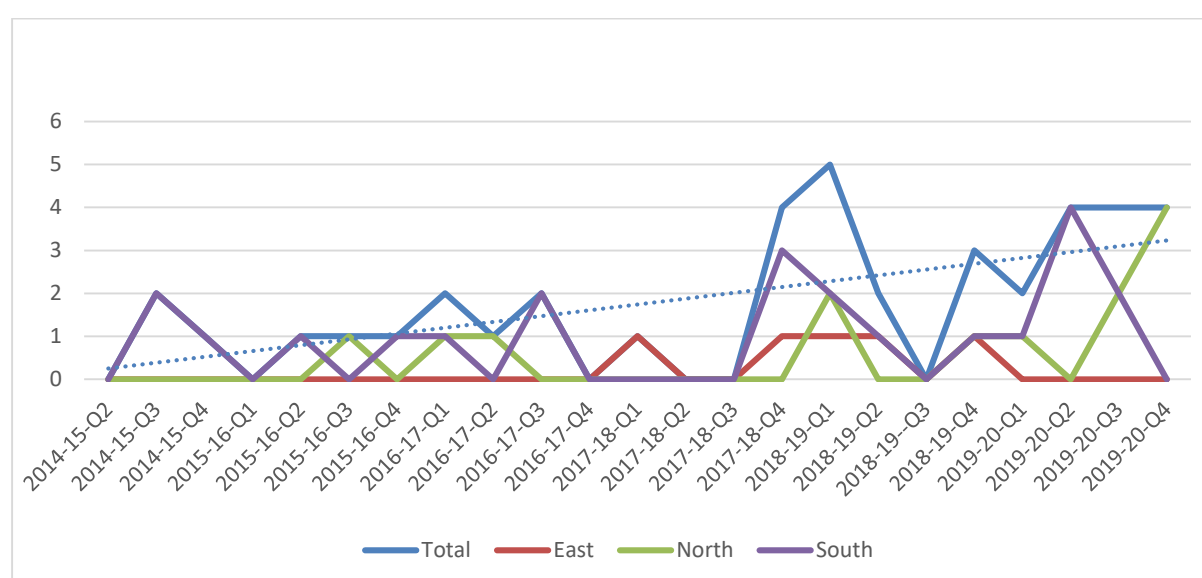


Figure 5.37 Number of maternal deaths due to gynaecological causes in the Ekurhuleni District and three sub-districts

There were significant differences in *maternal death due to gynaecological causes* among the three sub-districts (One Way ANOVA, $p < 0.0001$). The *maternal deaths due to gynaecological causes* in the East Sub-district was significantly lower than the South Sub-district (Tukey-Kramer Multiple-Comparison Test).

5.9.2 MATERNAL DEATHS DUE TO HAEMORRHAGE

The total number of *maternal deaths due to hemorrhage* is described in Table 5.26 (see also Appendix H8). The total number of deaths due to hemorrhage was 115 (24%). Twenty-one (18%) occurred during the antenatal period, three (3%) during the intranatal period and 91 (79%) occurred during the postnatal period. The mean number of *maternal death due to hemorrhage* per quarter was five (± 3). The minimum and maximum number of maternal deaths due to hemorrhage in a quarter were one and 11, respectively.

Table 5.26 Summary of *maternal deaths due to haemorrhage* in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Mean	5	1	1	2
SD	2	1	1	2
Minimum	1	0	0	0
Maximum	11	6	4	5

There was a significant decline in the *maternal deaths due to hemorrhage* from 2014/15 (Pearson's correlation coefficient $r=-0.43$ $p<0.03$; $R^2 = 0.19$).

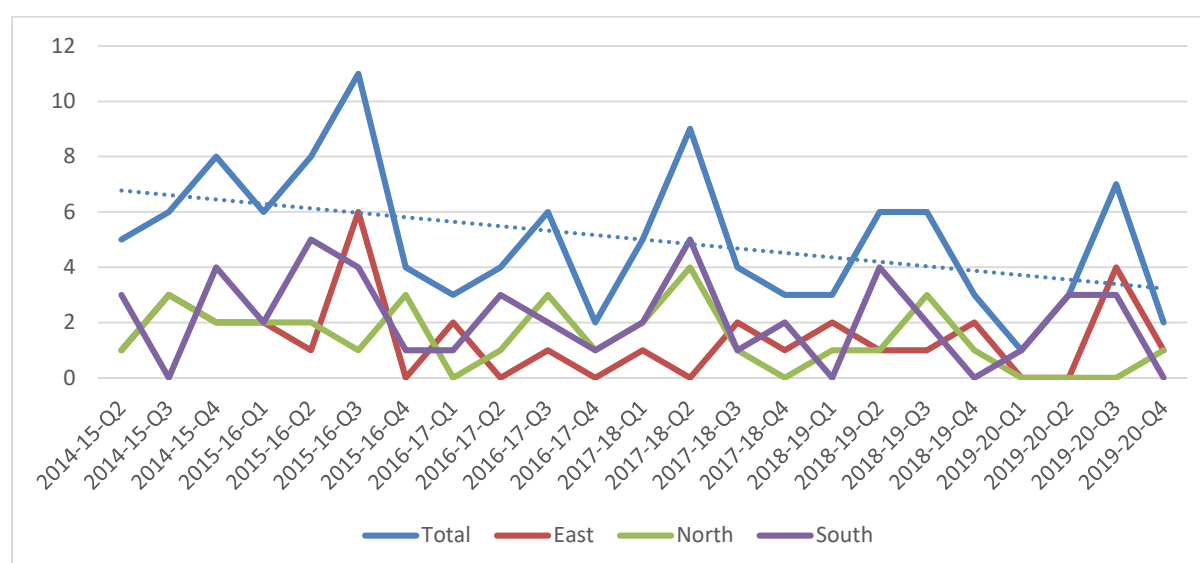


Figure 5.38 Number of *maternal deaths due to hemorrhage* in the Ekurhuleni District and three sub-districts

There was no significant difference among the three sub-districts (One Way ANOVA, $p=0.09$).

5.9.3 MATERNAL DEATHS DUE TO HIV

The total number of *maternal deaths due to HIV* is described in Table 5.27 (see also in Appendix H9). The total number of deaths due to HIV was 66 (14%). Forty-five (68%) occurred during the antenatal period, 21 (32%) occurred during the postnatal period. The median number of *maternal deaths due to HIV* per quarter was two (IQR 2 -4). The minimum and maximum number of *maternal deaths due to HIV* in a quarter were one and six, respectively.

Table 5.27 Summary of *maternal deaths due to HIV* in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Median	2	0	1	1
IQR	2-4	0-1	0-2	0-3
Minimum	1	0	0	0
Maximum	6	2	3	5

There was no significant decline in the *maternal deaths due to HIV* from 2014/15 (Spearman's correlation coefficient $p=0.22$; $p=0.31$; $R^2 = 0.05$).

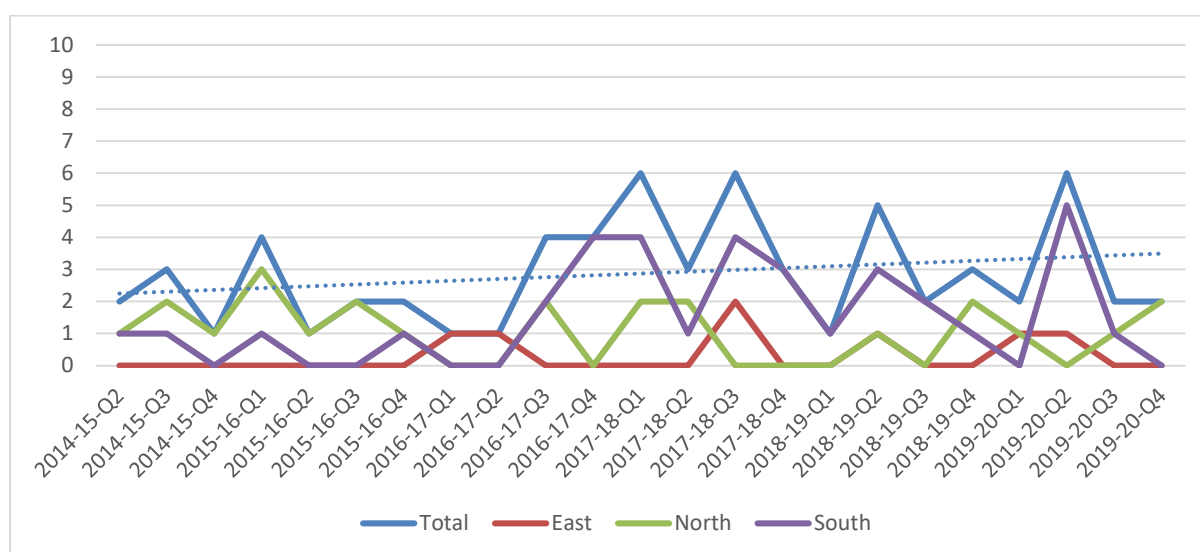


Figure 5.39 Number of Maternal deaths due to HIV in the Ekurhuleni District and three sub-districts

There were significant differences in *maternal death due to HIV* among the three sub-districts (One Way ANOVA, $p < 0.02$). The *maternal deaths due to HIV* in the East Sub-district was significantly lower than the South Sub-district (Tukey-Kramer Multiple-Comparison Test).

5.9.4 MATERNAL DEATHS DUE TO HYPERTENSION

The total number of *maternal deaths due to hypertension* is described in Table 5.28 (see also Appendix H10). The total number of deaths due to hypertension was 77 (16%). Twenty-five (32%) occurred during the antenatal period, one (1%) during the intranatal period and 51 (67%) occurred during the postnatal period. The median number of *maternal death due to hypertension* per quarter was three (IQR 3-4). The minimum and maximum number of *maternal deaths due to hypertension* in a quarter were zero and nine, respectively.

Table 5.28 Summary of *maternal deaths due to hypertension* in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Median	3	1	1	1
IQR	3-4	0-2	0-2	0-2
Minimum	0	0	0	0
Maximum	9	3	3	5

There was no significant decline in *maternal deaths due to hypertension* from 2014/15 (Spearman's correlation coefficient $\rho = 0.18$; $p = 0.39$; $R^2 = 0.01$).

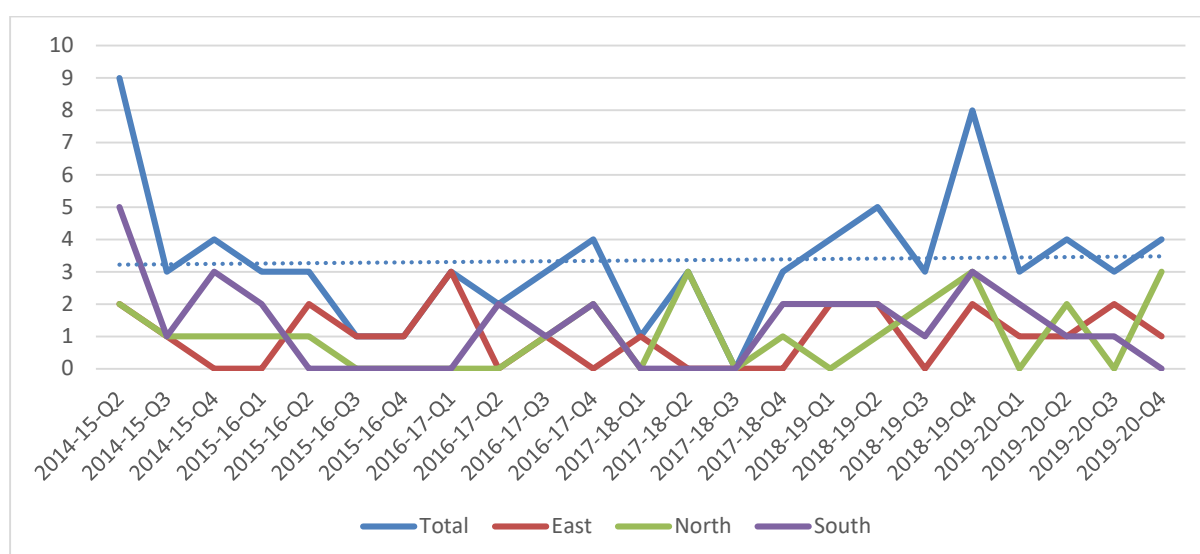


Figure 5.40 Number of maternal deaths due to hypertension in the Ekurhuleni District and three sub-districts

There was no significant difference in the *maternal death due to hypertension* among the three sub-districts (One Way ANOVA, $p = 0.46$).

5.9.5 MATERNAL DEATHS DUE TO MEDICAL AND SURGICAL CAUSES

The total number of *maternal deaths due to medical* (other than HIV and hypertension) and surgical causes is described in Table 5.29 (see also Appendix H11). The total number of deaths due to *medical and surgical causes* was 83 (17%). Among these patients, 41 (50%) occurred during the antenatal period, and 42 (50%) occurred during the postnatal period. The median number of *maternal deaths due to medical and surgical causes* per quarter was four (IQR 3-5). The minimum and maximum number of *maternal deaths due to medical and surgical causes* in a quarter were zero and nine, respectively.

Table 5.29 Summary of maternal deaths due to medical and surgical causes in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Median	4	0	2	2
IQR	3-5	0-1	1-2	1-2
Minimum	0	0	0	0
Maximum	8	2	4	4

There was a significant decline in the *maternal deaths due to medical and surgical causes* from 2014/15 (Spearman's correlation coefficient $\rho = -0.42$; $p < 0.04$; $R^2 = 0.17$).

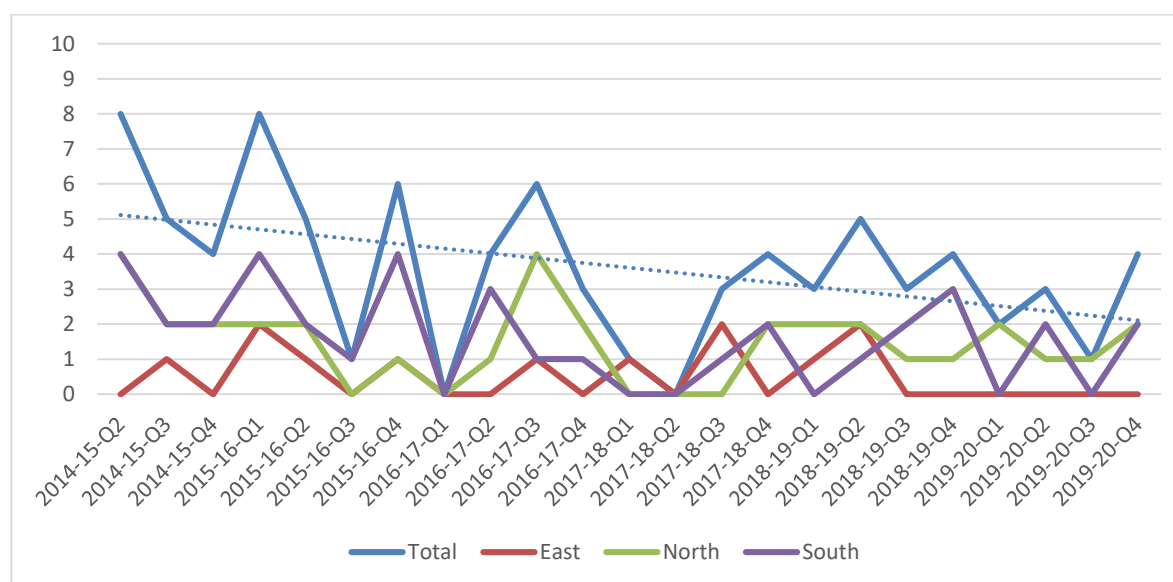


Figure 5.41 Number of *maternal deaths due to medical and surgical causes* in the Ekurhuleni District and three sub-districts

There were significant differences in the *maternal death due to medical and surgical causes*

among the three sub-districts (One Way ANOVA, $p < 0.01$). The *maternal deaths due to medical and surgical causes* in the East Sub-district was significantly lower than the South Sub-district (Tukey-Kramer Multiple-Comparison Test).

5.9.6 MATERNAL DEATHS DUE TO OBSTETRICS CAUSES

The total number of *maternal deaths due to obstetrics causes* (such as anaesthetic death, puerperal sepsis) is described in Table 5.30 (see also Appendix H12). The total number of deaths due to *obstetrics causes* was 30 (6%). Among these patients, one (3%) occurred during the antenatal period, two (6%) during the intra-natal period and 27 (91%) occurred during the postnatal period. The median number of *maternal death due to obstetrics causes* per quarter was one (IQR 0-2). The minimum and maximum number of *maternal deaths due to obstetrics causes* in a quarter were zero and three, respectively.

Table 5.30 Summary of *maternal deaths due to obstetrics causes* in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Median	1	0	0	1
IQR	0-2	0	0-1	0-1
Minimum	0	0	0	0
Maximum	3	1	2	3

There was no significant decline in the *maternal deaths due to Obstetrics causes* from 2014/15 (Spearman's correlation coefficient $p = 0.11$; $p=0.60$; $R^2 = 0.02$).

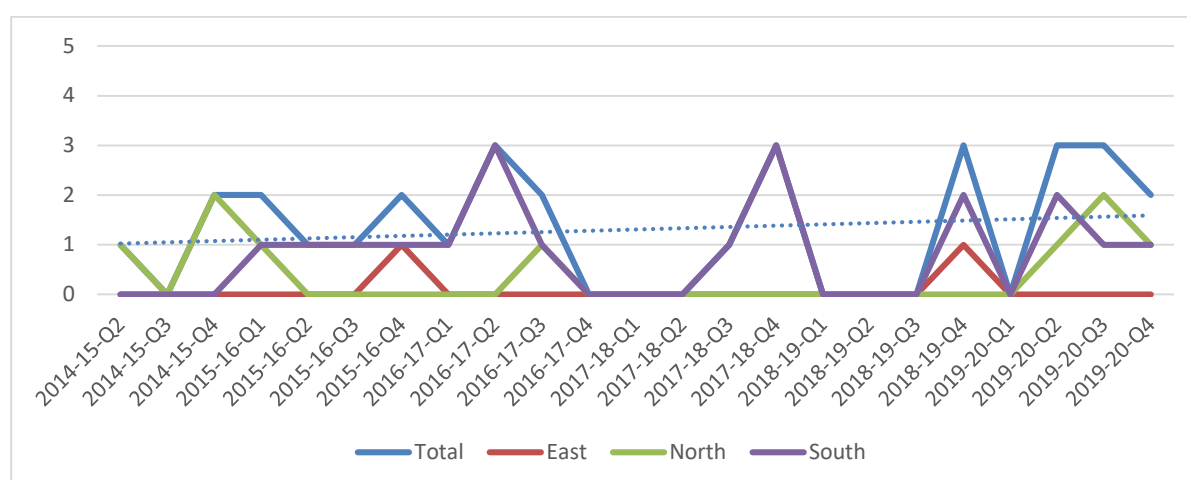


Figure 5.42 Number of *maternal deaths due to obstetrics causes* in the Ekurhuleni District and three sub-districts

There were significant differences in the *maternal death due to obstetrics causes* among the three sub-districts (One Way ANOVA, $p < 0.01$). The *maternal death due to obstetrics causes* in the East Sub-district was significantly lower than the South Sub-district (Tukey-Kramer Multiple-Comparison Test).

5.9.7 MATERNAL DEATHS DUE TO OTHER CAUSES

The total number of *maternal death due to other causes* (such as burn, DOA, MVA, trauma, suicide) is described in Table 5.31 (see also Appendix H13). The total number of deaths due to *other causes* was 29 (6%). Among these patients, 22 (76%) occurred during the antenatal period, and seven (24%) occurred during the postnatal period. The median number of *maternal death due to other causes* per quarter was one (IQR 0-2). The minimum and maximum number of *maternal deaths due to other causes* in a quarter were zero and four, respectively.

Table 5.31 Summary of maternal deaths due to other causes in the Ekurhuleni District

Quarterly	Total (n)	East (n)	North (n)	South (n)
Median	1	0	0	0
IQR	0-2	0-1	0-1	0-1
Minimum	0	0	0	0
Maximum	4	2	3	1

There was no significant change in *maternal deaths due to other causes* from 2014/15 (Spearman's correlation coefficient $\rho = 0.35$; $p = 0.10$; $R^2 = 0.15$).

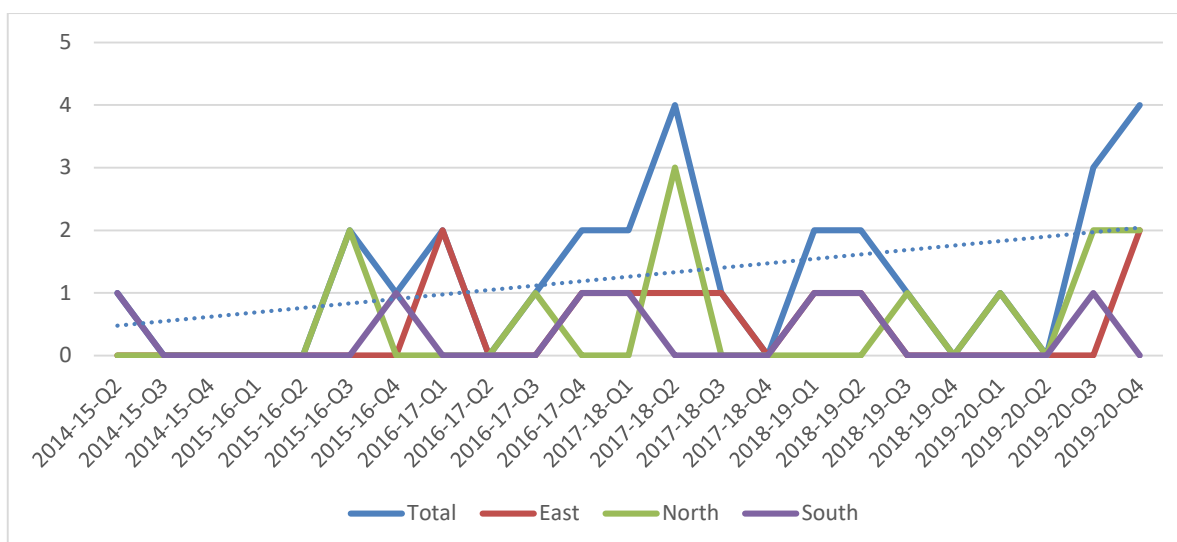


Figure 5.43 Number of maternal deaths due to other causes in the Ekurhuleni District and three sub-districts

There was no significant difference in the *maternal death due to other causes* among the three sub-districts (One Way ANOVA, $p=0.96$).

5.10 SUMMARY OF MATERNAL DEATH ANALYSIS

The total number of maternal deaths during the period was 869. The majority of them occurred in health *facilities* (847, 98%). The number of deaths during the antenatal, intranatal and postnatal periods were 324 (39%), 23 (3%) and 483 (58%). The majority of maternal deaths occurred during the postnatal period. However, in 39 cases (4%), the period was unknown.

The results are tabulated in the Table 5.32, which shows that there was a significant decline in total maternal deaths, which is due to reduction in in-facility maternal deaths and during the intranatal and postnatal periods.

Table 5.32 Summary of maternal deaths in the Ekurhuleni District from 2011 April to March 2020

Maternal deaths	status	p
<i>total maternal deaths</i>	decline	$p<0.001^*$
<i>In-facility maternal deaths</i>	decline	$p <0.001$
<i>Maternal deaths outside health facilities</i>	not changed	$p=0.09$
<i>Maternal deaths (antenatal)</i>	not changed	$p =0.52$
<i>Maternal deaths (intranatal period)</i>	decline	$p <0.01^*$
<i>Maternal deaths (postnatal)</i>	decline	$p <0.001^*$

*statistically significant; green = improved; red = declined

Comparative analysis among the three sub-districts, tabulated in the Table 5.33, showed that maternal deaths in the East Sub-district was mostly lower than the other two sub-districts (SD).

Table 5.33 Summary of Maternal deaths in the Ekurhuleni District from 2011 April to March 2020

Maternal deaths	Difference among sub-districts	P value
<i>total maternal deaths</i>	East SD < North and South SD	<0.0001*
<i>In-facility maternal death</i>	East SD < North and South SD	<0.0001*
maternal deaths outside health facilities	-	0.12
Gestational period		
<i>antenatal</i>	East SD < North and South SD	<0.0001*
<i>intranatal</i>	-	0.58
<i>postnatal</i>	East SD < North and South SD	<0.0001*

*statistically significant

Causes of maternal deaths

The causes of maternal deaths were documented by the DCST from the second quarter of 2014-15. The total number of deaths during the period (2014-15 quarter 2 to 2019-20 quarter 4) was 484. The number of deaths due to gynaecological causes, hemorrhage, HIV, hypertension, medical and surgical, obstetrics and other causes were: 40 (8%), 115 (24%), 66 (14%), 77 (16%), 83 (17%), 30 (6%) and 29 (6%) respectively. The causes of death were unknown for 44 (9%) of cases.

In terms of causes of maternal deaths, there was a significant decline in maternal deaths due to hemorrhage and medical and surgical causes. However, there was a significant increase due to gynaecological causes (Table 5.34).

Table 5.34 Summary of causes of maternal deaths in the Ekurhuleni District from 2014 July to 2020 March

Causes	Status	P value
gynaecological causes	increase	<0.001*
hemorrhage	decline	<0.03
HIV	not changed	0.31
<i>hypertension</i>	not changed	0.39
<i>medical and surgical</i>	decline	<0.04*
<i>obstetric</i>	not changed	0.60
<i>others</i>	not changed	0.10

*statistically significant; green = improved; red = deteriorated

The causes of maternal deaths were classified in terms of three sub-districts, which showed that deaths in the East Sub-District was lower than the South Sub-district (Table 5.35).

Table 5.35 Comparison of causes of maternal deaths among the sub-districts

Causes	comparison	P value
<i>gynaecological causes</i>	East SD < South SD	<0.0001*
<i>hemorrhage</i>		0.09
<i>HIV</i>	East SD < South SD	<0.02*
<i>hypertension</i>		0.46
<i>medical and surgical causes</i>	East SD < South SD	<0.01*
<i>obstetrics causes</i>	East SD < South SD	<0.01*
<i>other causes</i>		0.96

*statistically significant

The causes of maternal deaths are further classified according to the gestational period (antenatal, intranatal and postnatal), which showed the majority of maternal deaths occurred during postnatal period except HIV, and other causes (Table 5.36).

Table 5.36 Summary of maternal deaths in the Ekurhuleni District according to gestational periods

Causes	total	Antenatal	Intranatal	Postnatal	unknown
<i>gynaecological conditions</i>	40	40	0	0	
<i>hemorrhage</i>	115	21	3	91	
<i>HIV</i>	66	45	0	21	
<i>hypertension</i>	77	25	1	51	
<i>medical (other than HIV and hypertension) and surgical causes</i>	83	41	0	42	
<i>obstetrics</i>	30	1	2	27	
<i>Other causes</i>	29	22	0	7	
<i>Unknown causes</i>	44	5	0	4	35
Total	484	200	6	243	35

5.11 SUMMARY OF THE CHAPTER

This chapter presented the analysis of maternal health indicators since the inception of DCST in 2012 July. In addition, it also presented the findings of the causes of maternal death analysis instituted in July 2014. The next chapter will focus on the analysis of the intervention undertaken by the DCST since 2012 July.

CHAPTER 6

RESULT OF ANALYSIS OF DCST INTERVENTIONS

The results obtained from the analyses of various DCST interventions since its initiation in 2012 July in the Ekurhuleni District are discussed in this chapter.

6.1 INTRODUCTION

The data from the standardized format for quarterly reporting of the interventions undertaken by the DCST members (Appendices I1.1 and I1.2) and other reports were analysed and detailed analysis are added in tabular format in Appendix J. The salient points from the analyses are presented here.

6.2 CLINICAL EFFECTIVENESS

Components and activities for clinical effectiveness are listed in Table 6.1 (NDoH, 2014a).

Table 6.1 Clinical effectiveness components and activities

Components	Activities
Clinical standard	Clinical support Clinical support through mobile medicine (telephonic clinical consultation) availability of the skilled health worker at the point of service delivery accessibility Assisting referral of patients at appropriate level of care Effective patient transport systems
Clinical audits	Review of clinical records (such as maternity case records and maternal death files; labour ward records including partogram and cardiotocographs; family planning records –women's health cards) Operational research

6.2.1 MAINTAINING CLINICAL STANDARDS

6.2.1.1 CLINICAL SUPPORT

The analysis of quarterly DCST reports showed that support visits were regularly undertaken to various health facilities for clinical mentoring and auditing. The information from these support visits was recorded on a template developed by the DCST members (see Appendix J1.1 for DCST support visit template). The clinical mentoring was focused on basic antenatal care including common obstetrics conditions, intrapartum care, postpartum care, family planning services, termination of pregnancy services and cervical cancer screening services.

The summary of these activities is listed in the Appendix J1.2. The salient points of these activities are listed below:

- Improving efficiency of the MOUs: It was noted that in 2012-13, the majority of MOUs were not meeting the target of five deliveries per day (150/ month and 450/ quarter and annual 1800) (Ekurhuleni Health District, 2019). It was decided to put more efforts into the MOUs for increasing the number of deliveries to reach the target mentioned above.
- Lack of voluntary female sterilization services: The obstetrician in the DCST looked at speeding up the implementation of the high volume voluntary female sterilization service.
- TOP services: In 2012-13, only five facilities were implementing 1st trimester TOP services; 2nd trimester TOP services were not available. There were a number of maternal deaths due to gynaecological causes, which included septic miscarriages after unsafe TOPs. Additionally, there was motivation from the GDoH to expand TOP services in the District. Therefore, it was decided to improve access to these services (GDoH, 2014). The DCST members conducted various activities including meetings with health facilities to expand this service, attempted to head-hunt TOP providers in the private practice for using them in public health facilities and organising TOP training in the District. By 2020, TOP services were being provided by eight facilities at the District. Second trimester TOP was being provided by two facilities by 2020. It is presumed that continuous efforts by the DCST members might have assisted to expand this service.
- Management of emergency situations: There were certain circumstances, where the DCST members assisted in solving emergency problems. For example, during neonatal infection outbreaks in hospitals, DCST members supported in emergency interventions, such as closure of the maternity and neonatal units, implementation of strict infection control policy, transfers of all patients to other hospitals, restructuring of referral pathways and monitoring of the infection.
- Caesarean hub at the district hospital: Hospitals experienced a huge backlog of planned caesarean sections at times. The DCST members assisted to create a caesarean hub at the district hospital, where excess caesarean sections from other hospitals were performed. This helped to achieve timeous caesarean sections, thus avoiding maternal morbidity and mortality.
- Use of a WhatsApp groups: The DCST members created social media platforms, such as a WhatsApp group, in order to manage clinical problems effectively and timeously, as well as referral problems including daily monitoring of bed occupancy. This WhatsApp group consisted of managers of all health facilities, chief executive officers (CEOs) of hospitals, clinical head of the units (CHoU) of obstetrics and gynaecology, CHoU of

paediatrics, matrons of maternity and paediatrics departments, Ekurhuleni municipal MNCWH manager, MNCWH coordinators and emergency medical services managers. This platform promoted collaboration between hospitals, MOUs, primary clinics, and emergency transport services managers, which assisted in solving all challenges promptly as they happened.

- Others: In addition, other clinical mentoring activities were also undertaken based on specific need or request (such as family planning services).

It was reported that these activities assisted in increasing skills and knowledge of health care workers and assisted them in adherence to clinical protocols leading to improved health indicators as shown in Chapter 5.

6.2.1.2 AVAILABILITY OF SKILLED HEALTH WORKERS AT THE POINT OF SERVICE DELIVERY

The following activities were reported in the DCST reports, as a part of their efforts to ensure availability of skilled health workers at the point of service delivery.

- Clinical mentoring on site: Regularly, clinical mentoring (such as regular auditing, ward rounds, antenatal clinic services, postnatal care services, termination of pregnancy services, family planning services) was performed through support visits at the district hospital, CHCs and PHC clinics. During the antenatal clinic visit, DCST engaged in the management of all antenatal patients and discussed management of each patient with the antenatal clinic sister of the attending facility. Similarly, Postnatal clinics were attended by DCST to manage all postnatal patients and discussed it with the postnatal clinic sisters. DCST attended the TOP clinics and trained the sisters to perform Sonars for patients requesting TOP. Additionally, methods of safe TOP were discussed with the sister. DCST provided on-site training for insertion of Implanon implant and IUCD in various clinics and MOUs. Additionally, DCST assisted sisters for insertion of Implanon & IUCD in the clinics and MOUs to maintain the service. The only district hospital in the District (Bertha Gxowa Hospital) was visited on a weekly basis, whereas all MOUs (n=8) were visited at least once during the quarter and PHC clinics (n=88) were visited on a rotational basis, so that all PHC clinics in the District were visited at least once annually. Initially, the number of visits performed per week was not recorded; this was changed in 2014 to ensure at least one health facility being visited by one of the DCST members per week (see Appendix J1.2)
- Clinical mentoring off-site: Additionally, clinical mentoring was performed through WhatsApp group connections and telephonic consultations 24 hours a day, whenever

the DCST members were asked to assist to manage a patient. The DCST members created WhatsApp groups in 2018 including health care workers from PHC clinics and MOUs, which were reported to be frequently used for clinical assistance and mentoring services.

6.2.1.3 ASSESSMENT OF REFERRAL PATHWAYS

It was found from the reports that the DCST members actively participated in assessment of referral pathways. Examples of some activities are listed below:

- Organising meetings: Organised monthly Ekurhuleni District neonatal and obstetrics project meetings for PHC clinics, MOUs, and hospitals to discuss referral pathways, and other referral issues along with other challenges at hospitals, MOUs, and clinics, since 2014-15 (see Appendix J16.1 for a template for Ekurhuleni District neonatal and obstetrics project meeting Agenda).
- Referral routes and guidelines: Participated in developing referral guidelines for sub-districts and district. They were also involved with implementation of these guidelines at regional and tertiary hospitals (2014-15) as well as PHC facilities (2019-20).
- Referral system management. Developed referral criteria and pathway for hospitals and CHCs and clinics (see Appendix J16.2: sample of a down-referral memo created by the DCST members for referral from hospital to MOUs and Appendix J16.3: sample of a memo created by the DCST members for referral from MOUs to hospitals). (2018-19).
- Clinical protocols for referrals: Developed protocols of common ANC conditions (see Appendix J15: Sample of a clinical protocol developed by the DCST members for HCWs at MOUs and clinics).
- In-service training and support: Empowered PHC clinics by regular in-service trainings and assisted by regular telephonic consultation with the DCST members regarding clinical issues; supporting clinics for proper management and reducing unnecessary referral to the hospitals (since 2015-16).

6.2.1.4 ASSESSMENT OF EMERGENCY CARE PROVIDED TO THE PATIENT

It was found from the reports that the DCST members actively participated in assessment of emergency care provided to patients. Examples of some activities are listed below:

- Challenge with Emergency Medical Services (EMS) response time: Regularly met with EMS personnel for addressing issues related to obstetrics hemorrhage (since 2012- 13).
- Conducted situational assessments: Motivated for allocation of five obstetric ambulances

allocated to the Ekurhuleni District (since 2013-14; 2015-16; 2016-17).

- Attendance of EMS personnel at hospital MMR meetings: DCST motivated compulsory attendance of hospital EMS personnel at all hospital MMR meetings. Additionally, EMS personnel were represented at the district MMR meetings.

6.2.2 CLINICAL AUDITS

Clinical audits were found to be a key component of DCST activities.

6.2.2.1 AUDITING MATERNITY CASE RECORDS AND MATERNAL DEATH FILES

The analysis of quarterly DCST reports depicted that clinical audit of maternity records (such as maternity case records, labour ward records and antenatal records) had been conducted regularly from 2013, as an essential component of activities associated with clinical effectiveness, details of which are listed in Appendix J2. Antenatal cards and intrapartum records were two different documents in the past until 2016. Then, they were combined into one consolidated maternity case recording document, where antenatal, intranatal and postnatal services were recorded. In addition, monthly clinical audits were also performed for records of all maternal deaths occurred at hospitals, MOUs and clinics.

Information from clinical audits was used to inform the health facilities on their performance and training was conducted based on the gaps (such as management of HIV, TB and management of anaemia, symphysio-fundal height plotting, CTG and partogram); the results demonstrated that there were slow improvements in symphysio-fundal height plotting, CTG interpretation and partogram recordings. Additionally, training conducted by the DCST members during clinical audits motivated health care workers to seek assistance from the DCST members, whenever they faced challenges in management and referral of patients, thus improving the overall service delivery.

6.2.2.2 OPERATIONAL RESEARCH

Operational research projects were reported to be undertaken by the DCST members, the details of which are listed below.

- Research projects: Research was performed regularly by the DCST members and presented at Ekurhuleni District research conferences (2016-17; 2017-18; 2018-19), South African Society of Obstetricians and Gynaecologists conference, South African Society of Family Physicians conference and other conferences (see Appendix J3 as an

example).

- Research topics: Research was performed to identify the challenges in the District to develop and to implement quality improvement plans (QIP). Examples of research topics were: maternal mortality, ANC, HIV management, anaemia in pregnancy, record keeping of maternity case records, cervical cancer screening, Integrated Management of Childhood Illness (IMCI), (babies) Born Before Arrivals (BBAs), and Implanon implants (since 2016-17).
- District Research committee: It was reported that the Ekurhuleni District has an established district research committee, which oversaw all research protocols for researches undergoing at the district to support the researchers and to conduct research in a scientific manner. In addition, committee members were reported to be involved with supervision of many studies. The Committee had been organising annual research conferences in the District. It was reported that the DCST members were part of this committee and took part in all these activities, which in turn promoted and strengthened research activities within the District.

6.3 CLINICAL RISK MANAGEMENT

Clinical risk management focuses on incident and adverse event reporting, monitoring and trend analysis, event reporting, monitoring and clinical investigation, risk profile analysis, maternal and perinatal mortality review meetings (NDoH, 2014a).

Table 6.2 Clinical risk management components and activities

Components	Activities
Risk related to patients	Patient Safety Incident Committee meetings. Maternal mortality and morbidity meetings: Quality assurance meetings. Provision of expert analysis of all adverse events and legal cases.
Risk related to health care providers	Improve the skills, knowledge and competency of the health professionals who managed the patient Discussing the adverse events with the health care provider to identify the gaps, if any and improve the skill
Risk related to the organisation	Review the service delivery platform (clinic, CHC, district hospital, regional hospital & tertiary hospitals); Regular support visit to health facilities; Check the functionality of the equipment, infrastructure, logistic and pharmacy. Assess the emergency care provided to the patient. Assessing emergency medical service provision at all health facilities.

6.3.1 RISK RELATED TO PATIENTS

The analysis of quarterly DCST reports revealed that the main activities associated with clinical risk management were (a) regular reviewing of adverse events and (b) maternal mortality and morbidity (MMM) meetings.

- Patient Safety Incident Committee meetings: The District has an established Patient Safety Incident (PSI) Committee as per National Policy for Patient Safety Incident Reporting and Learning in the public health sector of South Africa (NDoH, 2016b). The DCST members were reported to be a part of this committee and participated regularly, when there were incidents related to MNCWH cases. (see Appendix J4 for a template of agenda and attendance register for these meetings).
- MMM meetings: MMM meetings have been organized monthly at six hospitals and quarterly at eight MOUs for discussion of both maternal and perinatal deaths, near-misses, delivery statistics, admission status, referral statistics, challenges, and action plan. These multi-disciplinary meetings were reported to be attended by both managers and health professionals (doctors and nurses) and were important forums to discuss every maternal death and to act as education platforms for participating health care workers. Based on discussion at these meetings, auditing of all maternal deaths due to hypertension in all hospitals was initiated. (see Appendices J5.1 for a template for agenda and J5.2 for a template of attendance register of these meetings, which were designed by the DCST members). The number of people that attended these MMM meetings is listed in Appendix J5.3. The mean number of meetings per quarter was 9 (+ 3). There was a significant increase in the number of meetings held per quarter from 2012/13 ($r=0.45$; $p<0.01$).
- Quarterly maternal mortality and morbidity meetings: It was stated that the DCST members initiated quarterly maternal mortality and morbidity meetings (in 2014), where all hospitals and MOUs present their maternal health statistics, challenges and action plans. This meeting was reported to be attended by all other managers, chief executive officers of hospitals, municipal MNCWH manager and emergency transport services managers. (see Appendix J6 for a template for Ekurhuleni District quarterly maternal mortality and morbidity meeting agenda). This resulted in reporting of causes of maternal deaths from 2014-15 Quarter 2. The DCST members developed a standardised template for MMM meetings presentation for facilities (see Appendix J8).
- Cluster maternal mortality and morbidity meetings: The DCST members were reported to present maternal death statistics at Charlotte Maxeke Johannesburg Academic Hospital cluster quarterly meetings (since 2018), where maternal death reports from

hospitals and MOUs under the cluster had been presented, challenges discussed and implementation plans discussed. This was reported to improve the collaboration between cluster hospitals and MOUs. (see Appendix J7 for a template for Charlotte Maxeke Johannesburg Academic Hospital Cluster MMM meeting agenda, which was designed jointly by the DCST members and Charlotte Maxeke Johannesburg Academic Hospital staff).

6.3.2 RISK RELATED TO HEALTH CARE PROVIDERS

The analysis of quarterly DCST reports showed that the DCST members were actively engaged in activities for improvement of skills, knowledge and competency of health professionals who managed patients. These activities were performed through a standardised programme called EOST or Fire-Drill.

6.3.2.1 EMERGENCY OBSTETRICS SIMULATION TRAINING

It was reported that this programme included conducting monthly training workshops covering essential knowledge and skills required by skilled birth attendants to recognise and to manage the major causes of maternal and newborn deaths in low and middle-income countries focusing on specific skills (Frank, Lombaard, Pattinson, 2009; Pattinson, Bergh, Ameh, et al, 2019). There were several topics in the EOST drills such as pre-eclampsia, obstetrics hemorrhage, breech delivery, shoulder dystocia, miscarriage, active management of third stage of labour, retained placenta, puerperal sepsis, etc. These drills were reported to be performed on-site at the health facilities. These topics were presented as a case scenario to participants, who would then manage the condition like a real-life scenario. The scenario was performed once first, when the participants were unaware of the topic followed by a discussion of correct management by the trainer. Thereafter, the drill was repeated by the participants as a revision. Participants received one score for each correct step performed in the drill during first time and revision time. Scores then can be compared to find out if there is an improvement. (see Appendix J9.1 for a Template for EOST Programme (Fire-Drill) Form for partogram).

NUMBER OF TRAINING SESSIONS

The DCST members initiated this programme in the Ekurhuleni District in 2012-13-Quarter 4. Two hundred and fifty-four training sessions were conducted during the period (from 2012-13 Q4 to 2019-20 Q4) (Appendix J9.2). The mean number of EOST sessions per quarter was

eight (± 4). The minimum and maximum number of sessions per quarter were zero and 18, respectively.

Table 6.3 Summary of EOST training sessions per quarter

	Total	East	North	South
Mean	9	2	3	4
SD	4	1	1	2
Minimum	2	0	0	1
Maximum	18	6	5	8

There were no significant changes in the *number of sessions per quarter* from 2012/13 Quarter 4 (Pearson's correlation coefficient $r = 0.17$; $p = 0.36$).

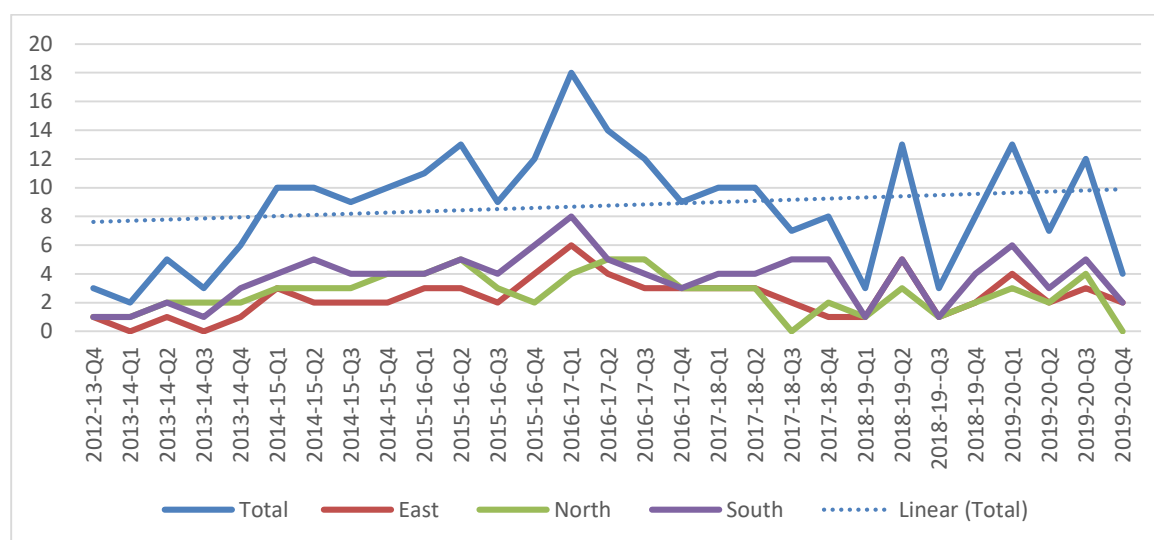


Figure 6.1 Number of EOST training sessions

There was a significant difference in a number of training sessions among the three sub-districts in terms of number of sessions conducted per quarter (One Way ANOVA, $p < 0.01$). The number of sessions in the South Sub-district was significantly higher than the North and East Sub-districts (Tukey-Kramer Multiple-Comparison Test)

NUMBER OF PARTICIPANTS

Information about number of participants were collected from 2012-13 quarter 4 (see Appendix J9.3). The total head-count during the period was 1394. It was noted that one participant attended a number of sessions on different topics; therefore, this number did not reflect the actual number of individual participants attending the sessions. The mean head-count for EOST sessions per quarter was 48 (± 22). The minimum and maximum head-count per

quarter were 11 and 102, respectively.

Table 6.4 Headcounts for EOST training sessions per quarter

	Total (n)	East (n)	North (n)	South (n)
Mean	48	12	15	21
SD	22	6	8	11
Minimum	11	0	0	5
Maximum	102	25	30	47

There were no significant changes in the head-count *for each session* from 2012/13 Quarter 4 (Pearson's correlation coefficient $r = 0.14$; $p = 0.45$).

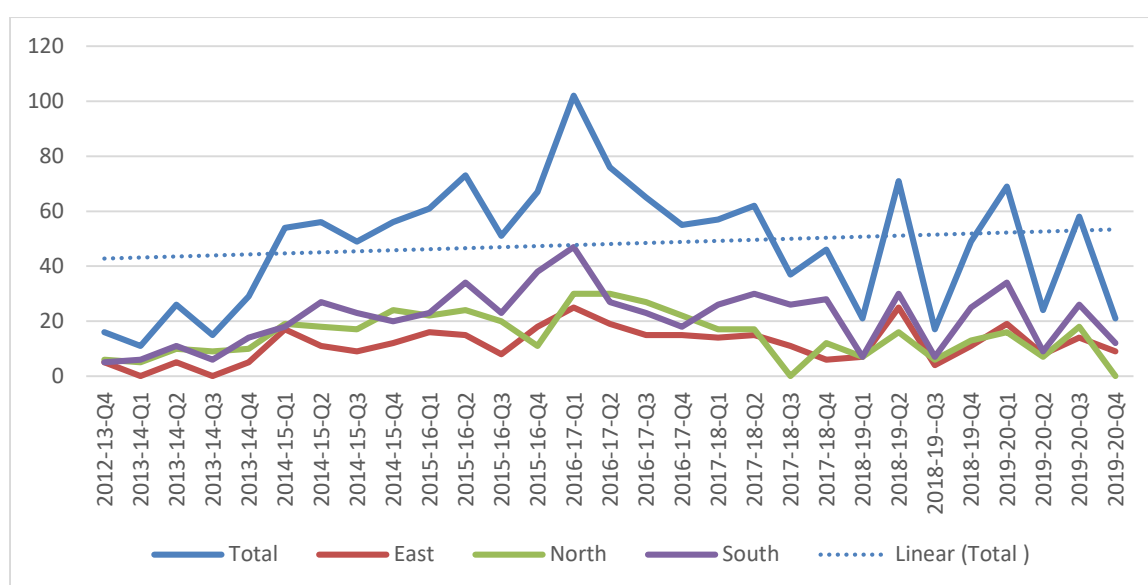


Figure 6.2 Number of participants for EOST training sessions

There were significant differences in number of participants among the three sub-districts (One Way ANOVA, $p < 0.001$). The number of participants in the South Sub-district was significantly higher than the East and North Sub-districts (Tukey-Kramer Multiple-Comparison Test).

PARTICIPANTS' SCORE

Information about EOST drill revision scores of participants were collected from 2012-13 Quarter 4 (see Appendix J9.4). The mean revision score of participants for EOST sessions was $82 (\pm 6)$. The minimum and maximum number of sessions per quarter were 62 and 96, respectively.

Table 6.5 Revision score for EOST training sessions per quarter

	East	North	South
Mean	85	84	81
SD	8	8	8
Minimum	62	69	63
Maximum	96	94	93

There was no significant difference among the three sub-districts (One Way ANOVA, $p=0.19$).

TOPICS OF EOST TRAINING SESSIONS

Topics of EOST sessions are listed below in Table 6.6

Table 6.6 Topics of EOST training sessions

Topics	Total (n)	East (n)	North (n)	South (n)
Gynecology				
Miscarriage	6	2	2	2
Hemorrhage				
Antepartum hemorrhage	16	6	4	6
Postpartum hemorrhage	36	12	6	18
Retained placenta	14	6	2	6
Hypertension				
Pre-eclampsia /eclampsia	28	8	8	12
Obstetrics	0	0	0	0
Partogram/obstructed labour	12	2	2	8
Shoulder dystocia	20	6	4	10
Puerperal sepsis	16	6	4	6
Neonatal				
Breech	18	6	4	8
Cord prolapse	16	6	4	6
Fetal monitoring by cardiotocograph (CTG)	12	4	4	4
Helping baby breath	4	2	0	2
Twin	16	6	4	6
Neonatal resuscitation	34	12	8	14
Tachypnoea	6	2	2	2
Grand Total	254	86	58	110

6.3.3 RISK RELATED TO THE ORGANISATION

The analysis of quarterly DCST reports showed that the main activities associated with clinical risk management at the institutional level were (a) review of the service delivery platform; (b) assessment of the functionality of the equipment and availability of medication; (c) assessment

of the referral pathway and lastly (d) emergency care provided to the patient. These activities focused on organizational teams rather than individual level.

6.3.3.1 REVIEW OF THE SERVICE DELIVERY PLATFORM

The activities undertaken by the DCST members in the Ekurhuleni District according to the quarterly reports are as follows:

- MNCWH service delivery platform (clinic, CHC, district, regional and tertiary hospitals): The DCST members had been receiving daily reports on bed occupancy (in antenatal, intranatal, postnatal and neonatal wards and ICU and high care units), number of deliveries, mode of delivery, etc. from the service delivery platforms. The DCST members compiled this information into a monthly report to be presented at DHMT meetings as well as provincial DCST quarterly review meetings since 2013-14. Templates for DCST quarterly reports to district (Appendix I1.1) and province (Appendix I1.2) were designed by the DCST members and are attached herewith.
- MMM meetings: Since 2015-16-Q1, the DCST members coordinated MMM meetings to monitor maternal deaths, as they occur at health facilities. MOUs were not used to conduct MMM meetings, as maternal deaths were a rare incidence at MOUs. Under supervision of the DCST members, MMM meetings in the MOUs were initiated and conducted regularly on a quarterly basis since 2016-17 to discuss morbidities and stillbirths. Initially, attendance of nurses from feeder clinics at these meetings were poor. After discussion with the facility management, their attendance improved. Templates for facility MMM meetings: agenda (Appendix J5.1) and attendance register (Appendix J5.2) were designed by the DCST members and are attached herewith.
- Since 2015-16, all hospitals had started regular conductance of MMM meetings under guidance of the DCST members. Previously, PHC clinics and MOUs were not attending MMM meetings at their referral hospitals. As the DCST members were conducting on-site activities and trainings at the clinics and MOUs, they repetitively emphasised on the attendance of MMM meetings at their referral hospitals. As a result, there were anecdotal evidence for improvements in attendance of health professionals such as family medicine doctors, clinic nurses, and MOU nurses and midwives at these meetings.
- Additionally, the DCST members implemented the monthly statistics presentation by all MOUs at their referral hospitals MMM meetings, which had resulted in improved attendance and improved coordination among MOUs, clinics and hospitals. Templates for MMM meetings presentation for facilities were designed by the DCST members and currently being used by the health facilities, which are attached herewith (Appendix J8)

- The DCST members formulated a plan since 2014-15, to improve the poorly performing indicators (such as *CYPR*, *Antenatal booking before 20 weeks rate* and *Mother Postnatal visits within 6 days rate*) at the facilities, where they occurred. The DCST members identified these facilities and organised support visits and developed and implemented action plans for these facilities to improve their services linked to these indicators. Follow-up monitoring showed much improvement on those poorly performing indicators at those facilities. As a result of these initiatives, there were significant improvements in all the three sub-districts (see Chapter 5).
- Sub-district multi-disciplinary team meetings: It was reported that each sub-district had been conducting monthly multi- disciplinary team (MDT) meetings since 2018 with all stakeholders to discuss challenges and to create action plan to solve them. These meetings were organised by CHoU of family medicine at these sub-districts. The DCST members took part to discuss challenges related to MNCWH, which in turn promoted the collaboration between the stakeholders in problem solving. (a template for an agenda of these meetings is appended as Appendix J10).
- North sub-district multi-disciplinary team meetings at the Tembisa Provincial Tertiary Hospital: The Tembisa Provincial Tertiary Hospital created a sub-cluster forum with its referral facilities (PHC clinics and MOUs) to address referral issues. This group started meeting in 2018. The DCST members were reported to attend these meetings and regularly contributed to issues around MNCWH (Template for an agenda of these meetings are appended as Appendix J11). Similar meetings were conducted on a quarterly basis at the Thelle Mogoerane hospital for south sub-district meeting and at the Pholosong hospital for East sub-district meeting.

6.3.3.2 ASSESSMENT OF FUNCTIONALITY OF EQUIPMENT AND AVAILABILITY OF MEDICATION

It was found from the DCST Quarterly reports (See appendices I1.1 and 1.2 for DCST quarterly reporting templates for district and province respectively) that the DCST members had been participating actively in assessment of the functionality of equipment and availability of medication and the emergency care provided to patients during clinical support visits to health facilities. Examples of some activities are listed below:

- Advocacy for emergency equipment in facilities: Advocated for emergency equipment and transport incubators in facilities (2012-13); organized delivery packs and eclampsia boxes for PHC clinics (since 2016-17)
- Facility audits for essential equipment and working tools: Facility audits were conducted

regularly. For example, 16 PHCs, 8 MOUs/CHCs and 6 Hospitals were audited in 2014-15. Additionally, EOST mannequins for ESMOE/ EOST training were delivered to seven MOUs in 2015 as it was required to conduct on-site drills.

- Discussion on regular availability of blood and blood products for management of obstetrics hemorrhage: They had regular discussions with the DHMT for improving availability of blood (2013-14); Ferrous sulphate (2014-15), Increased use of injectable Iron (2015-16).
- Regular availability of medication: DCST had regular engagements with the DHMT for improving availability of basic [such as calcium carbonate (2013-14), Bicillin injection for syphilis treatment (2017-18)] and specialised (such as Nifedipine) medication.
- Availability of contraceptives: The DCST members identified the following challenges associated with poor performance in terms of CYPR: condom distribution, Implanon insertion and availability of IUCD (2018-19); unavailability of proper equipment for the removal of Implanon implant devices (2014-15; 2015-16; 2015-16), which were partially addressed; investigated reasons for poor uptake of female voluntary sterilization.
- Assistance in acquiring medical equipment supplies: The DCST members helped with procurement of medications, laboratory tests kits and equipment as per need arising from hospitals, MOUs and clinics. These activities were performed by communicating with relevant managers for pharmacy, laboratory services and directors. For example, DCSTs supported and facilitated procurement of kits for syphilis testing in 2017 in the district. As a result, all MOUS and all government clinics have been conducting syphilis tests on-site. This has resulted in instant results and immediate management of syphilis.

6.4 PROFESSIONAL DEVELOPMENT AND MANAGEMENT

The purpose of professional development and management is to identify the competency level of health workers and thereby to determine the level of intervention required to address the gaps in competency levels. These interventions consist of (a) professional development and (b) development of competency standards (NDoH, 2014b).

Table 6.7 Professional Management and Development components and activities

Components	Activities
Continuing professional development	Identify and address the skills gap in the management of the patient by on-site clinical mentoring at the clinics, MOUs and hospitals and by regular clinical consultation with health care workers as and when necessary.
Competency standards	Determine the type of interventions required i.e., mentoring, in-service training or formal training, and develop an action plan and time frames to achieve the required outcomes.

6.4.1 PROFESSIONAL DEVELOPMENT PROGRAMMES

The analysis of quarterly DCST reports listed the professional development programmes on the maternal health conducted by the DCST members during the study period (Table 6.8) (see more details in Appendix J12).

Table 6.8 Professional development programmes

Type	Content of training	Expected outcomes
Continuing professional development		
Clinical Training	<u>Regular on-site:</u> EOST -drills, Helping Babies Breathe (HBB) (regular on-site), Management of Sick and Small Newborns (MSSN), Implanon (regular on-site), School health, Mom connect, Basic Sonar training at CHCs, CTG training, and partogram training) <u>Quarterly:</u> ESMOE, Neonatal resuscitation, ANC workshop	Improved service delivery Reduced newborn mortality & reducing maternal mortality. Improved skill is helping the health care workers to improve servicedelivery.
Designing of educational activities	Participated in Family medicine continuing medical education (CMEs) including maternal, women & child, newborn topics. Additionally, contributed in educational topics in CME at clinics, MOUs, district & regional hospital. Teaching educational topics to the interns at regional hospitals.	Helping clinical head of units (CHoUs) of hospitals to continue doing CMEs. Improved knowledge amongst the HCWs. Conducting CME at the hospital MMM meetings.
Giving presentations	Presentations were made during CMEs, all MMR meetings, all trainings, district and provincial meetings.	Improved dissemination about the health statistics and educational topics among the HCWs.
Mentorship of health professionals	Mentoring an ongoing activity that happened during clinical activities, Fire-drills and also during support visit to the facilities.	Improved confidence & knowledge leading to better service delivery. Improved interest among the healthcare workers
Formal programmes		
Family physicians	Trained Family Medicine Department & primary healthcare during CME and antenatal Sonar.	Increased involvement of family physicians in managing obstetrics patients at the clinics & MOUs resulting in reduced unnecessary referral to the hospitals. Improved confidence & knowledge in managing obstetrics patients leading to better service delivery.

Type	Content of training	Expected outcomes
Medical officers and interns	Conducted CME topics, EOST fire drills, practical training on CTG and partogram among medical officers and interns at the hospital.	Improved skill & knowledge leading to better service delivery.
Midwives and nursing sisters	Conducted on-site teaching session on various topics such as hypertension in pregnancy, obstetrics hemorrhage, BANC plus guideline at the PHC clinics.	Improved confidence & knowledge in managing patients leading to better service delivery. Increased request for assistance from the DCST members for managing patients resulting in improved service delivery.

Details of the training for continuous professional development and Essential Steps in Managing Obstetric Emergencies (ESMOE) are described below.

6.4.1.1 CONTINUING PROFESSIONAL DEVELOPMENT

Training for continuous professional development (CPD) was developed based on gaps identified by the DCST members during their clinical works. These programmes are summarized below (Table 6.9).

Table 6.9 Training programme for continuous professional development

Gaps	Training programmes
Antenatal care	
High-risk antenatal patients not properly referred to hospitals for management.	Antenatal care training Training on recording on the maternal case records BANC and BANC Plus training
To improve skill and competency for health personnel who provide ANC services. Failure to plot symphysio-fundal height at the Maternity case record (MCR)	BANC Plus ¹ Antenatal care training; Training on recording in MCRs; On-site CME on antenatal topics; Training on symphysio-fundal height plotting
Intranatal care	
Lack of interpretation and lack of action on partogram findings correctly were identified as a challenge Failure to interpret CTG correctly	Training on partogram Training on CTG interpretation
Postnatal care	
Poor PNC within 3 to 6 days of delivery	Training on postnatal care
Reproductive Health and Family planning	
Removal of Implanon was exceeding Insertion; Lack of removing instruments at the clinics. (2016-17-Q1)	Implanon insertion & removal training
Introduction of new contraceptive and family planning policy,	Training on contraceptive policy and guidelines
Introduction of intrauterine contraceptive device (IUCD)	Training on IUCD insertion and removal
Others	
To strengthen access to comprehensive SRHR services with specific focus on Family Planning.	CARMMA
Lack of regular communication between NDOH and pregnant women through MOM-connect system	MomConnect

These programmes were reported to be delivered by the DCST members at various health facilities during their support visits and usually linked to the gaps identified during these visits.

6.4.1.2 ESSENTIAL STEPS IN THE MANAGEMENT OF OBSTETRIC EMERGENCIES (ESMOE)

The Essential Steps in the management of Obstetric Emergencies (ESMOE) training is a skill and drill-based training and was introduced in 2008 to train all staff working at maternity as one of the measures for reduction of maternal and neonatal mortalities and morbidities. The ESMOE programme focuses on improving the quality of care in management of obstetric

¹ BANC plus: BANC model with reduced, goal-orientated visits up to 32 weeks' gestation, and thereafter to revert to routine visits every 2 weeks to 36 or 38 weeks, followed by weekly checks.

https://www.researchgate.net/publication/283821457_Time_for_'basic_antenatal_care_plus'_in_South_Africa

emergencies (UP Centre for Maternal, Fetal, Newborn and Child Health. 2021). The ESMOE training consists of 12 modules, which are conducted by a “Master Trainer” among small groups of participants. A module comprises of lectures with videos, practical skills demonstrations and practice using mannequins. The 12 modules are maternal resuscitation, neonatal resuscitation, HIV in pregnancy, eclampsia and pre-eclampsia, hemorrhage, assisted delivery, obstructed labour and use of the partogram, interpreting CTGs, obstetric complications, surgical skills, miscarriage, and sepsis (Naidoo, 2017).

These training sessions were initiated by the DCST members in 2012-13 Quarter 4 and 27 training sessions were conducted during the period (For more details see Appendix J13.1). One training session was conducted every quarter except two quarters namely 2014-15-Q2 and 2017-18-Q1. The number of people attending per session is listed in Appendix J13.2. Since the inception of ESMOE training, 1160 health professionals had attended the training. The mean number of participants per session was 42 (± 15). The minimum and maximum number of participants in each session were 10 and 68, respectively.

Table 6.10 Summary of participants per ESMOE training sessions

	Total	East	North	South
Mean	42	12	15	15
SD	15	5	10	8
Minimum	10	0	0	1
Maximum	68	25	43	31

There was a significant increase in the *number of participants* from 2012/13 (Pearson’s correlation coefficient $r = 0.58$; $p < 0.01$; $R^2 = 0.33$)

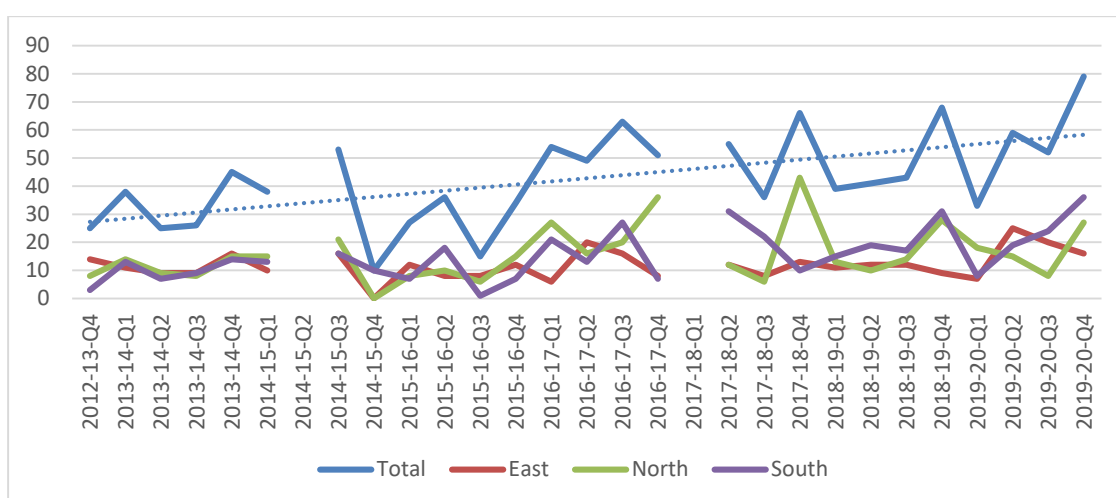


Figure 6.3 Number of participants for the ESMOE training sessions

There was no significant difference among the three sub-districts (One Way ANOVA, $p = 0.16$).

Challenges for implementation of ESMOE training

It was reported that the ESMOE trainings were conducted regularly (at least one in every quarter) in the District, which were coordinated by the DCST members. Every hospital in the District had ESMOE master trainer(s). It was reported that 80% of nursing staff working in MOUs were trained with ESMOE. Previously PHC clinic nurses were not used to attend ESMOE training. After persuasion from the DCST members, PHC clinic nurses working in antenatal clinics, started attending ESMOE training. As a result of that, skills and competency of PHC sisters, midwives and doctors improved thereby providing improved antenatal and intra-natal care services and reduction in maternal death. For example, the majority of hospitals have had reducing trends of maternal deaths since (2015-16) and there was no maternal death at MOUs and PHC clinics for four years (2016-17).

The challenges and possible solutions depicted in the reports are listed below:

- Strengthening implementation of ESMOE in all health facilities: The supports of hospital CEOs, MOU managers and PHC managers were sought to support ESMOE and EOST in their facilities.
- Improving participation of hospital master trainers in the District ESMOE training.
- Improving attendance of doctors through training of interns and community service doctors on ESMOE and EOST training.
- Initially the number of participants were poor during on-site EOST drills and often drills were cancelled by the facilities. Later on, with increased motivation and support, participation improved during on-site drills although improvement have been slow.

6.4.2 COMPETENCY STANDARDS

The analysis of quarterly DCST reports showed that the DCST members embarked on maintaining competency standards through regular evaluation of the training programmes described above through routine course evaluation as well as EOST (commonly known as Fire drill).

6.4.2.1 ROUTINE COURSE EVALUATION

Clinical activities of the DCST members focused on assessing the clinical competency, which was performed during their clinical work. Additionally, training was evaluated by a customer survey form after the training (see Appendix J14). It was noted that training had always

received about 90% satisfaction rate among the HCWs. Although satisfaction rate might not be related to improved competency, it could be associated with improved knowledge, which in turn might have motivated the health care workers to implement the knowledge they learnt.

6.4.2.2 DEVELOPMENT OF COMPETENCY STANDARDS

The DCST members were actively involved in development of clinical guidelines, which was updated every three years in order to make these guidelines available in a user-friendly format at each PHC clinic and MOU. These guidelines were adapted from the national policies and guidelines. These guidelines assisted HCWs working in the District to improve the standard of their clinical practices regarding management and referral of their patients (a sample of a clinical protocol developed by the DCST members for HCWs at MOUs and clinics is appended as Appendix J15). DCST also assisted health facilities for developing standards for referral of maternity patients. It assisted hospitals in formulating down-referral criteria for patients in labour in order to reduce low risk deliveries at the hospitals. (Appendix J16.1) Similarly, it also developed a referral form for MOUs to refer patients to hospitals (Appendix J16.2). During the study period, the following clinical guidelines were developed for maternal health services in the District (Table 6.11).

Table 6.11 Clinical guidelines

Clinical guidelines	Expected outcomes
Postpartum Hemorrhage	Reduction of maternal deaths due to postpartum hemorrhage by early diagnosis, management and timeously referral of patients.
Pre-eclampsia and eclampsia	Reduction of maternal deaths due to pre-eclampsia and eclampsia by early diagnosis, management and timeously referral of patients.
Hypertension in pregnancy	Reduction of maternal deaths due to hypertension by early diagnosis, management and timeously referral of patients.
Preterm labour	Reduction of fetal / neonatal deaths due to preterm labour by early diagnosis, management and timeously referral of patients.
Cord prolapse	Reduction of fetal/ neonatal deaths due to cord prolapse by early diagnosis, management and timeously referral of patients.
Shoulder dystocia	Reduction of maternal/ fetal/ neonatal injuries and maternal/ fetal/ neonatal deaths due to shoulder dystocia by early diagnosis, management and timeously referral of patients.
Anaemia in pregnancy	Reduction of maternal morbidity and mortality from the complications of anaemia in pregnancy by early diagnosis, management and timeously referral of patients.

The DCST members also organised caesarean section skill assessment for every doctor working in obstetrics departments at these hospitals. Assessments were required to be conducted by the CHoUs of obstetrics departments at hospitals and further training was provided if there was any incompetency found.

6.5 ACCOUNTABILITY FOR MATERNAL, NEWBORN CHILD AND WOMEN'S HEALTH

This entailed identification of community-based factors that could contribute to the under or over utilisation of services. The DCST members liaised with the provincial management and DHMTs as well as other health care workers (such as WBOT, integrated School health team) on health promotion and prevention of ill-health activities among the population. Some of these activities are listed in Table 6.12.

Table 6.12 Accountability for MNCWH components and activities

Components	Activities
Consumer liaison	Collaborated with the Integrated School health teams, WBOTs, and municipal management to promote campaigns relating to pregnancy conditions.
Consumer participation	Participated in community dialogues in collaboration with municipal management team to address challenges related to maternal health services in the district. Participated in the radio campaigns to promote antenatal care.
Interaction with health systems	Collaborated and worked closely with other stakeholders in the DHS such as DHMT, municipal management team, DHIS, quality assurance team, Pharmacy, EMS, primary health care team, Family medicine team and hospital management team in order to achieve all targets related to MNCWH.
Monitoring and evaluation	Monitoring and evaluation of maternal health indicators and maternal deaths at the facility level on a monthly basis is a routine DCST activity. Monitoring of poorly performing facilities on MNCWH indicators.

6.5.1 ACCOUNTABILITY TO COMMUNITY

6.5.1.1 CONSUMER LIAISON

The summary of these activities in the DCST reports are listed below (Appendix J17):

- WBOT: training of team leaders on MNCWH component to improve community based MNCWH services; support development of new WBOTs Teams; use of software and mobile phone for data collection.
- School health services: Development of a support programme with School health services according to their identified needs.

6.5.1.2 CONSUMER PARTICIPATION

- Community dialogue and preparation of information, education, and communication (IEC) materials on general health topics were often prepared by the DCST members. Some of the examples of the topics were given below:
 - Maternal, child and reproductive health: Women's health
 - Diseases of lifestyle: healthy lifestyle, chronic diseases of lifestyle (Non-communicable diseases), mental health, cervical cancer screening.
 - Communicable diseases: HIV, AIDS, STIs and tuberculosis.
 - Others: Role of Traditional healers and community health workers, medico legal issues; service standards /patient's rights.

- Field visits to support household and community intervention: Cervical cancer screening campaign, mentor mother training; household visit with community health workers;
- Institutional visits: Facilitated institutional visits such as Nigerian Department of Health visit to MOU; MRC visits to hospitals and CHCs.

6.5.2 ACCOUNTABILITY TO DISTRICT HEALTH MANAGEMENT TEAM

The elements of health systems related to DCST interventions are listed below:

- Engagement with DHMTs and program managers (HAST, Pharmacy, PHC, EMS, Quality assurance, EMS and others)
- Participation in provincial and national activities.

6.5.2.1 ENGAGEMENT WITH DISTRICT HEALTH MANAGEMENT TEAM AND PROGRAM MANAGERS

The DCST reports showed that the DCST members in the Ekurhuleni District:

- District Health Management Team: The DCST members had been attending regular monthly meetings with the DHMT, where the DCST members made contributions to discussions around improvement of MNCWH services in the District. A list of DHMT meetings attended by the DCST members are listed in Appendix J18.1. They also attended meetings of different task teams set up by the DHMT. However, it was reported that sometimes, attendance at these meetings interfered with their work.

The DCST members had been submitting monthly reports to DHMT (see Appendix J18.2 for a template for monthly reporting to DHMT). Besides monthly DHMT reports, the DCST members also contributed to other reports such as *Ideal Clinic project*. In addition, the DCST members contributed annually to all important strategic documents such as district health plan and annual performance plan in the District (Ekurhuleni, 2019).

- District Health Council Technical Committee (DHCTC): The DCST members had been attending regular meetings of the DHCTC. (see Appendix J19 for a template of Ekurhuleni DHCTC meeting agenda).
- District Quarterly review: These meetings were attended by the DHMT, DCST, hospital CEOs, facility managers and programme managers, where performance of the District on the previous quarter was discussed and action plans were developed. The DCST members were reported to regularly contribute to these meetings (see Appendix J20 for a list of District quarterly review meetings attended by the DCST members and Appendix I1.1 for a template of DCST reports presented at these meetings).

6.5.2.2 PARTICIPATION IN PROVINCIAL AND NATIONAL ACTIVITIES

The DCST reports showed that the DCST members participated in the following activities:

- (a) Provincial quarterly review: It was reported that the Ekurhuleni DCST members have been attending these meetings, since its inception in 2012 July (see Appendix J21 for a list of provincial quarterly review meetings attended by the DCST members). Although the reports were prepared on a quarterly basis, the provincial quarterly review meetings did not happen in all the quarters. A template of this report was appended as Appendix I2.
- (b) Other provincial meetings: The DCST members additionally attended various other meetings organised by Gauteng Provincial MNCWH programme managers. Examples were PMTCT meeting, New MCR implementation meeting, MCWH strategic planning meeting, TOP meeting, saving mothers report meeting and cervical cancer new screening method meeting.
- (c) National meetings: The DCST members had been attending meetings with the NDoH as and when called for (see Appendix J22 for an example of a meeting organized by the NDoH). Besides meeting attendance, the DCST members also contributed to other reports as and when asked by the NDoH. Examples were delivery reports, legal case reports, adverse event reports and maternal deaths reports.

6.6 MONITORING AND EVALUATION

The DCST members were asked to link their activities with improvement of DHIS indicators. Monitoring the DHIS related indicators were one of the activities of the DCST members. The reports showed that:

- (a) The DCST members were asked to assist the District to improve MNCWH indicators by reviewing targets for each health facility in the District.
- (b) The majority of the DHIS indicators were improving slowly. Maternal mortality had been very rare at the MOUs for last 5 years.
- (c) Surveillance was performed during all visits, supervision and by auditing and raising awareness among the facilities and HCWs to improve all aspects of service delivery.

6.6.1 CLINICAL INDICATORS

The DCST Interventions related to improvement of maternal health indicators are listed in Appendix J23.

6.7 CLINICAL WORK

The analysis of quarterly DCST reports showed that clinical work (patients care at antenatal clinics, the hospital wards, family planning clinics and telephonic clinical consultation with all health facilities) were being performed by the DCST members at various health facilities (such as hospitals, MOUs and PHC clinics). The summary of these activities is listed in Appendix J24. The main purpose of clinical works was to improve clinical care, to strengthen referral systems (up and down) and thereby, to reduce MMR, neonatal and perinatal mortality rates, and stillbirth rate. In addition, the following areas were covered by the DCST members based on the need and request from health facilities:

- Strengthening access to comprehensive sexual reproductive health services with specific focus on family planning (such as insertion of Implanon).
- Strengthening antenatal services including basic ultrasound training to clinicians.
- Strengthening the referral system at all levels of care.

These activities were performed through support visits at health facilities and through remote consultation (telephone and WhatsApp) especially after working-hours. Visit at these facilities included clinical consultation, in-service training and ward rounds at hospitals. During the study period, hospital visits were performed weekly at the district hospital (n=1), periodically at regional hospitals (n=4) and at the tertiary hospital (n=1) as and when necessary.

These clinical activities assisted in improving communication and cooperation from the health care workers at hospitals particularly the district hospital, MOUs & PHC clinics, which in turn improved health indicators (as reported in Chapter 5). Another expectation was improvement of referral systems through management of patients at their appropriate levels of care leading to low mortality and morbidity at PHC clinics, CHCs and the district hospital. This was expected to assist in reduction in conflicts between hospitals and referring clinics/ MOUs. It was also reported that these visits also assisted the DCST members to increase broad knowledge about the health facilities, which helps them in better planning.

6.8 SUMMARY OF THE CHAPTER

This chapter presented the analysis of intervention undertaken by the DCST members since 2012 July until 2020 March. The next chapter will focus on the methodology of the qualitative component study followed by the analysis of the data collected from qualitative study.

CHAPTER 7

METHODOLOGY FOR QUALITATIVE COMPONENT

In this chapter, the setting, scope and design of the study, the selection of the participants and research tools for the qualitative component are covered. Furthermore, the collection of the qualitative data and the methods of data analysis are described.

7.1 STUDY OBJECTIVE 4

To establish the knowledge and perceptions of the district health managers and health professionals (doctors and nurses) regarding the role of DCST in the Ekurhuleni District

7.1.1 SPECIFIC OBJECTIVES

The purpose of this section was to have in-depth interviews based on the analysis of the findings from the previous three aims and to obtain opinions from senior managers and health professionals (doctors and nurses) about the findings around these aims. It is acknowledged by the researcher that there might be other factors besides DCST, which might have positive or negative influences on the indicators listed under the first and second objectives. The researcher attempted to identify these factors through key informant interviews during the last phase of the study with the following objectives:

- To investigate district managers' knowledge and perception about DCST in the Ekurhuleni District.
- To investigate their opinions about the influence of DCST on the changes in maternal health indicators in the District.

7.1.2 STUDY DESIGN

The qualitative component of this study used in-depth interviews of a sample of health managers and health professionals (doctors and nurses) from the Ekurhuleni District based on the results of analyses of data related to the previous objectives. Data for this section was collected until saturation of the data was obtained.

7.1.3 STUDY SAMPLE

The purpose of conducting in-depth interviews was to assist in development of an understanding of the knowledge and perception about DCST among district managers and

health professionals working in the Ekurhuleni District. The sampling framework was drawn from the key stakeholders described in Section 3.2.1 (Chapter 3). This was also expected to validate the findings of the three objectives in terms of establishing a link between the DCST interventions and changes in maternal health indicators.

These in-depth interviews were conducted with district-level actors charged with overseeing and managing the implementation of the DCST in the Ekurhuleni District. These interviews helped to identify contributions made by the DCST since its inception. The interviewer first carried out a set of in-depth interviews with district-level managers charged with overseeing and managing the implementation of MNCWH programme in the District. Then, purposefully the researcher selected sub-district managers, hospital managers and facility managers for further in-depth work. In the last stage, the health professionals involved with the MNCWH services were interviewed.

- District office: all managers involved with maternal health (such as the Deputy Director (DD) health programme, Assistant Director MNCWH).
- Sub-district offices: three Sub-district managers.
- Health facility managers such as chief Executive officer (CEO) of hospitals and facility managers of the PHC clinics and CHCs.
- Health professionals such as doctors and nurses working with maternal health services.

This ensured interviewing people who were conversant with the subject. The interviews continued till saturation of the data was achieved. At each stage of the inquiry, the interviewer used snowballing to identify actors who were interacting with the DCST members; a sampling strategy suitable for the generation of knowledge about a phenomenon (implementation of DCST) that evolved over time and with inter-related developmental events (Ritchie, Lewis, El am, 2003). This approach assisted the researcher in avoiding bias in the selection of interviewees as well as cascading the level of engagement from the implementers to the intended beneficiaries. Data was collected between 2019 and 2020.

7.1.4 DATA COLLECTION

The researcher is a member of the DCST and a member of the Ekurhuleni DHMT. Because of her position, she did not conduct the interviews herself but used a research assistant (interviewer) to do the actual interviews. The interviewer who does not work at the Ekurhuleni District, is a qualified graduate in public health and a PhD candidate and has the experience to conduct such interviews.

The interview guide included open questions to allow the participants to comment on the findings of the study. Interviews took the form of semi-structured conversations rather than formal interviews or questionnaires. This method was used to engage individuals in meaningful ways that promoted natural conversation and to relate their experiences. The researchers also used open-ended probes to guide the flow of conversation. The probes were used as required. The topic focused on:

- Maternal and women's health services in the Ekurhuleni District.
- Role and function of DCST members working in the Ekurhuleni District.
- The influence of the DCST on any changes in maternal health indicators in the District.

Appendices K1 and K2 showed the list of topics and probes that were used. Field notes were kept to facilitate the interviewer's reflections on the context and content of interviews as well as to complement the interviews by recording non-verbal cues and any relevant observation by the interviewer. Informed consent was given and signed by each participant for the interview and also for the recording of the interview. (Appendices K3, K4 and K5)

After completion of an interview, the interviewer met with the researcher to hand over all the informed consent form, recordings, and field notes to the researcher. The researcher then transcribed the interviews, read the field notes, and enquired from the interviewer, if there was any ambiguity.

7.1.5 DATA ANALYSIS

Data analysis occurred concurrently with data collection. At the end of each interview, the researcher listened to recorded audio tapes and began transcribing. After completion of the transcription process, the transcripts were sent back to the participants to check the content and corrections were made if necessary. Subsequently, the transcribed manuscript, was compared with quantified data and was coded by the researcher and interviewer. This ensured cohesion between the quantitative and qualitative data analysis (Creswell and Creswell, 2003).

The researcher used a blended approach of coding (both deductive and inductive coding). Both the researcher and the interviewer started with the deductive approach to ensure structure and theoretical relevance from the start, based on the four pillars of the DCST policy framework, while still enabling a closer inductive exploration of codes in later coding cycles, (Saldana, 2016; Linneberg, Korsgaard. 2019) and new codes were added to avoid missing

out any new theme. In keeping with Colaizzi's (1978) seven steps of data analysis, the following steps were followed:

- The researcher and interviewer read and re-read the transcripts in order to obtain a general sense from the narratives of the participants about role of the Ekurhuleni DCST
- They independently extracted significant statements from the transcripts that related to the basis of the study.
- From the statements, they formulated codes in relation to the premise of the study, which were performed independently to avoid bias.
- Then, the researcher and interviewer compared their coding and a third qualitative researcher checked the codes.
- These codes were then grouped into categories and then developed the themes.
- Organising formulated codes into clusters, which allowed themes to emerge.
- Like-themes were then grouped together to reveal meaning.
- Identifying and providing a comprehensive description of the roles of the DCST members for maternal health in the Ekurhuleni District.
- Validating the findings by cross-checking with the research participants if their responses were all captured to which they agreed.

Data were collected until no new information was forthcoming, so data saturation was achieved.

Thematic analysis assisted in pinpointing, examining, and recording patterns (or "themes") within data. Themes across data sets that were important to the description of maternal health and DCST were identified as a part of responding to the research question associated with study objective four. Ultimately, a conceptual framework or model showing the links between changes in maternal health indicators and several factors influencing the changes (if any) were developed.

Triangulation of the data was achieved by inclusion of field notes; comparison with quantitative data; reflection and discussion between the interviewer and the researcher and ensuring agreed coding and theme development by the interviewer, the researcher, and a third qualitative researcher (Connelly 2016).

Trustworthiness of the data was obtained by ensuring credibility through the triangulation process; establishing the dependability of the data by including a third qualitative researcher to check the methodological process, a clear data collection process using an interview guide

and audio recordings, transcribing the interviews verbatim and further checking. The confirmability of the data was ensured by the inductive coding of the data thus preserving the objectivity of the data as well as the independent coding of the data. Finally, transferability of the data might be possible, given that participants from all levels of the health care system in this District were included (Krefting 1991; Connelly 2016).

7.2 PRETESTING OF ALL TOOLS

All study tools were pre-tested, and adjustments were made accordingly. The interview guide was piloted in the Johannesburg District by conducting interviews with one district manager and one sub-district manager and one health professional.

7.3 ETHICAL CONSIDERATIONS

As mentioned before, the project was approved by the Human Research Ethics Committee (Medical), University of the Witwatersrand and Ekurhuleni Health District Research Committee prior to conducting the study. Confidentiality was maintained by using participants' numbers and not their names. The room used for the interviews was usually the one used for counselling and this allowed for privacy.

7.4 SUMMARY OF THE CHAPTER

This chapter documented the methodologies for the qualitative component of the study to investigate the concept of change and innovation associated with introduction of DCST within DHS as well as effect of a "local ownership" of the problems in the Ekurhuleni District. The following chapter will present the findings of this component based on the methodologies described above.

CHAPTER 8

RESULTS OF QUALITATIVE COMPONENT OF THE STUDY

The results obtained from the analyses of key stakeholders' interviews are presented in this chapter.

8.1 DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

Twenty in-depth interviews were performed with actors at different levels of the District health services (DHS) in the Ekurhuleni Health District using an interview guide (Appendices D4.1 and 4.2) developed for this study to gather information. The mean number of years of working experiences and experiences in current position were 17.3 years ($\pm$ 9.3 years) and 4.2 years ($\pm$ 2.8 years) respectively. Their place of work and current positions are listed in Table 8.1.

Table 8.1 Place of work and current position of interviewees

Place of work	No (%)	Position	No (%)
District	3 (15%)	Deputy Director (DD) Health programme	1 (5%)
		Assistant Director Maternal, Child and Women's Health (MCWH)	2 (10%)
Hospital	4 (20%)	Chief Executive officer (CEO)	1 (5%)
		clinical manager	1 (5%)
		Clinical head of unit (obstetrics and gynaecology)	2 (10%)
Sub-district	4 (20%)	Sub-district manager	1 (5%)
		Family physician	3 (15%)
CHC	6 (30%)	Operation manager	6 (30%)
PHC Clinic	3 (15%)	ANC sister	3 (15%)
Total			20

Their professions are listed in Table 8.2. The majority of them were nurses (n=13; 65%)

Table 8.2 Profession of interviewees

Profession	No (%)
Nurse	13 (65%)
Advance midwife	2
Doctor	7 (35%)
Obstetrician and Gynaecologist	2
Family Physician	3
Total	20 (100%)

8.2 THEMES OF THE STUDY

Participants in this study identified numerous challenges and suggested possible solutions for improving maternal health services in the Ekurhuleni District. In addition, they responded to the questions regarding the roles and responsibilities of the DCST members in maternal health services. The analysis and presentation of the results was firstly framed with a deductive approach to ensure structure and theoretical relevance based on the four pillars of clinical governance framework of the DCST (namely clinical effectiveness, clinical risk management, professional development, and management, improve accountability for MNCWH) (NDoH, 2014b). These pillars were applied to understand, how participants distinguished the work of DCST members fulfilling their roles against the set parameters. This also assisted in describing variations in their expectations about the roles of DCST members. In addition, actual activities, and role-set (role behaviour) of DCST members were presented as a way of explaining the conceptions of the participants about their roles. Subsequently, new concepts were added to avoid missing out any new concepts and themes. The four themes were presented followed by new themes. The major themes that emerged from the data collected qualitatively are reflected in Table 8.3.

Table 8.3 Concepts/ Themes generated from the study

Themes/ Concepts	Number of women mentioning the theme
Clinical effectiveness	20 (100%)
Clinical risk management	14 (70%)
Professional development	15 (75%)
Accountability for MNCWH	19 (95%)
Clinical work	5 (25%)
Monitoring and evaluation	15 (75%)
Leadership and governance	4 (20%)

Each of these themes and categories under them are described below:

8.3 CONCEPT OF CLINICAL EFFECTIVENESS

Clinical effectiveness emerged as one of the themes of this study that was brought up by all study participants (n=20; 100%). It is an umbrella term describing a range of activities that support clinicians and healthcare professionals to examine and improve quality of care. Clinical audit is the best-known example, but clinical effectiveness stretches beyond this to include the implementation of nationally agreed guidance as well as agreed standards/ clinical performance indicators reflecting 'best practice'. Clinical Effectiveness is *"the application of the best knowledge, derived from research, clinical experience and patient preferences to*

achieve optimum processes and outcomes of care for patients. The process involves a framework of informing, changing and monitoring practice” (Worcestershire Acute Hospital NHS trust, 2018.). The categories under the theme of ‘clinical effectiveness’ are mentioned below in the Table 8.4.

Table 8.4 Clinical effectiveness

Category	Sub-category
Maintaining clinical standard	Clinical support Clinical support through mobile medicine Availability of the skilled health worker at the point of service delivery Accessibility Referral Effective patient transport systems
Clinical audits	Review of clinical records Operational research

8.3.1 MAINTAINING CLINICAL STANDARDS

Maintaining ‘clinical support’ to the district health facilities were highlighted by the majority of the respondents (n=11, 55%), as one of the key roles and responsibilities of the DCST members. This would assist in implementation of clinical guidelines and standards as well monitoring of clinical performance indicators. The responses could be further categorised under the sub-categories listed in Table 8.4.

8.3.1.1 CLINICAL SUPPORT

Clinical support was provided by both clinical support visits as well as through mobile medicine (telephonic consultation and WhatsApp consultation), which ensured their regular availability and accessibility.

CLINICAL SUPPORT VISITS

Regular support visits by DCST team members were highlighted as an important component of ‘clinical support visits’: *‘the DCST team, they supporting the programme very well, like in terms of if you find that there’s a facility that is battling with one of the indicators, when you call them, they actually come and assist us on a time to time basis’* (P03).

One respondent commented about their effectiveness: *‘Yes, yes, I do think they are effective... they are making a difference, I am always sure that they are making a difference’*(P08). The

importance of their support visit was emphasized by a number of respondents:

Firstly, it provided improved patient care: *'we just need support in terms of managing the patients in the clinic, in terms of coming in for support visits and then maybe just checking if we are indeed in the right path so that if ever there is a problem they don't come in later and say "but why didn't you do 1.2.3" whereas I will be thinking that I'm doing it right'.* (P19)

Secondly, outreach programme in hospitals assisted in better coordination between PHC facilities and feeder hospitals: *'DCST-O&G coordinating that our feeder hospital also assists because O&G-HOU comes sometimes for outreach to assist the clinics if we have challenges'* (P09).

Thirdly, it capacitated clinicians working in these facilities: *'They will be going into facilities and ensuring that they check and also capacitate the clinicians. They go & capacitate the clinicians'* (P01).

Fourthly, their support visits could assist in on-site problem solving: *'mostly they come and listen to our challenges and they try to deal with it, like they improved the way we working. They are there for consultation like DCST-O&G is always available'* (P12).

Lastly, it provided moral support to health professionals working in PHC facilities: *'If they can just come for moral support and that support can boost us and they must just come not only if we have a problem. We need a lot of support from them'* (P12).

Two respondents distinguished usefulness of 'support visit' in comparison to meeting attendance:

- *'they should just put more effort in terms of their support visits, checking us like more oftenlike individual facilities besides talking to us in the meetings. Let them come, follow us, theyshould just come and check us, we feel a little bit empowered. When they come, we knowwe are supported. We do need their support very much'* (P19).
- *'If they can improve in visiting us, though I know that sometimes it's difficult, but if they cancome and check even if there is nothing and not only when there is a meeting'* (P16).

However, the concerns were raised by a number of respondents about the frequency of their visits: *'the one thing that we need is for them at least visit us every month, or even bi-monthly and checking us in the facilities, the challenges and whatever we get, because sometimes you find that due to commitments we don't go to our monthly meetings'* (P19).

One respondent suggested a way forward: *'I've found them to be very helpful, very assisting in helping out and although it is difficult sometimes to get, because they are all over but u-DCST-O&G who has made ukuthi just leave a WhatsApp then will answer, even to the lower categories'* (P09).

Another respondent mentioned another challenge with their support visits especially unannounced visits in the hospitals: *'They go to the hospitals and they are not supposed to tell them when going, they come unannounced but that does not sit well with the CEO's like they are invading and it's not correct, because they are there to support the hospitals and also the place, the facilities'* (P01).

However, all the responded agreed about the importance of their support visits: *'I think everyone including myself are very comfortable to work with i-district in specialist, they've had impact, even though people might not see but they are good'* (P09). ...*'they need to give us those visits and supports more'* (P12).*'it makes our work so easier like we can able to minimize the maternal deaths'* (P12).

AVAILABILITY

Availability of DCST members were identified by respondents as key component for maintaining clinical standards: *'She (DCST-O&G) supports us. She's always available on the phone and when you have a problem she is always there, even if we have a problem in transfer, we tried everything we involve her.... Some other times we don't care that this one is for what we just call them & get help. What I've realized that Ekurhuleni we are far better when you look at like COJ other clinics are coming this side'* (P13).

Their continuous availability and user-friendliness were identified as important factor dealing with:

- Patients: *'With DCST-O&G you call her now, she gives you what you need to be doing when you are dealing with a patient'* (P18), as another responded mentioned *'If you can't get hold of any of them, it is frustrating'* (P19). One responded proposed that there should be more members to increase their availability *'I think they really need to be more than one'* (P14).
- Difficult patients: *'if you have got a patient that gives you problem and you see it's a challenge, you can just call her and ask some other things on the phone and she will advise you'* (P12).

- Transfer of a patient: *'if we have a problem in transfer, we tried everything we involve her'*(P13).
- Neonatal resuscitation: *'we have DCST-PNURSE for Pediatrics, when we have problems she comes to training'* (P13)
- Helping with management of equipment: *'they are busy even with the machine, we are using the wrong machines which was supposed to be used in hospitals. so now they are just helping us to, to not to make a mistake with the other one'* (P13).
- Helping with data governance such as PIPP and DHIS: *'they are also trained on what DHISof which is very good, they are able to go in and take the information and be able to see the underperforming facilities'* (P01)

One of the district managers commented about their reliance on the availability of DCST members for managing poor performance in PHC facilities *'DCST team, they supporting the programme very well, like in terms of if you find that there's a facility that is battling with one of the indicators, when you call them, they actually come and assist us on a time to time basis'* (P03).

This view was supported by one of the facility managers: *'There is no day that I wanted DCST-AM, I did not find her. They are always there. So they are always available. They are always willing to help us in the facilities.... But when we have something, we come to them. We seeking for help, they are there, they are available, they are helpful, so I want to appreciate them very much for that'* (P15). One respondent mentioned that *'What I've realized that Ekurhuleni we are far better when you look at like COJ other clinics are coming this side'* (P13).

SUPPORT TO THE MATERNAL, CHILD, NEWBORN AND WOMEN'S HEALTH DEPARTMENT

Clinical support to the 'District MNCWH Health manager' was extremely important: *'They are working hand in hand with our maternal MCWH manager from this unit and also MCWH manager from local government. When they do the visits, they do them jointly'* (P01).

REFLECTION

One respondent mentioned that she was really impressed with DCST members about their ability to reflect on activities of the District, which assisted in better functionality of the District: *'one you do investigation after the reflect, like for example people are going to reflect, where*

did we go wrong? If maybe there's somebody, maybe there's a mother who's passed on then they sit without maybe harassing the people that were there but supporting to say this must not happen again, they are doing that' (P01).

INTEGRATION OF CARE

It was mentioned that DCST members, through their clinical support, assisted in integration of care: *'So even myself I went to that hospital, I did sit with the sisters, doctors, since that day my impression changed. I told my MO if those people need to send patients, don't refuse the patients, if they are stuck. I think, for me really, they are assisting a lot really' (P07).*

8.3.1.2 CLINICAL SUPPORT THROUGH MOBILE MEDICINE

Communication and regular access to clinical support was identified as one of the strengths of DCST members in the Districts by the participants (n=12, 60%). The extensive use of mobile medicine (telephonic consultation and WhatsApp consultation) supplemented the clinical support visits especially during the COVID-19 pandemic: *'we've got access. They gave us access. They've given us their phone numbers and we've got a WhatsApp group where we can ask whatever we need to ask' (P19).*

As a result of that they were not feeling isolated *'In Ekurhuleni from my side, I won't talk for other people. I think they are giving me most support that I need. I don't feel alone. I have people around me that are helping me whenever I need help' (P14).*

The willingness to assist health professionals was captured by one of the participants: *'It is not easy for a person who has got a family to wake up at 01:00 am just like as I do because we having problem with transferring, and the staff will be phoning me and saying we are struggling to get a space at whatever hospital. I would wake up and call DCST-PAED or DCST-O&G or whoever DCST-AM or MCWH-AD (P02). I would be calling them and the most people I would be worrying is DCST-O&G and DCST-PAED. And I never had a problem in them not answering the phone, if they don't answer the phone the first call, the second call they will be answering. On my side, they are doing very well to me' (P14).*

TELEPHONIC AND WHATSAPP CONSULTATION

Comments from the participants revealed that communication was an integral part of DCST activities. Mobile medicine became a valuable tool for communication between the DCST and

health professionals working with the Ekurhuleni District. One respondent stated: *'I have an open line. So we are able to communicate each & every time I get to her and as for DCST-AM, not so much'* (P18).

Remarks from another respondent supported that *'They support a lot. If there are queries from the managers and the staff and you know they try to address that'* (P08). another participant said that pointed out the mode of communication is through telephone or WhatsApp *'She (DCST-O&G) says even if something you remember during the day, WhatsApp me at night. I am not going back to you right now, but eventually I will get back to you'* (P20). Another respondent mentioned about using group chat to talk about cases. *'Even if it did not happen to me, but I learn from the group discussion what to do for future patients'* (P05).

FEEDBACK LOOP

The participants valued the communication channel between DCST members and health professionals, which usually supplied them with necessary information. For example, one participant from a PHC clinic mentioned about attending workshops and symposiums *'Some of this things before there was the district specialist, we were not attending them. Since they are there, wherever they go, they want us to be there'* (P14).

However, one of the sub-district manager raised concerns about not being included in the feedback loop *'she would love one of them come to her and say that today I visited your facility and this and this and this I picked up, I have already given feedback to your operational manager, but I think you as the AD should also know this'* (P08), which needs attention as their good work might not be brought to the attention of the sub-district and district managers *'they are doing a lot of good work, but it's not always bringing to our attention'* (P08). An effective feedback loop among the different stakeholders is necessary as they have to work together to address the challenges in mother and child health services. One participant aptly concluded *'the Government has not made any mistake to make this team. The way I get the support & I am sure that is why I am working so hard'* (P14).

8.3.1.3 AVAILABILITY OF SKILLED HEALTH WORKERS AT THE POINT OF SERVICE DELIVERY

A number of participants (12, 60%) suggested the roles of DCST to ensure availability of skilled health workers at the point of service delivery. They gave examples of diverse options used by the DCST members for this purpose:

ONSITE/ IN SERVICE TRAINING

Onsite/ in-service training was mentioned by seven (35%) of them *'they are assisting and also training, in service training, when they come to the facility and they see something they immediately correct and try to do the in-service there'* (P08). They have mentioned insertion of IUCD, ICDM, cervical cancer screening as examples. One participant mentioned that the on-site trainings were often linked to the challenges found by DCST members at a PHC clinic *'Her (DCST-O&G) role mainly when she goes to the MOUs to do audit of maternal files, check you know, what she can find there. She immediately tries to in service training to the staff that is there and also do ESMOE training when she goes to the facilities, also fire-drills'* (P08). It was noted by another participant that *'DCST-O&G is also supporting the hospitals and helping them on how to manage their caesarean section and everything'* (P17).

Another participant felt that the presence of DCST instilled confidence among health professionals working in PHC clinics *'we referring on time because of the DCST team that instilled in us stating that you don't sit with the problem, when you are having a problem you have to refer to the hospital. So their support is very important in the maternal and child health'* (P17).

One participant felt that their on-site training programme helped to capacitate clinicians *'They will be going into facilities and ensuring that they check and also capacitate the clinicians. They go & capacitate the clinicians.....'* (P01) as their trainings were practical *'there were more in training, emphasizing guidelines, ensuring people were following guidelines'* (P10).

MENTORING

Mentoring was also mentioned as one of the tools for availability of skilled health workers at the point of service delivery. *'whenever I do go to them I come back with enough information to be able to function in the facility and am able to reach DCST-O&G whenever I need help. So I don't really feel that they are not present, they are present when we need them'* (P18).

8.3.1.4 ACCESSIBILITY

Accessibility to the health care system was identified as one of the major factors by the participants (n=7, 35%) for improving MNCWH care services in the Ekurhuleni District. They have identified non-alignment of distribution of public health facilities and the population they

serve as one of the major challenges: *'Tembisa Hospital, without an MOU, before the district was there., because in Tembisa, it was always packed and now that we are dealing with the normal deliveries, it's a bit relief for Tembisa hospital'* (P16).

This maldistribution adversely affect the MNCWH indicators: *'Nokuthula and Kwathema we are servicing one community, so it's us here the Nokuthela and Kwathema for deliveries, we are not reaching the target of 150 delivery (IES) per month. Because we are servicing one community Kwatsaduza area, hence we are not reaching the target'* (P17).

The population growth in the Gauteng province over the last 20 years had aggravated this maldistribution. One participant mentioned *'If you go back even more than 20 years, you will find that population of Gauteng and of course that of Ekurhuleni have grown tremendously. But when you look at the number of facilities, you know that facilities have not been increased at the same rate at which the population is grown, specially the hospitals. And that's a serious challenge'* (P04).

He remarked that *'it has been determined that we need more of hospital facilities in the district than we have currently. That's a major challenge because you find that there are patients that are seen, who need hospital admission but for one reason or another they are not able to access that kind of service because of shortage of beds'* (P04). This was compounded by the influx of populations from neighbouring provinces as well as from neighbouring countries.

The other challenge was preferential health seeking behaviour of the people toward medical doctors. *'people want to go where there is doctor, when you tell them that we are midwives, we are doing the deliveries, they don't come to us..... because patients will prefer to go to the hospital'* (P17). However, the regular visit by the DCST members as senior and experienced clinicians could have a positive effect on the health seeking behaviour.

8.3.1.5 REFERRAL SYSTEM

Referral systems were identified by the participants (n=14. 70%), as a major factor influencing clinical standards for MNCWH *'we end up having patients that are booking late, and you are doing it because of despite the fact, they present early'* (P10).

The participants believed the DCST members were playing a significant role for fixing the system within the District (between the PHC facilities. MOUs and district and regional hospitals) and outside the District (such as central hospitals); DCST members had been

covering the entire District and work in both PHC facilities and hospitals and therefore, could provide integrated care: *'she's also working with the hospital that we are transferring so when we write the notes, when we mention her name, they know that we have contacted the right person. And with us also, we referring on time because of the DCST team that instilled in us stating that you don't sit with the problem, when you are having a problem you have to refer to the hospital'* (P17).

Their personnel relationship with hospital doctors as well as clinical managers also assisted: *'she phones me directly really, maybe I have that personal relation'* (P07).

The responses from the participants in relations to referral system could be categorized into: up-referral, down-referral, and establishment of referral route (when necessary).

UP-REFERRAL

The up-referral from PHC facilities (including MOUs) to hospital is an integral function of any health system: *'The district is the team, is able to go through their channel to go to primary health care to the clinic to say this is the problem that you are referring to the hospital'* (P06).

Unequal distribution of health facilities compounded the challenges of up-referral especially in the North Sub-district: *'in north (this side) sub-district we are not doing well. I think the other thing is that we are having a tertiary hospital and 2 MOUs. we don't have other, like a regional hospital to refer to'* (P13).

In other sub-districts overcrowding blocks the up-referral pathway. For example, in the South Sub-district: *'that was the barrier more especially Thelle Mogoerane. It was so prominent. Thelle Mogoerane was always complaining. DCST-O&G will go. DCST-PAED would go. DCST-PAED was going because SAM cases were very high, so she had to go and making sure she teaches them how to calculate the separations and what's not. But they were aloof'* (P01).

Identification of high-risk patients and up-referring them to appropriate levels of care is an essential part of any health system *'You know people bring us everything in the clinic, it was just push, push, so now certain things they are able to know, manage, then refer to appropriate level where it's necessary. So I think there has been an improvement in management and referral'* (P10).

Clinical expertise of the DCST members also assist in development of a dedicated support system for up-referral. *'it is obstetricians who is able to communicate with our referring hospital, like if we are having a challenge with our referring hospital, maybe if its full they are*

able to communicate with other districts and hospital like Steve Biko and other Pretoria ones, just to make it easy for us to transfer the patients' (P16).

All these factors mentioned above make it difficult to maintain the clinical standards for maternal and child health in the Ekurhuleni District. Based on the comments from the participants, it seems that DCST could manage to address some of the challenges. One of the facility managers made a concluding remark *'We can't do without them, really because maternal and child health is the core business' (P17).*

DOWN-REFERRAL

Down-referral was also identified by a number of participants, as an important component to decongest the hospitals and increasing deliveries at underperforming MOUs such as Nokuthela and Kwathema MOUs, which are not reaching the target. However, it requires careful planning and expert support to ensure appropriate referral. One respondent mentioned *'They (DCST) are part of that team that is looking at how best can the hospital help in down-referring the low risk that can deliver at MOU' (P17). We are almost in last stage of this down-referral system.'* DCST Members helped to *'establish referral routes and criteria for the district which is also very important. the facilities need to refer to the MOUs & the MOUs to refer to the hospitals, according to the condition of the patient. MOUs are getting these patients but only the low risk cases to deliver at the MOUs and from the MOUs if there's complications, high risk and intermediate risk, they send them to the hospital' (P02).*

One respondent mentioned the challenge of communication between hospitals and PHC facilities: *'The other issue would be mis-communication between us & the hospital. We are not speaking the same language. Sisters at the hospitals are not speaking the same language themselves.'* This was supported by another respondent who mentioned the role of DCST members to address this: *'So most of the time when we communicate with her, she will make sure she communicates with the HoD' (P19).*

EFFECTIVE PATIENT TRANSPORT SYSTEMS

Effective patient transport system was highlighted as another challenge for the referral system: *'Transport is quite a big problem there in terms of the referral of the patient. Transport, really a big problem' (P02), the ambulance services It's still a problem. We were hoping that we get to the onsite ambulances in all the CHCs, but because of this shortages of ambulance, we are unable to get and you find that sometimes for the patients to be taken to the hospitals, it takes*

longer by the time they reach the hospital, some have complications and because of this ambulance that is not available.' (P01).

One participant mentioned about her expectation of the DCST members to resolve this *'My expectation for her to also maybe fix the issue of referral system in terms of the EMS, us and the hospital'* (P19).

There was an expectation of alleviation of this problem with introduction of obstetrics ambulances, which unfortunately did not resolve the problem of inter-facility transfers: *'Obstetrics Ambulances, sometimes we have a patient, then it would take time to come'* (P09).

8.3.2 CLINICAL AUDITS

Clinical audits were identified by the participants (n=10, 50%) as one of the key activities of the DCST team members.

8.3.2.1 REVIEW OF CLINICAL RECORDS

Review of clinical records were mentioned as one of the sub-categories of clinical audits: *'the PHC team, it will be DCST-FM, usually she is a family medicine doctor that works with primary health care nurse and they also visit facilities and they check files.'* (P08).

One respondent mentioned the challenge of completing new maternity records *'The new issue maternity record, it's a lot of work especially when you are alone..... and then 60 something pages of this new book. It's too much'* (P20). This often resulted in poor record-keeping. However, regular clinical audit could alleviate this problem *'It is the audit, it will be nice if they can audit us more frequently, because I can be bias to myself on how I'm doing so if they can just maybe audit us quarterly, when we have MMR meeting they give a feedback on how we are doing records wise or everything, it will just even make us go stronger even more because you know there's someone who is watching'* (P13). Another respondent also commented *'I'm happy because they think we are far better than lot of DCST team in other district, I don't want to say stories but a lot of things are improved'* (P05).

8.3.2.2 GUIDELINE IMPLEMENTATION

The clinical audit also ensures effective implementation of clinical guidelines. The National Department of Health consistently generates comprehensive policy and guidelines that have

a strong and current evidence basis and are tailored to the South African context. However, the high quality of these guidelines is not matched by implementation that leads to effective care. The reason for this is that the contents of these guidelines often do not filter down to the clinicians at the coalface of clinical care.

The role of DCST members was highlighted for this activity *‘there were more in training, emphasizing guidelines, ensuring people were following guidelines’* (P10). Another respondent explicitly stated that *‘DCST team role is to assist us in facilities, giving us information about the obstetric and guiding us in terms of protocols and what is new, what is out-dated, supporting us down here and whenever we need anything from them we are able to reach them’* (P18).

8.3.2.3 OPERATIONAL RESEARCH

Operational research was identified as the third component of clinical records for improving clinical effectiveness. The DCST members have been assisting in motivating for operational research *‘Kwathema & Nokuthela Ngwenya, the deliveries are not what we would like there to be and we have been having research to see what is the reason & what could be the cause of it. DCST-O&G and the DCSTs was also involved in that’* (P08).

Another respondent mentioned how DCST supported research *‘We did a study to see what is the reason most of the time these women, they don’t reach the place of delivery early because they are not sure of their pains though we educate them’* (P17).

8.4 CLINICAL RISK MANAGEMENT

Clinical risk management emerged as another theme brought up by a large number of study participants (n=14, 70%). The categories under the theme of ‘clinical effectiveness’ are mentioned below:

Table 8.5 Clinical risk management

Category
Risk associated with patient
Maternal mortality and morbidity meeting
Risk associated with health professionals
Emergency obstetrics simulation training
Risk associated with organization
Resource mobilization
Quality improvement plan

8.4.1 RISK ASSOCIATED WITH PATIENTS

Managing 'risk associated with patients' was highlighted by the majority of the respondents (n=11, 55%), as one of the key roles and responsibilities of DCST team members as a part of clinical risk management.

RISK IDENTIFICATION

Regular visits to health facilities for identification of risk to patients was a key step towards managing them. Their availability to the health professionals also assisting in identification of risk was acknowledged by one respondent as something new: *'they are forever available and it doesn't matter who we get but there's always a way to help them. So it has helped a lot. Before there was DCST team there was a lot of stories so mara-after they came there's too much improvement'* (P13).

One respondent gave an example of an incident, where one DCST team member assisted her to identify risk to a patient: *'it was a patient that has recurrent leucocytes in the urine and I was still fresh then. The parents, was it the mother, I think the baby was born with the septicaemia and they thought it was from the recurrent leucocyte. And they came and taught me on how should I be managing'* (P18).

RISK MANAGEMENT

Support of DCST members of health facilities was recognized as a key step in risk management. One respondent mentioned: *"Yeah, they do support us. They arrange meetings almost every month and they do workshops for us to help us manage better the patients, especially in term of the problematic condition in the antenatal side as well, especially because I'm doing antenatal. They mostly help us with the management of hypertension. They mostly help us to categorise the patients so that we don't manage the patient that should be in the hospital. So in terms of that one, they are very good"* (P19).

Another respondent acknowledged the role of DCST members in terms of risk management: *'They have reduced maternal deaths. The rates of birth asphyxia have gone down. They have reduced the waiting time in terms of surgery'* (P 04).

8.4.1.1 MORTALITY AND MORBIDITY MEETINGS

Maternal mortality and morbidity (MMM) meetings were identified as an important strategy for management of clinical risk in obstetrics: *'that is where we discuss all the cases, the total deliveries per MOU and the total deliveries in hospital and if there's any morbidity or mortality cases, we discuss the avoidable factors if there's any substandard care and recommendations and to make sure that going back to the facilities or the MOUs, they implement the recommendations. And also at the MOUs, there's quarterly maternal mortality and morbidity meetings that are happening whereby MOUs meet with their feeder clinics to discuss the challenges or the mortalities'* (P06).

The following activities are highlighted by the respondents, which were linked to DCST members:

LEADING FROM THE FRONT

One respondent acknowledged the roles of DCSTs in organizing these meetings: *'DCST attends to all these meetings, in fact they lead those M&M meetings and then even at the MOUs they also attend'* (P02).

ORGANISATION OF MATERNAL MORTALITY AND MORBIDITY MEETINGS

The following points were mentioned by the participants outlining the contribution of DCST members in terms of the organization of MMM meetings.

Firstly, regular attendance of DCST members of all maternal mortality and morbidity meetings in the district was identified as an important step in this process: *'We meet them almost always at the M&M'* (P07).

Secondly, their attendance at these meetings has been generating a spirit of team building among the health professionals working in the PHC facilities *'So they are part of us, even in the MMR, they are there. They help us. They motivate us to do better'* (P17).

Thirdly, they ensured regularity of these meetings, whereas in the past, these meetings were more sporadic: *'I must be honest, I think at many of our hospitals, the MMR meetings was(WERE) not held as it should have been held. You know by looking at all the cases and I think, with their intervention, I can really see there is a difference. We are achieving goals. We*

are working towards a goal to say this is what we need to do and not to just come and meet and it is like that, but specifically report format so that we can identify all our problems there' (P08).

Fourthly, they have managed to integrate the health professionals by bringing the health professionals from PHC and hospitals into one meeting, whereas previously these meetings were held separately: *'I am talking about this relationship between the hospitals and the clinics and the MOUs, there's what we call maternal mortality and morbidity meetings that are happening in all these 6 hospitals and then the clinics also attend those meetings'*. (P02)

Fifthly, it was mentioned that DCST was successful in bringing health professionals from provincial and municipal facilities into one platform: *'Really there was even in the local because we are two sectors, GPG and City of Ekurhuleni, those people were not doing thing the correct way. So since the DCST team, we are doing the MMR meeting with local clinic, we are taking our colleague to the next level for them to understand that at the end of the day they are doing the antenatal, at the end they come here having a problem. So with the help of DCST team, they do attend our MMR meeting. It helps us to enrich our counter-parts the one that are from City of Ekurhuleni. So it's making a progress in the Ekurhuleni district. Now they are at, they are buying our story. Remember COE was working in their own way & GPG, but now they know we are at par, they even phone us, they inform Nokuthela, this is the patient can we bring them to you or should we take them because now they are at par with us. So there is a lot of changes that happened after the DCST took over'* (P17).

Sixthly, the reporting of maternal death within 24 hours improved resulting in improved quality of data: *'when there is a maternal death we do inform them within 24 hours and they also assist in progressing in the program of reporting, because it is supposed to be reported to the province as well'* (P16).

Lastly, they managed to integrate different discipline especially obstetrics and pediatrics: *'I know with DCST-O&G, when there is a maternal death, she would be part of that. Even DCST-PAED when the Paeds for the child, maternal meeting would be part of the mortality and morbidity meetings'* (P10).

As a result of these interventions the health professionals felt empowered to find the root cause of maternal deaths in the district *'if we have M&M for example, to participate and their contribution and questions that they help us to answer'* (P06).

Discussion at these meetings on both mortality and morbidity also assisted in reduction of maternal deaths in the District: *'they are also discussing like for example if there are serious advert events or maternal deaths then that case will be discussed on the MMR with the assistance of the district clinical specialist team. They also support the hospitals (P01) We managed to reduce the maternal mortality rate'* (P01).

One participant suggested how they should devolve from district to sub-district level and appoint one DCST member per sub-district for further reduction of MMR: *'when it comes to maternal mortality, which we know largely sub-district based, last year we improved. We were less than 100 per 100,000, which is very good. This year we had minor challenges... So I must say I am very happy with what we are having. The only challenge is that she is one. If we could have an obstetrician in each sub-district, I think then things will be better. Because then they will have more time to spend & we would improve even more'* (P09).

As a result of these intervention, there was consensus about the role of DCST in improving MMM *'the fact that we see the results of those indicators improving you know they have got a role to play'* (P06).

SUPPORT AFTER MATERNAL MORTALITY AND MORBIDITY MEETINGS

The participants acknowledged their support even after the MMM meetings: *I have seen that they also give support when we need them and if we have M&M for example, to participate and their contribution(s) and questions that they help us to answer'* (P06).

The discussion at these meetings led to identification of causes of maternal deaths, which then formed the topics of in-service training conducted by DCST members *'they also do the in-service training for the people that will be attending. They also do tell us to say that if we have any challenges may be something we need to help or be it training or whatsoever, we must forward to them so they can help'* (P15). Another respondent stated *'But since they started, they will go, they will give support there, they will teach us more because if they experience that Ekurhuleni has got so many maternal deaths and whatever and macerated stillbirth, they change their teaching in-service. They will concentrate on what is the problem now and then they will give us more information on educating the woman on the safe and whatever'* (P14).

8.4.2 RISK ASSOCIATED WITH HEALTH PROFESSIONALS

8.4.2.1 EMERGENCY OBSTETRICS SIMULATION TRAINING

EOST (commonly called fire drill) was identified as another key component of professional development (n=8, 40%).

EOST training

The role of DCST in terms of EOST was acknowledged by the majority of them *'the experience that we have before our government started to introduce the district specialist, we were having problem. But since they started coming to us doing this drill and giving us more information, at least we are doing much, much, much better if not 100% because there were no people that were giving us information. We were not having that faith yokuthi there are people that are looking after us. But since the drills started and the courses started and they are around. They are coming to us. we've got less neonatal death and whatever'* (P14).

The regular visits to the PHC facilities and organization of fire drills were acknowledged by the PHC staff *'In a month, they can come twice, to just come re-educate us with the fire drills so that we can be at par with what is happening. And when if there are changes, they inform us'* (P17). It was pointed out the current focus of the EOST was the MOU which should be expanded to include ANC staff as well as these staff members, who also had to deal with obstetrics emergencies *'Other side when you are at ANC, you are never trained. So it has created a gap, there are a lot of mistakes we identified the other side'* (P13). Hospitals were identified as another area which should be involved with this training *'People are doing that but we are still struggling in our hospitals. The fire drills are not performed. Not to say the district clinical specialist team are not doing their work, they are trying their level best. And we work hand in glove, there's no them. We are one'* (P01).

Effects of EOST

One participant highlighted the need for regular organization of the EOST for reduction in maternal death in the District *'they need to give us those visits and supports more. They used to come and do us the fire drills, by doing that it makes our work so easier like we can able to minimize the maternal deaths'* (P12).

8.4.3 RISK ASSOCIATED WITH ORGANIZATION

Clinical risk management also involved management of risk to the organization. The role of DCST members was acknowledged by one participant in terms of this type of risk: *'What I've noticed is that they visit all the institutions where there is a death and then they would go to that institution and see what was the reason for the death. That was not there before because there ama-, we wouldn't even know ukuthi what we are supposed to be doing'* (P14).

8.4.3.1 RESOURCE MOBILIZATION

Mobilization of resources is an important component for mitigating organizational risk. The DCST could play an advocacy role for resource mobilization and sharing among different facilities for their optimal utilization, as one participant mentioned: *'they have to enhance their pace and also to manage the relationships within the facilities because the natural tendency is to protect your own turf'* (P04). Other participant had an example of resource sharing: *'you may find that in a particular hospital, there is a department that has experienced resignations or whatever and you find it very difficult for other departments in other hospitals to come on board and assist that particular hospital. to an extent that you may find that their call roster is full of gaps, meanwhile there are other doctors from other facilities who could have easily come in and fill in those gaps. So the result thereof is that on the days where there are gaps, patients have to be shifted out of the district to other facilities'* (P05); In this scenario, DCSTs being neutral to these facilities, could play a role: *'it should be possible for DCST to be able to influence that movement of resources human and other ones to be able to cover gaps when they develop'* (P04).

MEDICAL EQUIPMENT AND MEDICATION

Medical equipment is an important component of any health system. Equipping PHC facilities with appropriate medical equipment is extremely important for delivery of health services: *'I think to me the biggest problem is the MOUs are not well resourced. In terms of equipment's and even expertise at times that is why the hospital is being overloaded, overburdened because every little thing, you have to transfer to the hospital'* (P11). A number of examples were provided by the participants:

- Inappropriate referral as: *'Let me give an example, like years back when I was a registrar, once working in the MOU, we have CTG, it's there and you have a woman that's fully dilated and she can't push. She had no Caesar before, so the risk of rupture is very low. So before we used to augment, very low dose and apply this vacuum, so now it's*

not performed. So once the woman is weak, she can't push even if she's got no fetal distress, she's fully dilated, she has to go to the hospital' (P11).

- Management of anaemia: *'It will be the challenges of not having Hb, I am making the example of Hb because so far it is the only challenge and we were supposed to be doing it three times but we do it two times because of the funds and the lab staff'* (P18).
- Fetal hypoxia: *'sometimes you lack somethings that we make use of on a daily basis, like find that we don't have the Doppler'* (P15).
- Medication: *'there is shortage of medication, usually we have shortage of calcium, but now we are fine'* (P20). *'you find there is still struggle for certain medication....' 'There is no availability of certain medications'* (P10).
- Dry dispensary: *'in terms of dry dispensary, only to find like for instance you wanted some surgery, you wanted to go do an insertion an implant or removal of implant, and you found out the facility doesn't have the dry dispensary'* (P03).

However, the problem of shortage of equipment was not universal, as one facility manager pointed out: *'No in this unit. because if ama-equipment, I've got 4-5 CTGs. I've got so many things that I don't really have the problem'* (P14) which was echoed by another participant from the district management *'Equipment no (problem)'* (P01).

The participants believed that the DCST could play a significant role in terms of management of equipment: *'I know they were instrumental; a lot of things they were getting'* (P10). The examples given by the participants are as follows:

- Equipment ordering: *'we can also tell her (DCST-PAED) if we are running sort of other equipment's like baby warmers. She is the one who is combining. They are the ones combining with the procurement to order for stock for us, medical equipment's, like CTG machine, BP machine, all the medical equipment that we are in need of'* (P16).
- Procedural support: *'when we need some of the things we don't get them on very same time because we are supposed to make an order and hand it over to them and they are also supposed to take it to the central office of which it will wait for some signatures before it gets to us. And but mostly things are not as bad as before. So we are able to get and they are able to organize, like we do have a WhatsApp group so if we are having a problem we just contact them or put the message on the group so they can organize from other sites or from other districts like Jo'burg and Sedibeng'* (P16).
- Post-delivery support: *'on the same day when they are delivered, we call them to come and assist in training with the supplier'* (P16).

- Specific equipment: One participant acknowledged the role of DCST *'DCST-PAED is one doctor that motivated the district to purchase for us the uniform resuscitation trolley for the baby'* (P17).

Other equipment and consumables

A number of participants mentioned challenges with procuring other equipment and consumables, examples of which are listed below:

- Computer and Printer: *'to perform some duties need cartridges, computers and whatsoever...the resources that we need to be using, most of the time you find that we don't have the cartridge, when we transfer the patient. But you find no photocopy machine, no cartridge to print whatsoever. So when coming to resources we are really struggling'* (P15).
- Training resources: *'sometimes we lack some resources, training resources so when they come to train we need to organize them probably overhead projector, lighting, lamps, as well as the extension cords, which they don't have'* (P03).
- Gloves: *'The only thing is resources that's the only thing that we have problem with, in terms for examples, glass, a simple glass (GLOVES), you find that we end up using the sterile glass (GLOVES) due to the unavailability of the non-sterile of which it may cause a problem and also stationary is also a problem so if also they can sort that one I think we will be ok'* (P19).
- Consumables: *'we still have challenges that here and there, especially in..... stock shortages'* (P19).
- Transport: *'The things that affect most of us is the resource. We have minimum resources because for them to come down they need a car'* (P15).
- Catering: It affects the patients delivering in the MOUs (*'The challenges that we are having is with the MOUs when it comes to patient's food, our patients as we admit them like when they are delivering they stay for six hours if it's during the day then after six hours we discharge them home, but this is if the six hours is will elapse during the night so the patient have to sleep over and go the following day'* (P15)) as well as staff (*'they don't have food for us, they just serve us tea and we have to sit from 11:30 until 15:00 and we don't have lunch and otherwise they are doing well'* (P20)).

SPACE

Structural problem and lack of space were identified as other challenges affecting service

delivery. Examples provided by the participants are listed below:

- Structural problem: *'In terms of structure, first of all the structure is not conducive... 1st visit needs a privacy as we want private information from patients' (P12).*
- Lack of space: *'we don't have a MOU. But we still need to refer to another facility which is also overcrowded' (P10).*
- Lack of space to deliver babies in the PHC facilities: *'Sometimes they deliver in an admission room instead of labour ward because maybe if it is 4 that side they just have to, because sometimes you find that we have 4 deliveries in 1 hour' (P13).*
- Lack of MOU: *'In terms of access, of a big facilities (FACILITY), they should have long more or less seen the need for a MOU to be available here' (P10).*
- Introduction of new services without adding space: *'They introduced these services where they were not supposed to be like, this was an ordinary CHC which was not having the maternity service included and then when the decision just came' (P14).*
- Lack of theatre space: *'Other challenge is the theatre.... we have to share theatre with all those departments. We found that we are using one theatre for almost all emergency, Gynae & Obstetrics' (P07).*

However, none of the participants described how DCST members could play to alleviate these challenges associated with space.

HUMAN RESOURCES

Human resource management was identified as another challenge associated with MNCWH services. Examples provided by the participants are listed below:

- Lack of understanding between doctors and midwives at the MOU: *'In terms of the midwives in the MOUs and also some of the other doctors when they are on call, they are not familiar with the maternal cases, so the midwife's actually they say that no we are not even going to call a doctor, if they run it to problems they'd rather refer on their own' (P11).*
- Rotation of staff: *'when we also have a change of i-staffing, you'll find mangithi mhlambe kuwenziwa some rotation or whatever, you'll find that there'll be new midwife's that are not very skilled' (P09).* This problem seems to be more in PHC clinics operated by the local government: *'what happens in mostly in our COE clinics is that we've got rotation and you know every 3 months people rotate and it's a new person that comes in that. They have to render that maternal service where maybe they were at chronic, so to have a person to orientate that' (P08).*
- Lack of skilled staff: *'managers will allocate a novice professional nurse straight from the*

college who does not have any experience' (P01).

- Lack of skilled midwives: *'we need to get an experienced mid-wife to do ANC' (P01).*
- Shortage of staff in PHC facilities: *'if it's a maternal mortality, we sit down and look at the avoidable factors and you find that the avoidable factor of this shortage of staff almost always come as a fact' (P02).*
- Distribution of staff: *'Ethafeni is one of the clinics that's having high deliveries, but with least staff upto the whole district. We have MOUs having 50 or 100 deliveries. But they have more staff than us. Now we are also doing ANC' (P13).*
- Designated staff: *'everywhere you go, you are not going to find a designated sister who is doing ANC alone. You find ANC patient now and the next patient who comes in is a mother and you have to do immunisation. so your concentration is not focused on one thing' (P20).*
- Staff attitude: *'sometimes staff attitude plays a role. You know the nurse, I don't want to say, because my profession is a nurse, but sometimes our nurses are not that passionate about the service that they render. And it might make an impact on to the services, because I am just here to collect my money at the end of the month, I am not really here to look at my patients wellbeing' (P08).*
- Lack of administration staff: *'We don't have admin clerks to cover the 24-hour service and again when you are transferring the patients we are expected to photocopy the file and whatsoever and you find that there is nobody to do that because there are no clerks so that goes to the of staff' (P15).*
- Hospital staffing: *'when mentioning the first visit and all indicators, the problem is in shortage of staff, is a big problem. For this hospital, normally supposed to have more consultants. But right now I am alone' (P07).*

Moreover, the participants pointed out the impact on services due to human resource challenges:

- Medico-legal cases: *'I only have 1 permanent clerk so it means after hours, after 4 weekends, the sisters have to do everything of which is overwhelming. We have a lot of litigations and at the end of the day there are too many things to be written, the tick register, the maternity register, the PCR book, the discharge and whatsoever things. So some othertimes there are a lot of gaps that's what we find in records because of too many things to be performed since there's no enough staff and everything, so it's too much' (P13).*
- Inability to attend workshops: *'there is a workshop somewhere, I have to go and attend. I can't go because there is no other one who is going to do my services.....' (P20).*

In spite of all the human resource challenges mentioned above, the participants still felt that the staff have been doing their best: *‘Just the only thing to keep on supporting staff, be on their side, keep motivating, because some other times it brings negativity at work’* (P13). As another participant mentioned *‘generally I can say we are trying our level best to perform to the level of our abilities’* (P19). The participants believed DCST members could do a lot to support them through communication with District Health Management Team as well as training *‘We do have trainings in the sub district that is conducted by our DCSTs’* (P08).

8.4.3.2 QUALITY IMPROVEMENT PLANS

Quality improvement plans could be used as a tool to mitigate organization risk. This led to changes in organization practice. For example:

- Late ANC booking was identified as one of the commonest factors associated with maternal deaths. As a result of that the District put a major emphasis on early ANC booking. One district manager confirmed *‘We’ve actually supported the facility, together with the DCST to say that ANC’s first visit below 20 weeks should actually be performed daily. Should attended on a daily basis because there are facilities that we are actually booking this month and we said no they should take them early so that we put those who are to be found positive on treatment immediately’* (P03).
- HIV was identified a major cause of maternal death. As a result of that, it was decided to re-test for HIV to detect seroconversion during the antenatal period: *‘Every first visit is supposed to do HIV test and counselling so in every visit when they come we also re-test them because we’ve also noticed that before it used to be every 6 weeks and at week 12 they must re-test again. so we noticed gore they convert while we are still waiting for that 3 months period. So we came to conclusion, every visit, our women are not using protection so we advise them that every visit, they must come and re-test so that we catch them early and put them on treatment and increase the chances of the babies’* (P20).

8.5 PROFESSIONAL DEVELOPMENT

Professional development emerged as another theme brought up by a large number of study participants (n=15, 75%). It is about evidence-based capacity building among the health professionals for improvement of MNCWH services. The categories under the theme of ‘professional development’ are mentioned below:

Table 8.6 Professional development

Category
Continuous professional development
In-service training
Competency standard
ESMOE
On site staff mentoring
Identify opportunities and needs for formal education

8.5.1 CONTINUOUS PROFESSIONAL DEVELOPMENT

The participants acknowledged the contributions of DCST members towards continuous professional development (CPD) for health professionals *'the DCST as their role and also the fact that they have put much effort in terms of educations and they supporting the clinics and hospitals'* (P06). These programmes include:

IN-SERVICE TRAINING

These collaborative training programmes were led by the DCST in collaboration with the MCWH and 'Training unit'.

Examples of topics covered during the in-service training

- *'basic anti-natal care, hypertensive disorder in the big five causes of the maternal mortality but mostly focusing on hypertensive disorders in pregnancy because now they are the leading cause of maternal mortality'* (P02).
- *'helping baby's breath, the ANC workshop, the BANC PLUS' (P17), 'planned ANC, postnatal trainings'* (P03).
- *'emergency for mother (ESMOE) & the Pediatric one, saving babies'* (P10)
- *'changing in the policies and guidelines and protocols'* (P03). This actually *'empower... clinicians'* (P03) with up-to-date information.

The focus of these training programmes was more practical than theoretical *'It's not about theory because we used to get theory, then come they use these dolls and then we see what we are supposed to be doing straight forward we see it. It is not a matter of you are just told you can do this. They do the drills. They do in-service'* (P14).

On the other hand, DCST members also participated in the training organized by other departments: *'If the training unit is training on sexual & reproduction health, DCST is also included to the part of the training to train the nurses and the doctors.'* (P02)

These training programmes has been organized on a monthly schedule covering the District as a whole. *'we have got a time table on a monthly basis, it goes to all the district, covering the district as a whole. We actually expecting all sub-districts to bring some participants from theirs, especially clinicians who are dealing with mother and child services'* (P03).

The pursuance of DCST members in terms of organizing these programmes was also acknowledged *'Because they would sit on our necks, please send doctors, please send, ensuring even the new ones, so they say more. people are trained'* (P10). Another participant mentioned about their punctuality *'I don't think there is anything else because we do have the trainings are all scheduled on time even if we can nominate whoever, if it is late they always say we are going to start now where are the nominees and are there any other people who are coming, so they are always there'* (P16).

Effects of in-service training

One participant mentioned that *'they assisted us to understand BANC well, among the midwives to be able to get early detection of any complications, will be able to refer to hospital'* (P09).

These training programmes also assisted in management of referral. For example, the newly appointed staff were trained to develop an understanding of the referral system in the District *'Yah if we have abantu aba the new ones, you'll find instead of delivering everything here, they will refer everything to Pholosong, so that is where the district specialist has to pick up and say let us train, which they do by giving more training, which they do'* (P09).

The training programme also assisted in introduction of new services such as sonar and introduction of intra uterine contraceptive device (IUCD): *'before prior to them coming, we were not doing like sonar in our clinic, it was like for the hospital. I think, because people are used to see things happening. Now it is easy to introduce more, move things like to put IUD in the clinics which is something that we were not doing previously. and also, I think now even the nurses are doing SONARS in certain areas without the doctor. And also the equipment, in facilities are better'* (P10).

Moreover, training programmes assisted in building relationships and better understanding among staff members *'they were effective in terms of, I would ask them in terms of training. They would say the more you train people, obvious you want to create such relationship by*

whereby even if a lot of people' (P10).

These training programmes also raised awareness: 'So in terms of people being aware, at least when someone does something that is wrong, they are aware that this is not what they are supposed to do. That someone does something wrong; because they don't even know so, at last that one, it was easy for us to say. But training was made available and gone. But now we are still doing, so it was making it more effective for us to enforce compliance, so people were aware of what they are supposed to do' (P10).

Challenges associated with in-service training

The participants also identified a number of challenges for effective implementation of in-service training programmes which are delineated below:

- Lack of funds: *'They are trying, shame, even though they will complain about the funds sometimes you find the training has been cancelled because of funds but they are trying. I can give them 60% out of 100. I think it funds from the Department National. I think if they are getting enough support in funds I think it will be easy for them to do their job' (P12).*
- Fewer training sessions: *'they are doing trainings of which is too limited, it doesn't, cause there's a certain number for municipality and there's a certain number for us but again we also contribute a problem because we are just staff shorted on such people' (P13).*
- Staff shortage in the PHC clinics resulting in poor attendance: *'We are like short staffed maybe we have 2 people who are not on duty, sick or they have their problems we just say no, no one is going because now we have to be compromising the customer service and the service to the patient and the training that we compromise the training of which again is one thing that needs to benefit us then you stuck with the person who doesn't know anything instead of going and push' (P13).*
- Lack of transport: *'I think one of them is the transport. They need to organize the transport sometimes and find that may be the transport in the district is no there. Sometimes they can delay to come to the facilities due to the transport. Sometimes they will come to us and find us busy, so they are unable to continue with the training or whatever visit they are coming to' (P16).*
- Lack of space: *'look for a bigger space for training because last time in MMR meeting we discussed that can they have more space because you find this rotation thing every year' (P13).*
- Challenges with implementation: *'I've been too much training but when you go back to*

your practice, to where you've been practicing, to where you working, there's no opportunity to implement, to put in use. So just keep on going for trainings, there are no opportunities to practice the skill' (P11).

The above comments from the participants confirmed the contribution of DCST members regarding in-service training and their effect on service delivery in terms of a number of challenges, which were nicely summarized by one participant: *'So therefore, they actually come on board from time to time, they are also advisors because some of years we've got challenges, we get some challenges as coordinators, we call them and come and support us. And will go together to some facilities, they come they are always on board. They are really supporting the district very well. we really commend their activity that they are doing for us' (P03).*

8.5.2 COMPETENCY STANDARDS

Maintaining competency standards is another key component of continuous professional development, which was stated by four participants. Examples of which are given below:

- Ideal clinical and national core standards (NCS): *'They do facility support visits. They also get involved when there is an ideal clinical assessment and NCS national course standard assessment and evaluation. They are always there for the district' (P03).*
- Skills-update: *'If they see a need that this training must be performed, then they consult us and they give us the schedule then we send people to go and train, right now the thing that have performed that we love the most the rapid RPR. We are now doing the rapid RPR. They have motivated. We've got the kits. Now we no longer reporting the RPR that is unknown' (P17).*
- Enforcement of service delivery: *'the role of I-DCST team also was to enforce nurses and doctors, health workers, all of them, encourage people ukuthi they must come and they must be booked well and then we start early. ... That's why it's important because the DCST particularly DCST-O&G has been going around' (P09).*

8.5.3 ESSENTIAL STEPS IN MANAGING OBSTETRICS EMERGENCIES

The ESMOE training was highlighted by a number of participants (n=10, 50%) as one of the key components of professional development. One participant especially acknowledged the important role of DCST in terms of ESMOE training *"the achievement with the introduction of the district clinical specialist team, our clinicians are being trained on ESMOE' (P01).* In fact, the DCST members has been coordinating [*"They do the trainings, capacity building, they are*

having a huge impact for ESMOE training on emergency obstetrics conditions' (P02)] and scheduling [‘if you have a very good coordinator like DCST-O&G who is always willing to give ESMOE training, that is always available on the phone.....Last year it was rated as one of the best’ (P09)] of ESMOE training in the Province.

One obstetrician from a hospital mentioned that 100% of his staff were trained in ESMOE *‘they run effective program of ESMOE, good schedule program and when we go to our hospital and say how many we do have and say how many doctors training as mark in our case 100% and will rely on them’ (P06).*

The ESMOE training was also offered to the majority of the midwives working in the PHC facilities *‘it really gives a midwife a confidence of working after they have gone for ESMOE training. So our saturation at the present moment is 98% because I have only a comserv nurse that hasn’t gone for ESMOE training and it’s going to be due very soon, so she is going to attend’ (P17).* Another participant mentioned *‘This is the clinic even if you could go to the statistic, we are at 100% and with the drills, we are also doing well because DCST-O&G and the team, they always come to coordinate us. They always visit us, all the things that are supposed to be happening and what I liked with their ESMOE’ (P14).*

One of the participants suggested the Ekurhuleni DCST members should also train the staff from the adjacent PHC clinics in the COJ, who has been referring their patients to Ekurhuleni facilities *‘Now we are requesting for Ekurhuleni to provide training for those clinics for COJ because they are not doing ESMOE and they are affecting us because complications then come to us instead of going to COJ. It plays a very big role and what I have realised when you talk to other districts you realise we are far better. We are doing well. So I don’t know how they are doing it but there are something more they are doing’ (P13).*

Effects of ESMOE training

Essential steps in managing obstetrics emergencies (ESMOE) training allowed staff to gain confidence to manage emergency obstetrics especially complicated cases *‘Something that they do well is emergency obstetrics. We are even excelling, even though other clinics have got problems like maternal deaths and everything. Things that are performed in ESMOE with us...They are just doing well with teaching us most important complications so that’s why we hardly have maternal death and neonatal death’.* Some of the ESMOE topics mentioned by the participants in this regard include *‘pediatrician helping babies breathe, maternal resuscitation’ (P13).*

Prioritization of poorly performing facilities for ESMOE training might also enhanced its effect *they look at the problem and come up with quality improvement plan. They look at the struggling facility, look at the challenges and assist the facility"* (P15).

8.5.4 ON SITE STAFF MENTORING

Onsite mentoring of staff was also identified as another key component of professional development (n=3, 15%).

DCST members could act as mentors due to their experiences in the areas of MNCWH *'If there's any mentoring, training that is required they are there to assist'* (P01) An example was given by a participant about a regional hospital in the district where their regular visit and mentoring staff improved the services *'they do ama-workshops together.....they've really helped (hospital) It used to be very bad performing but they went in and they tried to help'* (P09).

This mentorship role was especially acknowledged by the participants: *'They are the ones who are mentoring us. Should we have any problem, we go to them. They update us with any new guidelines and everything.....Even if we have guidelines here, you find that it is complicated but the DCST gives us clarity'* (P20). One more participant also mentioned the importance of mentorship to direct staff to the right direction, when things could go wrong *'Their role is to mentor us and to make sure we are at the right track, gives us up to date information about any changes that are happening in the guideline and give us support in everything we do regarding maternal side yah they are just there to support us'* (P05).

8.5.5 IDENTIFY OPPORTUNITIES AND NEEDS FOR FORMAL EDUCATION

Medicine is ever changing and there is a need for regular update through CPD. This is an area identified by four participants (20%), where DCSTs could play an important role. Some of the examples are listed below:

- On-site RPR test kit: One participant mentioned: *'on site RPR test kits, that we have introduced, they have been advocated by the DCST for the district to have those onsite RPR kit, because according to the maternity guideline, the RPR test should be performed on site, so they advocated for that and they say to them'* (P02). Second participant echoed that: *'because we've got a problem in our district of congenital syphilis cases are increasing. But they were actually training and helping as very well on that'*

(P03). Another participant stated: *'for those mothers who are unbooked, late booker. You can just do them in the house and get the result and transfer the baby in the facility or manage the baby in the facility and the bicillin now are available in our Pharmacy'* (P12).

- Cervical cancer screening: One participant mentioned: *'when we introduced from convectional pap-smear, cervical cancer screening to LBCS, they actually came also to training us to say "now we are doing liquid based cytology' (P03).*

8.6 ACCOUNTABILITY FOR MATERNAL, NEWBORN. CHILD AND WOMEN'S HEALTH

Accountability for MNCWH emerged as another theme brought up by a large number of study participants (n=19, 95%). It is about accountability and creation for demand for improvement of MNCWH services. The categories under this theme are mentioned below:

Table 8.7 Accountability for MNCWH services

Category	Sub-category
Accountability to community	Community dialogue
Accountability to district health management team	Engagement with district management Resource mobilization Equipment, medication, and consumables Space Human resources

The accountability can be further sub-divided into accountability to community and accountability to the organization.

8.6.1 ACCOUNTABILITY TO COMMUNITY

8.6.1.1 COMMUNITY DIALOGUE

PATIENT ASSOCIATED FACTORS

Communication with stakeholders including community is important to reduce death due to patient associated factors. Without active support of the community and their understanding of the services and risk associated with maternal and neonatal services, it would be nearly impossible to improve these services and the indicators associated with it. A participant provided an example: *'they are supposed to be coming for example from 30 weeks if a patient is a previous caesar. we bring them back every two weeks depending on the different condition*

that they have, some complain why we bringing them too soon and if they come here and the next weeks you want to see them, then they start to complain that you are giving me, my work bosses are complaining and I don't have time to come to clinic I also have other stuff to do' (P18). A situation like this, could put the patient at risk of a ruptured uterus. Another participant gave another example: *'The other challenge will be the issue of our clients. In terms of the clients, they miss their dates, they don't take their treatment as explained to them. in terms of the danger signs that are being taught to them'* (P19). Increased mobility was mentioned as another challenge: *'there's a lot of moving around where in you find that you started a person here for antenatal and then she decides to go to Limpopo. When she comes back, already the date has long passed and then she has complications'* (P19). Teenage pregnancy was another challenge which would require active engagement with school health services as highlighted by another participant *'Even there I'm using the school health to just talk about it at school because these are mostly the teenagers that are not coming early at clinic because they are also hiding the pregnancies because they are at school'* (P14). These challenges associated with 'patient related factors' could only be addressed through community dialogue for taking accountability of health.

LIAISON WITH HEALTH PROMOTERS

Liaison among DCST, PHC staff and health promoters could be an important step to address the challenges mentioned above. One participant provided an example of a situation where a patient mentioned to her: *'We are able to see coming early, knowledge of danger our signs have increased. We know when the first visit we can go, sit with the sisters, they will explain, what you are told, they will tell you once I have bleeding, I must come, I must go to hospital, once I have headache, Once I have, so already they are aware of whatever. They will tell you if caesarean section, they will make sure they understand. They will tell them what they must eat, all of dangers, so that you are aware when you are pregnant this is what not to be presented'* (P16).

LIAISON WITH WARD BASED OUTREACH TEAM

The ward based outreach team (WBOT) is one four arms of PHC re-engineering introduced by the NDoH in 2012 (NDoH, 2012). Liaison with them could be important for development of health preventative and promotional activities for active engagement with communities for improving their own health: *'we have a challenge Yokuthi i-community is still not invaded'* (P09). As a result of that it is difficult to improve the ANC indicators such as ANC visit before 20 weeks rate: *'We have a challenge of people presenting after 20 weeks of pregnancy of*

being pregnant in the facilities because we have not yet established a system where we can detect women that are less than 20 weeks. You know they only come to us' (P09). Another participant expressed her belief about WBOTs playing an important role: *'It is only places where there are WBOTs that go out that are able to find women that are less than 20 weeks'* (P05). She acknowledged that DCST in the District has been trying with the WBOT to address it: *'I think it is specialist team that has been trying to address working with WBOTS to say how do we let the community be involved and be able to understand that you don't have to stay till it shows'* (P09). The DCST members has been training the WBOTs so that they could identify the women with early pregnancy and refer them to the ANC as early as possible if any abnormality was detected: *'Once you know ukuthi you are pregnant, come to the clinic early so that we can detect whatever abnormality at a very early stage and with the WBOTs that are there they are also trained by the DCST team, You know you find women now that do present'* (P09). The effectiveness of this interaction could be demonstrated in the improvement of the ANC booking below 20 weeks rate: *'Now we have improved and we got first visit WBOTs and Counsellors, they go outside and tell the patients as soon as you find out you are pregnant then come and book on ANC. So we getting 14 weeks, less 20 weeks they come and we manage to reduce maternal Deaths as soon as you discover that a patient is having a problem and you can manage that patient unlike the patient come for booking on that point it's difficult to manage that patient in a good way'* (P12).

8.6.2 ACCOUNTABILITY TO DISTRICT HEALTH MANAGEMENT TEAM

8.6.2.1 ENGAGEMENT WITH DISTRICT HEALTH MANAGEMENT TEAMS AND PROGRAM MANAGERS

Engagements with DHMT and programme managers were reported in both formal and informal settings. In a formal setting *'DCST-O&G & DCST- AM attend higher meetings they able to be like a channel between the clinics and decision makers'* (P06), as one participant mentioned *'We don't sit in the district meetings. We only have M&M meeting once a month where we meet. Maybe, I don't know, the nurses are meeting, but doctors level, we are not sitting in the district meetings'* (P07). One participant felt that DCST members could play an important bridging role between DHMT and PHC facilities staff as the PHC staff did not have access to DHMT *'Sometimes you find that it is difficult to connect with the people above, and you have a case now only if they can find a way to step down to us more often like the support visit. We really need those support visit so the challenge will be the communication between us and them. Sometimes you find something that has been, if I can put it in an aggrated, you only find it when they, how do they call it, only when the litigation comes up, do you learn that'*

(P18). Another participant suggested that DCST could be a role model for DHMT: *'we do have meetings where we meet them quarterly. But sometimes you find that they have other commitment, they can't come to those meetings. I think if possible on their side they can have their schedule to say, maybe quarterly they are coming the facility to have support visits as the District Clinical Specialist Team'* (P15). One participant mentioned the challenges of too many meetings in the District, which might be reason for lack of visibility of the DHMT in sub-districts and PHC facilities.

8.7 CONCEPT OF CLINICAL WORK

Although it is not included as a part of the proposed four pillars of the DCST policy framework, clinical work undertaken by DCST members was mentioned by five (25%) participants. One participant stated: *'I was told that 80% of their work supposed to be clinical and 20% admin but that one I cannot attest to say they are doing that. But shame they are trying their level best'* (P01). The categories are mentioned below.

Table 8.8 Clinical work

Clinical responsibility
Clinical work at PHC clinics and hospitals

8.7.1 CLINICAL RESPONSIBILITY

It was felt by the participants that their clinical work should be scheduled at both hospitals and PHC clinics, so that patients and health professionals could benefit from their expert skills such as ultrasound: *'It can be scheduled in such a way they have important time to do the clinic work, be in the MOU, go see, there is midwife, do the sonars for them, run. It will help the patient who are travelling from the clinic to come here for a sonar or hypertension or this or that'* (P06).

Their expertise could also assist in skill transfer in doing clinical examinations (symphysio-fundal height plotting) diagnoses (such as ultrasound) and operations in hospitals (such as hysterectomy): *'the clinical work should be such that it involves a lot of teaching and skill transfer from them to other medical officers in a particular institution'* (P04).

8.7.2 CLINICAL WORK AT PHC CLINICS AND HOSPITALS PHC FACILITIES

PHC FACILITIES

It was mentioned that their clinical skills definitely assisted the PHC facilities especially the MOUs: *'They are sort of a support for MOUs. Because this is the area where we don't have a stationed doctor. So their role is very important because they are supporting us throughout so that we can make informed decision regarding the patient before we can transfer to the next level of care'* (P17).

HOSPITALS

The participants acknowledged the important role played by DCST members at all levels of hospitals in the Ekurhuleni District: *'they are also doing the work at hospitals, as commuted overtime. They are also putting hours, especially at the district hospital, Germiston hospital, to see they can improve these'* (P08).

Their roles as specialists in their respective specialties empowering health professionals were also acknowledged by the participants: *'They seem to be as leading from the front and also to be respected by their peers....their role as a specialist to sort of come on board and help to empower, you know, the medical officers within the different disciplines to be able to do, over and above, what a normal or an average general practitioner within a department could do'* (P04).

Thus, the leadership and oversight roles of DCST members in clinical fields were acknowledged over and above their other roles and responsibilities. They believed this would assist in skill development within the District workforce.

8.8 MONITORING AND EVALUATION

Monitoring and evaluation also emerged as another important theme not included in the four pillars of the DCST policy framework. The monitoring and evaluation work undertaken by DCST members were mentioned by 15 (75%) participants. One participant stated that: *'....they are also trained on what DHIS of which is very very good, they are able to go in and take the information and be able to see the underperforming facilities'* (P01).

Another participant even mentioned '*They are here to improve the indicators, the APP indicators*' (P01)

A number of participants accepted that the improvement in the MNCWH indicators since their appointments in 2012: '*We can see it our mother and child indicators there is an improvement*' (P08).

One participant mentioned their modus operandi in terms of improving the MNCWH indicators through identification of poor performing facilities and regular visitation and implementation of quality improvement plan through close monitoring and regular evaluation: '*If the program is not doing well in terms of certain indicators... they identify facilities that not performing or poorly performing in those indicators; They integrate with MCWH program and initiate to visit the facilities....And they share their best practice with us and also those best practices are also shared with the facilities that are not performing well*' (P02). The participant felt strongly about the role of DCST in improving indicators: '*without DCST at the district, MCWH will fall*' (P02).

The comments of participants in terms of involvement of DCST with certain maternal health indicators are categorized below:

Table 8.9 Monitoring and evaluation

Category	Sub-category
Indicator (general)	
MNCWH Indicator	Reproductive healthAntenatal Intranatal Post-natal Maternal and Newborn mortality
Quality management	Quality Improvement Project

8.8.1 REPRODUCTIVE HEALTH INDICATORS

8.8.1.1 COUPLE YEAR PROTECTION RATE

Couple year Protection Rate (CYPR) is the most important pre-natal/ family planning indicator. It measures success and failures of family programmes. The GDoH and the Ekurhuleni District put a lot of emphasis on this indicator as they were not performing well: '*then the indicator that we are not performing well in is also the couple year protection rate under the MCWH, the indicator*' (P01). The reasons for underperformances were stated by the participants:

Firstly, the problem of condom-distribution: *'it's the condoms that is also affecting that and that condoms is not most counted at the facility. It's counted at the PDA site, that is why even if they can give how many condoms from Phillip Moyo, it's already reported at PDA site'* (P08).

Secondly, unavailability of IUCD and injectables: *'We had a period that we did not have any IUCD in the district, but now we are back, people have been trained and the doctors are helping also to be able to gain that skill, its coming gradually, The only thing that was drug stock-out in the past month it was Nur-isterate but we are giving them something an alternative of injectable'* (P17).

Thirdly lack of skill for insertion of IUCD: *'But the thing is train the trainer, that was trained, after getting the skill, still you know we are reintroducing it again'* (P17).

Fourthly, lack of community awareness and difficulty to reach outside clinic clients, which has been subsequently addressed by health promoters: *'it is really difficult to connect with the partner outside patient and the understanding yama-patient as to why they are supposed to come to clinic which makes it difficult for the district to meet the target because reaching out to the patient is very difficult...plus with the cultural diversity that we have. But health promoters are helping us to advertise it'* (P18).

Fifthly, the misconception about newer contraceptive 'implanon' *'we are promoting is the implanon and people are still having misconception about the implanon, mostly because as much as we try to explain how it works and the advantages relating to the implanon, but they are still sceptical in terms of putting it in, because they have this means that it makes their arms green, they bleed yeah, all those side effects but if you explain to them, some of them do agree to put it on so with that'* (P19).

The majority of the participants (n=10, 50%) accepted the contribution of DCST members for improvement of the District's performance related to this indicator: *'since we have integrated with DCST, there is an improvement in those indicators because when we are at the facilities, we do quality improvement plan together with the staff'* (P02).

The following points were mentioned by the participants as a probable reason of their success:

Firstly, they assisted in teaching the methods of calculating the CYPR: *'we were not calculating couple year protection correctly because with the oral contraceptive we were giving, we were just writing one as an individual instead of writing you have given me 3 tablets. So they helped us in calculating this couple year protection so that we can at least get the correct formula'*

(P17).

Secondly, they visited the under-performing facilities and worked with the facility staff to develop a quality improvement programme: *'they do come on quarterly basis to see how are we performing so as a facility last time when they were here, it was not bad, it was climbing'* (P17). Another participant confirmed it saying: *'We call them all that are involved and together do the quality improvement plan and they share their best practice with us and those best practices are also shared with the facilities that are not performing well'* (P02).

Thirdly, they assisted in development of an action plan: *'as I've said we actually got some action plans in order to improve from that rate'* (P03).

8.8.1.2 TEENAGE PREGNANCY

One participant mentioned the challenges associated with teenage pregnancy: *'they come late because of stigma'* (P09).

8.8.2 ANTENATAL INDICATORS

8.8.2.1 ANC BOOKING

'Antenatal booking' was identified as one of the major causes of maternal and neonatal mortality. The District's under-performance for its indicator *'Antenatal booking before 20 weeks rate'* was accepted by the majority of the participants (n=12, 60%). They also agreed about the current improvement: *'We are improving if I can compare with lets 3 years, 4 years ago'* (P20) and *'Our first visit Antenatal, we have improved, we have been reaching our target, so with that one we are very happy'* (P08).

In fact, one participant mentioned they became best in the Gauteng Province: *'The indicators we are performing very well as compared to the other districts in Gauteng. ANC 1st visit before 20 weeks it was so low, but now we are sitting at 65.9 and the target is 66. And with ANC coverage as a whole, the target is 80 we are above the coverage, we are sitting at 89. It's more than 80'* (P01).

Some of the reasons for previous under-performance as delineated by the participants are listed below:

Firstly, patient related factors: *'women are not coming to clinic early....they are having some social problem, they are caring for their old mothers'* (P17).

Secondly, another patient related factor associated with multiparity: *'those are the mothers that have more babies like 3 or 4. They are having that thing that we are having an experience, so we cannot just go to the clinic while we are still on first trimester'* (P16).

Thirdly, traditional issues associated with pregnancy: *'If you go to clinic early people will be seeing you and then you will get a baby that is not normal and whatever, so they hide pregnancy until such time that they are sure at 6/7 months, they are sure now that they are pregnant'* (P14).

Lastly, organizational factors: *'ama-clinics they are too much over-crowded with limited staff, some of the patients they need to be turned away. Because like yesterday they went home at 19:00 hrs instead of 16:00 hrs because they were many'* (P13).

The participants mentioned a number of steps taken by the Ekurhuleni District under the advice of DCST members to address them, such as improve accessibility by offering week-end services: *'they can't access the clinic in such a way that we as the district there are facilities that are rendering services in weekends, but the attendance it's not 100%'* (P17).

8.8.3 INTRANATAL INDICATORS

8.8.3.1 DELIVERY IN FACILITY

One participant mentioned it was not a problem in the Ekurhuleni District: *'Ours as the MOU, we are still the best because we are rendering 24 hours' service. We are always beating the target because our target is to deliver 150'* (P16).

However, one sub-district manager mentioned about her concerns about few babies who were born outside facilities, as they were often associated with increased risk of mortality and morbidity: *'what we are experiencing, what we are having is a lot of BBA's that is our biggest problem is these BBA's'* (P08).

8.8.4 POSTNATAL INDICATORS

8.8.4.1 POSTNATAL VISIT

Postnatal visits were also identified by some participants (n=5, 25%), as one of the MCWH indicators where the District had been under-performing but improvements were noticed after the introduction of DCST: *'we've got also this postnatal care within 6 days. Our facilities are actually getting there, we're coming closer to the target, we actually reaching the target in terms of the PNC as well'* (P03).

Some of the reasons provided by the participants for the previous underperformance are listed below:

- (a) Overcrowding at the MOUs: *'Before all the mothers used to go back to their MOUs for check-up,....there is overcrowding in the MOUs. So instead of them focusing on the deliveries only, on them they have to focus on the check up and it is doing well'* (P02).
- (b) Cross-border facilities: as some patients come from the City of Johannesburg to deliver in the Ekurhuleni District but attend their post-natal check-up in Johannesburg: *'we are at the border-line of the city of Johannesburg. So now most of my clinics that are referring here are from City of Jo'burg. Now post-natal they are doing their 3 to 6 days post-natal visits'* (P16).
- (c) Lack of coordination with local government facilities: *'some of the facilities especially the local government one, they were having a problem initially because they were not agreeing to do the three days check- up but then after discussion, now they are doing them'* (P15).

One participant mentioned collaboration with local government as the majority of the PHC clinics in the Ekurhuleni District were operated by local government: *'Mothers post-natal we were not doing well, we then engaged local government. Remember we've got Ekurhuleni 93 facilities and there are about 10% of those facilities they belong to province but the rest, 90% they belong to local government'* (P01).

Another participant provided an example of an intervention introduced as per advice of DCST: *'the implementation has been recently implemented here in Ekurhuleni before we introduce mother post-natal care within 6 days to be performed at the clinics from May 2018. Together with the DCST we managed to implement this mother post-natal care within 6 days effectively, for the mothers to go to their facilities after delivery, to their clinics on 3rd to 6 days postnatal'* (P02).

8.8.5 MATERNAL AND NEONATAL DEATH

8.8.5.1 MATERNAL DEATH

A number of participants (n=6, 30%) specifically highlighted the contribution of DCSTs in terms of improvement of maternal deaths in the District: *'there is an improvement especially with the maternal deaths. We had a lot of maternal deaths, at our 2 hospitals. But there is definitely an improvement and we are very happy about that'* (P08).

One facility manager proudly mentioned about their achievement of preventing deaths in the MOUs: *'In our clinic we are at zero maternal death, especially maternal death'* (P14). However, still there were number of maternal deaths reported in hospitals and one respondent attributed them to patient related factors: *'we are not working together because some patients are coming late or not booked at all so our performance is really not that great. We could do better'* (P18). One participant attributed the reduction in maternal deaths due to success of the roll-out of ante-retroviral therapy: *'We know at one stage we had issues regarding impact of HIV/AIDS which actually got a huge role to play in terms of both the indicators that I have given the examples, maternal mortality ratio.... There was a time we really struggling because most of these deaths, you know, were attributed to issues pertaining to HIV/AIDS. But once ARV programme started, we got as many as people on board, we managed to then reduce mother to child transmission by very significant percentage to an extent that last time I checked that it was less than 2%'* (P04).

8.8.5.2 STILLBIRTHS

The challenges associated with stillbirth were mentioned by four (20%) participants. It remained a problem both in PHC facilities [*'we do have most of macerated of which that is my challenge that I need to search about it because once you have a macerated stillbirth'* (P14)] as well as in MOUs and hospitals [*'at a certain time, we had a lot of stillbirths reported at our hospitals as well at our MOUs'* (P08)].

One participant mentioned about the intervention measure being introduced in collaboration with the DCST to address this challenge: *'But our mother and child together with the DCSTs, we are putting efforts in place with EMS, because you know, all of those factors works together to improve'* (P08).

8.8.5.3 NEONATAL DEATH

The participants felt that neonatal death was not a problem especially in the PHC facilities: *I really don't have neonatal and late neonatal. We are at zero neonatal*' (P14).

8.8.6 QUALITY MANAGEMENT

Two participants specifically gave examples of quality improvement plans developed in association with the DCST for the improvement of MNCWH indicators:

8.8.6.1 QUALITY IMPROVEMENT PLANS

One participant mentioned about a quality improvement plan designed to improve MNCWH indicators in collaboration with DCST members: *'as for their role like I said is to continuously do monitoring and evaluation to ensure that you identify areas of non-performance and you come up with quality improvement plans to be able to address those areas of non-performance and you also have to identify areas, perhaps where we are exposed to things like litigation what is causing that and come up with plans to be able to prevent'* (P04).

One respondent felt that quality improvement projects (QIP) should also include prevention strategy and training need assessment within different departments and gave an example of introducing specialized diploma programme for doctors (P05). One facility manager mentioned about a QIP for a clinic to improve the CYPR *'we had some sort of QIP to try and say how do we increase this couple year'* (P09).

8.9 LEADERSHIP AND GOVERNANCE

Leadership and Governance also emerged an additional theme not included as a part of the proposed four pillars of the DCST policy framework. Although it was explicitly mentioned by four (20%), it was still included as a theme because of its importance.

Table 8.10 Leadership and Governance

Category
Leading the team
Governance
Centre of Excellence

8.9.1 LEADERSHIP

They acknowledged that DCST members were senior clinicians and had an important role to play as leaders within the District and a positive impact within the District: *'in terms of performance, everybody is trying to play their role and we can see also in the outcome that yes, they do have a positive impact'* (P04).

However, it was felt that there was a need for proper coordination among them to avoid the risk of duplication and to improve efficiency: *'You are no longer efficient. Meanwhile if there was proper coordination ... within the structure, this...will not happen'* (P04).

Another respondent felt they should be able to coordinate services within their specialties in all the facilities within the District and they should on a regular basis interact with clinical head of department (CHoD) and unit (CHoU) from hospitals and they should actually become a voice of the District when issues of that particular speciality were actually discussed *'their voices within the hospitals specifically where they have their counterpart's specialists, I think it's a bit diluted on one way or other'* (P05).

They felt: *'there is this gap where hospitals autonomous as they are sort of reluctant you know to allow the members of DCST to play that central role in trying to put them together, in trying to influence the agenda.....that's what they are here for to play overall oversight role'* (P05).

One respondent suggested elevating their level from a CHoU to a CHoD to fulfil the oversight responsibilities mentioned above: *'one way to do it is to appoint district specialist team at higher level. At the moment they are at a head of the unit level. Perhaps if they were to be appointed as a head of the department level, then they will be able to exercise this kind of authority over the HoUs who are in the hospitals. At the moment they are at the same level'* (P05).

8.9.2 GOVERNANCE

One respondent mentioned about the issues of governance and reporting lines. The DCST members within the District report to the head of the District i.e., chief director and suggested addition of a clinical manager to the team to improve reporting: *'clinical manager will easily run with the day to day coordination of the team & report you know directly to the chief director, meanwhile the members of the team actually focus on their core business which is to look at their specific areas'* (P03).

8.9.3 CENTRES OF EXCELLENCE

One participant believed that the DCST team members *should have a 'sort of a panoramic view over all the facilities'* (P04). Based on a worldwide trend, he proposed establishment of centres of excellence, so that all the resources could be rallied around those centres to get the best value-added services: *'Meanwhile worldwide, the trend is to establish centres of excellence, so then you rally around all the resources around those centres so that you actually get the best value for money'* (P04).

He proposed that the ministry has to be reminded somehow that the team should actually be expanded to improve all other specialities to have a bigger impact: *'the ministry has to be reminded somehow that the team should actually be expanded to improve all other specialities'* (P04).

8.10 SUMMARY OF THE CHAPTER

The results obtained from the analyses of key stakeholders' interviews (n=20) are presented in this chapter. These interviews were performed with actors at different levels of the District health services in the Ekurhuleni Health District using an interview guide developed for this study to gather information. The analysis of the transcripts revealed seven themes, four of which are similar to the DCST policy framework (namely clinical effectiveness, clinical risk management, professional development, accountability for MNCWH) and another three new themes (namely clinical work, monitoring and evaluation, leadership and governance). All participants acknowledged the important role played by DCST members as change agents and their positive impact for improvement of MNCWH services, which reflected on the improvement of MNCWH indicators. Their role as clinicians, communicators, mentor, negotiators, trainers, and researchers were highlighted. Participants proposed various suggestions, which included increased support visit, employing increased number of DCST members, improving the position of DCST to a higher level (HOD) and establishing DCST in other disciplines.

CHAPTER 9

DISCUSSION

In this chapter, the results obtained from the analysis of the data are discussed and compared with those from other published studies. Furthermore, in some instances, the researcher attempted to explain the findings according to her own hypotheses. Although not every aspect of the findings is discussed in this chapter, selected important topics from the study are covered.

9.1 INTRODUCTION

Based on recommendations from a Ministerial Task Team following stakeholder consultations, South Africa's National Quality Policy framework established the role of the DCST as: *'[The] DCST should ensure quality in clinical services; provide clinical training, monitoring and evaluation, support district-level organisational activities, support health systems and logistics, collaboration, communication and reporting, teaching and research activities* (NDoH, 2011c).

In South Africa, the DCST members are seen as focal persons for clinical governance of MNCWH within a District health system (DHS). In a clinical governance setting, an ideal role set may comprise all health care professionals responsible for ensuring quality in service delivery (Campbell, 2002; Som, 2004; Tait, 2004). In the DCST policy framework, an ideal clinical governance role set envisages collaboration between the DCST members and various stakeholders working within a DHS as well as the community it serves. These include existing hospital-based specialists, members of district health management team (DHMT), maternal, newborn, child and women's health (MNCWH) managers, and coordinators at a sub-district level, health professionals, including staff working with other streams of PHC reengineering (ward-based outreach teams (WBOT) and school health teams) (NDoH, 2012a).

This study was developed to evaluate the role of DCST members within that complex role system in the Ekurhuleni Health District. The researcher first considered the key legislations and policies for MNCWH in South Africa to develop a conceptual framework. Then, she examined the maternal health indicators from 2011-April to 2020 March. Afterwards, she appraised the various DCST reports since their inception to evaluate these interventions against the DCST policy framework and lastly, she included an analysis of interviews of key informants from the District to assess their opinions about the role of DCST members in the change of maternal health services as well as usefulness of DCST interventions in the District.

9.2 MATERNAL HEALTH INDICATORS IN THREE SUB-DISTRICTS IN EKURHULENI DISTRICT

9.2.1 MATERNAL HEALTH INDICATORS

The DHIS routinely collects information for South African health system. This study focused on the maternal health indicators for the study period from 2011/12 April to 2019/20 March i.e., nine financial years to document any change immediately before and after the introduction of DCST (in July 2012). The researcher decided not to include any data beyond April 2020, when the COVID-19 pandemic disrupted all the services including MNCWH services.

9.2.1.1 CHANGES IN THE MATERNAL HEALTH INDICATORS SINCE 2011/12

A comparative analysis of maternal health indicators for 2019-20 among the Ekurhuleni District, Gauteng Province, and whole of South Africa, based on the data from District Health Barometer (Massyn, Day, Ndlovu, et al, 2020) is described in Table 9.1.

Table 9.1 Maternal Health indicators

	Ekurhuleni*	Gauteng	South Africa
Reproductive health indicators			
Couple year protection rate	51.4	43.7	54.5
Antenatal indicators			
Antenatal 1st visit before 20 weeks rate	66%	66.5	69.7
Antenatal client initiated on ART rate	96.7	97.2	96.2
Intranatal indicators			
Delivery in 10 to 19 years in facility rate	7	7.5	13.2
Postnatal indicators			
Mother postnatal visit within 6 days rate	73.8	85.5	80.1
Outcome indicators			
Maternal mortality in facility ratio	115	102.9	88
Neonatal death in facility rate	11.2	12.4	11.9

*For Ekurhuleni 2018-19 financial year data from findings of this study were used

The analysis of nine years of data (reported in Chapter 5), revealed that there were improvements in the majority of these indicators, although these changes were not uniform. This District was one of the worst districts at the time of inception of DCSTs (Massyn, et al, 2013) in terms of *In-facility Maternal Mortality Ratio* and therefore its progress related to this outcome indicator linked to SDG 3 is important. The series of '*Saving mothers reports*' (NCCEMD, 2012; NCCEMD, 2014; NCCEMD, 2018; NCCEMD, 2020) as well as *Guidelines*

for *Maternity care in South Africa* (NDoH. 2016a) and some of the specific policies, provided guidance to DCST activities. The following are some examples of linking the DCST members to the improvement in maternal health indicators.

Reproductive health indicators

In terms of *CYPR*, the District achieved more than provincial and national averages, because of a significant increase in *CYPR* during this period, indicating improvement of family planning services. This finding is similar to the one reported in the North West Province for the period 2011/12 (prior to implementation of PHC re-engineering) to 2014/15 (three years after implementation of PHC re-engineering) (Assegaai, Reagon, Schneider, 2018), which was attributed to the PHC re-engineering especially WBOTs. Besides WBOTs, the improvement in *CYPR* in Ekurhuleni District was possibly due to regular availability of injectable contraceptives, including newer long-acting contraceptives (such as Implanon). Analysis of DCST intervention reports and interviews confirmed the role of DCST members in terms of regular availability of injectable contraceptives, training of staff for insertion of IUCD and Implanon. In addition, teaching the methods of calculating *CYPR*, regular visits to under-performing facilities, co-designing quality improvement programmes and action plans with facility staff based on the *National contraception clinical guideline* (as amended) (NDoH. 2013c) might have assisted as well. However, lack of progress in voluntary sterilization services, as stated in DCST reports, were of concern.

During this period, there was a significant decrease in *Termination of pregnancy rate*, which probably indicates decline of access to health services. This indicator is closely associated with unsafe abortion, which is a preventable phenomenon and continues to be a major public health problem in South Africa affecting maternal mortality and morbidity (MMM) (NCCEMD, 2017). It was corroborated with the findings of this study i.e., a significant increase in maternal deaths due to gynecological causes (which was mainly due to unsafe abortion). Despite the liberalisation of the abortion law and the relative availability of more abortion facilities, access to legal abortion services remains a major challenge for many women in South Africa (Turner, Hyman, Gabriel, 2008; Meel and Kaswa, 2009; Kaswa and Yogeswaran, 2020). Lack of knowledge of the time-limited nature of the TOP services (especially second trimester abortion) amongst healthcare users and providers and shortages of public health service providers were identified as a major obstacle to legal abortions in South Africa (Gerdtz, DePiñeres, Hajri, et al, 2015; Harrison, Montgomery, Lurie, et al, 2000), which was more pronounced for second-trimester abortion services (Kaswa, 2021). The DCST reports stated that by 2020, TOP services were being provided by eight facilities (two providing second trimester abortions)

in comparison to five facilities providing 1st trimester TOP services (and no second trimester services) before the introduction of DCST in 2012/13. Although there was an increase in TOP services during the last few years, the District should investigate this as a priority.

Antenatal indicators

The BANC-PLUS guideline emphasised the importance of doing the first antenatal visit as early as possible, with the next visit scheduled at 20 weeks and then repeat visits at 26 weeks, 30 weeks, 34 weeks and then every two weeks until delivery (eight visits). (Pattinson and Buchman, 2016). This study found that the *Antenatal 1st visit before 20 weeks rate* in the District in 2019/20 (66%) was slightly above the provincial and national averages. The significant increases in the *Antenatal First visit before 20 weeks rate* and *ANC patients initiated on ART rate* imply improvement of antenatal services in the District during the nine-year study period. For example, accessibility was improved by offering week-end services. The current *Antenatal First visit before 20 weeks rate* in Ekurhuleni in 2019-20 was 66% which was much higher than reported in a secondary data analysis from three facility-based, cross-sectional national surveys 50.8% (95% CI 49.3 -52.2) (Nsibande, Goga, Laubscher, et al, 2020).

Findings of this study also demonstrated that the District made significant progress in terms of the *ANC patients initiated on ART rate*. As a result of that, it achieved the provincial target. This higher level of ART initiation in pregnancy might be due to integration of ART initiation into ANC in South Africa (Stinson, Jennings, Myer, 2013). According to the South African guidelines on maternal care, HIV diagnosis is one of the assessments that pregnant women must undergo during the first ANC visit and all HIV positive women should be started on ART as soon as an HIV positive status is determined (NDoH, 2015a; NDoH, 2016a). This achievement (*ANC patients initiated on ART rate*. above 90%) since 2015-16, probably reflected in the significant increase in the *Live birth to HIV positive women and* reduction in *perinatal mortality rate*. However, during the last six years, there was no significant decline in *Maternal deaths* due to HIV, which is of concern and would require further exploration. Adherence to treatment during pregnancy and linkage to care from antenatal to postpartum period in South Africa were identified as major challenges (Phillips, Clouse, Zerbe, et al, 2018) and might be a cause of that.

Intranatal indicators

The changes in intranatal indicators were equivocal. There was a significant increase in the total deliveries in facility and *delivery by Caesarean section rate* implying increasing pressure

on the health system. During the nine years of the study period, there was a significant increase (18%) in the population in the Ekurhuleni District (3,178,470 in 2011 to 3,774,638 in 2020) (Ekurhuleni Health District, 2019). However, neither a hospital nor a MOU was built during this period. However, the DCST members have facilitated 24 hours' services in all MOUs since 2014/15 (according to reports) and this has assisted in increasing access. The mean *Caesarean section rate* in the Ekurhuleni was 25.4%, which is comparable to South Africa (24.1%) and Gauteng (25.6%). The case fatality rates were 145.7 and 127.3 per 100,000 *caesarean sections* in South Africa and Gauteng Province, respectively. (Solanki, Cornell, Daviaud, et al, 2020). The low number of maternal deaths (during intranatal period) shows that case fatality rate associated with Caesarean section might not be a problem in the District.

There was a significant decline in the *Delivery in facility rate*, which might be due to improving quality of data as this indicator was often reported to be more than 100% in the past. In spite of that, the *Born before arrival rate (1- Delivery in facility rate)* of 3-4% was still lower than other parts of South Africa (4.6%) (Khupakonke, Beke, Amoko, 2017). This indicator is influenced predominantly by social determinants of health and its improvement would require a prolong period of intervention.

In spite of the significant increase in the *Delivery in facility under 18 years rate* in the District during the period, it was still found to be lower than that of the Gauteng Province and National rates. The South Africa Demographic and Health Survey (NDoH, 2016c) indicated that the proportion of adolescent girls aged 15–19 years who have begun child- bearing increases rapidly with age, from 4% among girls at age 15% to 28% among girls at 19 years of age. The recent increase in this indicator would require broader discussion with all stakeholders within the District. The SDG 3.7d stipulated that by 2030, universal access to sexual and reproductive healthcare services should be ensured, including family planning, information and education, and that reproductive health should be integrated into national strategies and programmes. (United Nations, 2015). A rise in this indicator in this District is a cause for concern, as it indicates challenges in improving access to sexual and reproductive healthcare services for this vulnerable sub-population in this District (Horwood, Butler, Barker, 2017).

Postnatal indicators

The postnatal indicator *Mother postnatal visit within 6 days rate* in the District was well below the provincial and national rates. However, during the study period, there was a significant increase in this indicator. This might be one of the reasons for a significant decline in *Maternal*

deaths (postnatal) during the study period. The DCST members managed to set up a coordination mechanism between provincial health facilities (where deliveries occur) and local government facilities (where postnatal visits occur) resulting in improved access and accountability for this important service. In the past, the data on *Mother Postnatal visits within 6 days rate* were often above 100% probably due to mothers' visiting facilities, which are non-designated for their post-natal check-up (denominator). The District should consider some innovative ways for further increasing postnatal visits such as the use of WBOTs as found in some parts of South Africa (Horwood, Butler, Barker, et al, 2017; Assegaai, et al, 2018).

Outcome indicators

Significant decreases in the in-patient *Maternal mortality ratio*, *Stillbirth rate*, *Neonatal mortality rate*, as well as *Perinatal Mortality rate* signify improvement of quality of maternal health services in the District.

Estimates from both global metrics and institutional reporting, although widely divergent, indicate that South Africa has made considerable progress in reducing maternal and neonatal mortality (Damian, et al, 2019). It was estimated that up to 60% of maternal deaths could be prevented, if healthcare providers had the necessary knowledge and skills supported by a fully functional health system to provide quality emergency care (NCCEMD, 2018). There was a significant decline in *Maternal mortality in facility ratio* in the District ($r=-0.80$) during the study period, in comparison to an increase in the iMMR ($r=0.35$) during the preceding period [(2009 (Jan-Mar) to 2012 (Apr-Jun))]. In spite of this improvement, it was still higher than the provincial and national ratios. Improvement in antenatal and postnatal visits, successful roll-out of ART, effective management in MOUs, institutionalization of ESMOE training and EOST [as recommended by the NCCEMD (NCCEMD, 2009)], by the DCST members might play an important role in achieving that (van den Broek, Ameh, Madaj, et al, 2019). Finding of this study also revealed improvement in *Antenatal First visit before 20 weeks rate* was an important determinant associated with iMMR based on the regression model.

Neonatal mortality in facility ratio in the District was also below the provincial and national ratios. In addition, reductions in *Stillbirth rate*, as well as *Perinatal Mortality rate* during this period signify improvements in intranatal and neonatal services in the District. It was estimated that up to 40% of asphyxia-related neonatal deaths could be prevented, if healthcare providers had the necessary knowledge and skills and access to appropriate health technologies (NCCEMD, 2018). It was probably due to extensive ESMOE training, EOST practices, and clinical mentoring by DCST members in the District.

In South Africa, the largest category of perinatal deaths is unexplained stillbirth, of which up to one-quarter had intra-uterine growth retardation (IUGR). This could be prevented by early recognition of small-for-gestational age (SGA) babies (Allanson, Muller, Pattinson, 2015). Early antenatal detection of problems in these babies is important, as most deaths occur in late preterm or term period. This calls for increased antenatal care visits during the third trimester (Lavin and Pattinson, 2018). However, their detection would require availability of appropriate health technologies (such as doppler ultrasound), which remains a challenge in poor-resourced setting (Lavin, Preen, Pattinson, 2016). This study showed that there was no significant change in the *Live birth under 2500g in facility rate* during the study period, which would require further attention for further reduction in the mortality in these categories. Nkwanyana, Voce, Mnqayi, et al (2019) used WHO health system Building Block (WHO, 2007) to develop a health system framework for perinatal care in South African district hospitals which might be considered for this purpose.

9.2.1.2 PROVINCIAL TARGETS FOR MATERNAL HEALTH INDICATORS

It was noted that there were no set provincial targets for a number of maternal health indicators such as reproductive health (*Termination of pregnancy rate*), intranatal (*Total births in facility, delivery by caesarean section rate, Live birth to HIV positive woman, Stillbirth rate, Perinatal mortality rates, Livebirths under 2500 g in facility rate*). Therefore, it was not clear, how the provincial and district Management has been measuring their progress and developing quality improvement plans to address under-performance.

9.2.1.3 DIFFERENCE AMONG THE THREE SUB-DISTRICTS

Overall, the East Sub-district was found to be doing better in maternal health services in comparison to the other two sub-districts.

The low *Maternal mortality ratio, Neonatal mortality rate* and *Perinatal mortality rate* in the East Sub-district might be due to low *total delivery rate* and higher *Caesarean section rate*. The well-structured network of PHC clinics (n=26), two MOUs and two regional hospitals in the Sub-district might be the reasons for that.

In comparison, the absence of any regional or district hospitals and two over-burdened MOUs in the North Sub-district might affect its maternal health services, which is compounded by the migrant population in suburbs such as Tembisa. The Tembisa Provincial Tertiary Hospital

(TPTH) is the only hospital in this Sub-district and it also served as a referral hospital for neighbouring sub-districts (Sub-districts A and E in Johannesburg and Sub-district 4 in Tshwane). NCCEMD (2020) found that provincial tertiary hospitals managing a large number of patients from lower levels of care who died in their facilities as often the care prior to admission to the provincial tertiary hospital had been substandard. However, there was a high proportion of deaths in provincial tertiary hospitals that probably also had substandard care due to increased workloads in the absence of a district or regional hospital affiliated to it. This might be true for the TPTH, which should consider the establishment of an On-site Midwife Birth Unit (OMBU) within the hospital premises, as close as possible to the labour ward (NCCEMD, 2018). In addition, this Sub-district urgently requires additional health facilities to address the growing demand of MNCWH services from the population.

The South Sub-district is relatively well-resourced with the presence of three hospitals, three MOUs and 34 PHC clinics. However, it also has the largest population in the District. The fragmentation of referral systems in this Sub-district (between Charlotte Maxeke Johannesburg Academic Hospital and Chris Hani Baragwanath Academic Hospital clusters) often creates confusion among the staff resulting in delays in referral and increasing mortality and morbidity. However, this Sub-district has a well-organized network of WBOTs, which probably assisted it to achieve better *Postnatal visits within 6 days rate* in the District.

9.2.2 MATERNAL DEATHS IN THREE SUB-DISTRICTS IN EKURHULENI DISTRICT

Although the data on the maternal deaths (number and in/out of facility) were routinely collected by the DHIS, the data collection for periods of maternal deaths (antenatal/ intra-natal and post-natal) and causes of maternal deaths were only initiated in 2014/15 in the Ekurhuleni District at the behest of the DCST members and routinely analysed and presented at the MMM meetings. This provided an opportunity to review the trends in causality of maternal deaths in the District.

Since 2014/15, there has been a significant decrease in *total maternal deaths*, which is mainly due to a reduction in deaths during the postnatal periods. This might be due to improved postnatal care at health facilities, as a result of clinical mentoring, regular ESMOE and EOST trainings documented in the DCST reports and by the participants of the qualitative components of this study.

In South Africa, indirect deaths are more common than direct obstetric deaths, and non-pregnancy infections (mostly HIV related), hemorrhage and hypertension together account for

70% of maternal deaths (van den Broek, et al, 2019), which is similar to the findings of this study. Since 2014/15, in terms of causes of maternal death in the District, there was a significant increase in *Maternal deaths due to gynaecological causes, which* constituted less than 10% deaths in the District (Table 9.1). Decline in TOP services in the District might have led to unsafe abortion, which was the main cause in this category. Improved access to TOP services should be considered for addressing this category of maternal deaths as mentioned in one of the DCST reports: '*Second trimester TOP is being provided by two facilities by 2020. It is presumed that continuous efforts by DCST might have assisted to expand this service.*'

It was identified that bleeding during Caesarean section was the commonest cause of deaths for hemorrhagic deaths (NCCEMD, 2017). There was a significant decline in *maternal deaths* due to hemorrhage during this period. This might be due to better postnatal management in-facility (as demonstrated by the decline in deaths during the postnatal period), as a result of improved management of labour, improved Caesarean section skills and continuous support from the DCST members, as mentioned by one of the participants (P17): '*DCST-O&G is also supporting the hospitals and helping them on how to manage their caesarean section and everything*'.

There were no significant changes in maternal deaths due to HIV and hypertension, which is of concern. Although the District made significant progress in terms of *ANC patients initiated on ART rate*, lack of adherence to treatment during pregnancy and linkage to care from antenatal to postpartum period might be cause for that. A similar problem might exist for the management of hypertension. Use of adherence counsellors (Phillips, et al, 2018) and risk categorization of patients with HIV and hypertension might address this problem.

Table 9.2 summarised the causes of maternal deaths in the District (derived from findings of this study) and compared with the data from the Gauteng Province (derived for the periods 2014-2016 and 2017-2019) from the two '*Saving mothers reports*' as this period almost corresponded to the study period (NCCEMD, 2018; NCCEMD, 2020).

Table 9.2 Causes of maternal deaths

Causes	South Africa	Gauteng	Ekurhuleni*	East SD*	North SD*	South SD*
gynaecology	7%	10%	8%	5%	8%	10%
hemorrhage	17%	17%	24%	31%	21%	22%
HIV	26%	22%	14%	7%	15%	16%
hypertension	18%	20%	16%	22%	15%	14%
medical and surgical	17%	16%	17%	11%	21%	17%
obstetrics	8%	8%	6%	2%	6%	9%
other	3%	3%	6%	10%	8%	3%
unknown	5%	3%	9%	12%	6%	10%

*findings from this study

It showed that while HIV remained the main cause of maternal deaths (approximately 25%) in the Gauteng Province and South Africa, it contributed to less than 15% of deaths in the District (even 7% in the East Sub-district). Hemorrhage and hypertension related deaths remained the major challenge in the District. There were also some differences among the Sub-districts. For example, in the East Sub-district, hemorrhage (31%) and hypertension (22%) accounted for more than 50% of deaths. HIV related deaths were less than 7% probably due to strict adherence to the protocol; further studies are needed to understand the reasons for their success. In the North and South Sub-districts, hemorrhage, HIV, hypertension, and medical surgical causes featured prominently. These variations were not reported before and developing national, provincial, or even district-based interventions would miss these disparities. These variations should be noted, while planning any interventions including ESMOE, EOST, clinical mentorship programmes. Lastly, a large number of unclassified deaths are of concern and should be addressed at the MMM meetings as well as monthly reporting.

9.2.3 MONITORING AND EVALUATION

Monitoring and evaluation were identified as one of the key activities of DCST members. It featured prominently in both DCST reports as well as in comments made by the participants. The DCST reports showed that DCST members were tasked to review targets per health facility, as well as to institutionalise surveillance during all visits. In addition, it was noted that DCST members were involved with operational research on these indicators. The monitoring and evaluation work undertaken by DCST members were applauded by many participants. (P01) ‘....they are also trained on what DHIS of which is very very good, they are able to go

in and take the information and be able to see the underperforming facilities’.

Damien, Njau, Lisai, et al (2019) highlight the challenges with uncertainties about the true estimates of maternal and child mortalities in South Africa. They proposed the need for accurate, reliable, continuous, and timely mortality statistics from the vital registration system, a clear understanding of any under-ascertainment of maternal or neonatal mortality and consistent approaches to accounting for these. The DCST could play an important role to address this by strengthening monitoring and evaluation within DHS. This concept of district-based initiatives had shown positive results in two districts in the Limpopo and Mpumalanga Provinces. (Schneider, George, Mukinda, 2020).

Feucht, Marshall, Kauchali (2018), in a multicentre study across South Africa, found unambiguous evidence of major discrepancies between their audit data and data from DHIS and under-reporting in DHIS as well as the ‘*Saving mothers reports*’, in comparison to DCST monthly reports. This is similar to the findings of this study (See Appendix H14 in Appendix H).

Health facilities in the Ekurhuleni District were also found to be misclassified according to sub-districts, which causes erroneous reporting as well as difficulty in linking antenatal and postnatal care to intranatal care. For example, the Tambo Memorial Hospital is situated in the South Sub-district but misclassified in the DHIS as a part of the North Sub-district. The DCST support visits in health facilities were also found to improve data quality and its long-term beneficial effects for better decision making within the DHS based on accurate data was reported in a study conducted by Feucht, et al (2018).

9.3 DCST POLICY FRAMEWORK

A number of interventions have been introduced by the DCST members since its inception in 2012 July. This study attempted to review these interventions in the context of the DCST policy framework details of which are presented in Chapter 6 and were based on the review of ‘Obstetric intervention measures undertaken by the DCST members in the Ekurhuleni District’. In Chapter 8, the researcher presented findings from 20 in-depth interviews with actors at different levels of the DHS in the Ekurhuleni Health District to gather information about their ‘*Knowledge and perception of DCST among district health managers and health professionals in Ekurhuleni district*’. These interviews were conducted by a research assistant to avoid any bias. The findings reported on in both these chapters provided evidence for the role of DCST members in the changes of maternal health indicators mentioned in Sections 9.1 and 9.2 of

this report. The following section will review these changes under the four pillars of the DCST policy framework as well as new themes emerged from the interviews.

9.3.1 CLINICAL EFFECTIVENESS

Clinical effectiveness is an umbrella term describing a range of activities that support clinicians and healthcare professionals to examine and to improve the quality of care (NDoH, 2014b). Clinical audit is the best-known example, but clinical effectiveness stretches beyond this to include the implementation of nationally agreed guidance as well as agreed standards/ clinical performance indicators reflecting 'best practice'. Clinical Effectiveness is *"the application of the best knowledge, derived from research, clinical experience and patient preferences to achieve optimum processes and outcomes of care for patients. The process involves a framework of informing, changing and monitoring practice"* (Worcestershire Acute Hospital NHS trust. 2018). The DCST Handbook described clinical effectiveness as a function to achieve 6Rs namely: right care (the right care is provided to the patient), to right patient (right patient who is informed and involved in their care), at right time (at the right time) by right clinician (by the right clinician with the right skills) in the right way (NDoH, 2014a). There were a number of interventions identified as components of clinical effectiveness by the document reviews as well as key informant interviews, such as clinical support through support visit and mobile medicine (telephonic clinical consultation), ensuring availability of the skilled health workers at the point of service delivery, improving accessibility, assisting in referral of patients at appropriate levels of care and motivation for effective patient transport systems. In addition, DCST members also assisted in review of clinical records (such as maternity case records and maternal death files; labour ward records including partograms and cardiotocographs; family planning records), and operational research as and when necessary. Feucht et al (2018) reported a DCST case study, where monitoring of use of clinical guideline for hypertension, concomitant training of clinic supervisors, MNCWH programme managers and maternity operational managers and use of checklist for building dashboards, resulted in reduction of iMMR from 83/100 000 (2013) to 44/100 000 (2015) with maternal deaths due to hypertension reducing from 58% (7/12 deaths in 2013) to 20% (1/5 deaths in 2015).

9.3.1.1 MAINTAINING CLINICAL STANDARDS

Maintaining clinical standards emerged as one of the key activities under clinical effectiveness. This included clinical support; availability of the skilled health workers at the point of service delivery; referral system and organizing effective patient transport systems.

SUPPORT VISITS

Interventions such as training of doctors and midwives working in local hospitals and MOUs, outreach visits by external facilitators to provide supervision and mentorship are found to be effective in reducing maternal mortality (Willcox, Price, Scott, et al, 2020). Regular support visits by a trained external facilitator and onsite training were found to provide health-care professionals with knowledge and confidence to make quality improvement suggestions during audit sessions in referral hospitals with high maternal mortality rates in Senegal and Mali (Dumont, Fournier, Abrahamowicz, et al, 2013). The analysis of quarterly DCST reports confirmed regularity in clinical support visits to various health facilities. These support visits were reportedly used for clinical mentoring, auditing, and improving the efficiency of the MOUs as well as specific services such as the insertion of implanon, and second trimester TOP services. The importance of their support visits was emphasized by a number of participants because of the following reasons: improvement in patient care, better coordination between PHC facilities and feeder hospitals, capacitating clinicians working in these facilities, assisting in on-site problem solving and lastly, providing moral support to health professionals working in the PHC facilities. The participants actually preferred support visits by DCST rather than meeting them in meetings. However, concerns were raised about the frequency of support visits, which should be increased to achieve desired effects. *'I think everyone including myself are very comfortable to work with i-district in specialist, they've had impact, even though people might not see but they are good' (P09).....'they need to give us those visits and supports more.....it makes our work so easier like we can able to minimize the maternal deaths'.* (P12).

The findings of this study are similar to a systematic review of articles focusing on supportive supervision for primary healthcare services in Sub-Saharan Africa that found supportive models of supervision based on a problem-solving approach was more strongly linked to increased health care worker motivation and job performance, which in turn were associated with increases in provider confidence, job satisfaction, and morale (Bailey, Blake, Schriver, et al, 2016). Marquez and Kean (2002) differentiated supportive supervision from traditional supervisory visits, which put the onus of fixing problems on the staff, while a supportive or facilitative supervision aims to support staff to engage in problem solving through technical assistance, capacity building, and resource provision. As a result of that, this type of visit was viewed as an optimal choice for clinical care settings; because it upends traditional notions of supervision and focuses on facilitation instead of inspection (Bailey, et al, 2016). In case of DCST, their support visits were more aligned to a supportive supervision model.

AVAILABILITY

The availability of the DCST members especially to PHC facilities was identified as another important component of clinical effectiveness. In DCST reports, the importance of continuous availability and user-friendliness were identified as important factors in dealing with patients especially difficult patients, patient transfers, neonatal resuscitation, helping with management of equipment and lastly, data governance. As one district manager commented about their reliance on the availability of the DCST members for managing poor performance in PHC facilities *'DCST team, they supporting the programme very well, like in terms of if you find that there's a facility that is battling with one of the indicators, when you call them, they actually come and assist us on a time to time basis'* (P03). In a study performed in remote parts of Australia with inadequate access to medical care, specialist outreach services from a regional centre were found to provide a more equitable means of service delivery than hospital-based services alone (Gruen, Weeramanthri, Bailie, 2002). A sustainable outreach service that was organised appropriately, responsive to local community needs, and had an adequate regional specialist base could effectively integrate with and support primary health care processes (Gruen, et al, 2002; Ramos, Barreto, Shimizu, et al, 2020). This would assist in integration of health system, wherein regional structures are responsible for providing and administering health services in a specific region such as a district (Ramos, et al, 2020). Availability of the DCST members to support the entire MNCWH services could provide a model of regional integration.

Mobile medicine and health (mHealth) based interventions are increasingly being used in nearly every aspect of maternal health care, such as virtual patient consultation with specialty services, interpretation of non-stress tests, counselling patients, managing diabetes, reading ultrasound recordings, management of postpartum depression, and supporting patients from remote sites (Magann, McKelvey, Hitt, et al, 2011). Application of mHealth in maternal health services was found to be associated with better gestational outcomes, early detection of complications, prevention of unnecessary referrals, providing local intervention even before hospitalization (Alves, Times, da Silva, et al, 2020). In a systematic review, DeNicola, Grossman, Marko et al (2020) also found the use of mobile health to be associated with improvements in obstetric outcomes. The findings of this study also suggested that extensive use of mobile medicine supplemented the clinical support visits: *'we've got access. They gave us access. They've given us their phone numbers and we've got a WhatsApp group where we can ask whatever we need to ask'* (P19). Kruse, Betancourt, Ortiz, et al (2019) in a systematic review found improved health outcomes with mHealth (such as infectious diseases and maternal health) and identified barriers to its use (such as infrastructure, lack of equipment,

and technology gap). In this study, these barriers were not identified, as problems, possibly due to relatively better infrastructure in a metro district such as Ekurhuleni.

INTEGRATION OF CARE

An integrated and comprehensive community-based health programme could assist in the reduction of maternal mortality and morbidity. The DCST members, through their clinical support, assisted in integration of care between PHC facilities and hospitals, between PHC clinics operated by the provincial and local governments, as well as between MNCWH services. A study performed in Tanzania showed that a hospital-based programme with a vision of integrated healthcare (including reproductive and child health services, PMTCT-plus, comprehensive emergency obstetric care, ambulance, radio and transport services, paediatric care, an HIV/AIDS programme, and a generalized healthcare service to a population of approximately 500 000) contributed to the low mortality found in that area (vjen-Olse, Olsen, Kvåle, 2009). A similar model could be easily implemented in the different sub-districts in the Ekurhuleni District. This could assist in regionalization under administrative decentralization and for rationalization of resources as reported in the study conducted by Ramos, et al (2020). However, it would involve changes in current health practices of vertical programmes and in distribution of health resources.

AVAILABILITY OF SKILLED HEALTH WORKERS AT THE POINT OF SERVICE DELIVERY

Strengthening PHC facilities by up-skilling health facilities are important intervention measures in improving maternal health and reduction of maternal mortality and improving birth outcomes in many countries. A package of community- and facility-focused educational interventions for training health professionals at rural health units in Egypt found a marked reduction in adolescent pregnancy by 55% and better birth outcomes with a reduction in the percent of stillbirth by 11.5% (Metwally, Abdel-Latif, Mohsen, et al, 2020). Clinical mentoring, capacity building and supportive supervision of staff had been shown to be facilitators of retaining nurses and could be quickly implemented even in a context of low resources and limited technology such as in Tanzania (Ojemeni, Niles, Mfaume, et al, 2017) and the Democratic Republic of Congo (Xiong, Carter, Lusamba-Dikassa, et al, 2019). DCST documents revealed that in the Ekurhuleni District, clinical mentoring had been used by DCST members as an important tool to ensure availability of skilled health workers at the district health facilities. This was echoed by the participants who gave examples of various options used by the DCST members for this purpose: such as onsite/ in service training, mentoring: '*whenever I do go to*

them I come back with enough information to be able to function in the facility and am able to reach DCST-O&G whenever I need help. So I don't really feel that they are not present, they are present when we need them' (P18).

ACCESSIBILITY

Accessibility is an essential element necessary for improving clinical standards. Accessibility of maternal health care services depends not only on availability of outreach clinics or peripheral health facilities for antenatal care but also delivery units (such as MOUs and hospitals) (Abouzahr, 1998; Kyei-Nimakoh, Carolan-Olah, McCann, 2017). The WHO provided guidelines for estimating the availability and use of emergency obstetric care services (WHO, 2009). Subsequently, the Lancet Commission on Global Surgery estimated accessibility as the proportion of pregnancies within two hours of the nearest hospital using geo-located hospital data for sub-Saharan Africa, with their associated travel times, along with small area estimates of population and pregnancies (Meara, Leather, Hagander, 2015). However, this did not provide guidelines about other maternal health services, such as antenatal and postnatal care. In addition, it did not consider accessibility of such services, regarding the time taken to get to a facility, where the availability of a service might be limited by the number of women who could reach and use it (Gabrysch and Campbell, 2009). Unequal distribution of health facilities in the District could hinder the access to maternal health services in the Ekurhuleni District. For example:

- There was only one district hospital in the entire District.
- There was only a tertiary hospital and two MOUs in the North-Sub-district but no district or regional hospital, which should have ideal.
- The referral route of the District was skewed as the District refers to three central hospitals in the Gauteng Province.

Absence of a medical school and a central hospital in a large metropolitan district even 27 years after the formation of the District is of major concern. As one participant stated *'it has been determined that we need more of hospital facilities in the district than we have currently. That's a major challenge because you find that there are patients that are seen, who need hospital admission but for one reason or another they are not able to access that kind of service because of shortage of beds'* (P04). This was compounded by the influx of people from neighbouring provinces as well as from neighbouring countries. The population growth in the Gauteng Province over the last 20 years has aggravated this misdistribution. One participant mentioned: *'If you go back even more than 20 years, you will find that population of*

Gauteng and of course that of Ekurhuleni have grown tremendously. But when you look at the number of facilities, you know that facilities have not been increased at the same rate at which the population is grown, specially the hospitals. And that's a serious challenge' (P04).

Wigley, Tejedor-Garavito, Alegana, et al (2020) measured the availability and accessibility of maternal health services across sub-Saharan Africa and found that most countries met the accessibility target (2 hours to the nearest hospital proposed by the Lancet Commission on Global Surgery) at the national level. However, there was substantial sub-national variation, with, 56% of the countries found to have at least one province not meeting the accessibility target, increasing to 74% at the district level. A study performed in Sri Lanka and Zambia found that disaggregating data at a sub-national level could assist in revealing inequalities in service provision within and between countries (Collender, Gabrysch, Campbell. 2012). This study focused on analysis at a sub-district level and revealed the gross variation among the three sub-districts within a district.

REFERRAL SYSTEMS

Weak referral systems remain a major concern influencing timely access to the appropriate level of care during obstetric emergencies, particularly for low-and middle-Income countries (Alkema, Chou, Hogan, et al, 2016; Ofosu, Ofori, Ntummy, 2021). In general, a referral system is characterized by multiple inter-related steps by an individual seeking specialist healthcare across different levels of care (Ofosu, et al, 2021). Both up and down referrals were identified as major elements of clinical standard, possibly because of the reasons mentioned above. A patient with complications from a clinic or MOUs should be up-referred to a higher-level facility (such as district, regional, tertiary, or central hospital), as they are better equipped than those from which the referral emanates. On the other hand, facilities at the higher level of referral chain should down-refer uncomplicated patients to facilities at the lower level of referral system to decongest the system. The balance between up and down referral is critical for any maternal health services. The participants expressed their reliance on the DCST members for fixing the system within the District (between the PHC facilities. MOUs and district, regional and tertiary hospitals) and outside the districts (to central hospitals). The DCST members were found to cover the entire District and to work in both PHC facilities and hospitals and therefore they could provide integrated care: *'she's also working with the hospital that we are transferring so when we write the notes, when we mention her name, they know that we have contacted the right person. And with us also, we referring on time because of the DCST team that instilled in us stating that you don't sit with the problem, when you are having a problem you have to refer to the hospital'* (P17).

Hensher, Price, Adomakoh (2006) postulated characteristics of an ideal referral system, where patients could receive appropriate, high-quality care for their condition in the lowest-cost and closest facility possible, given the resources available to the health system, with seamless transfer of information and responsibility, as patients were required to move up or down the referral chain. However, it could only be possible if such facilities exist within the system. Unfortunately, in the Ekurhuleni District, the system is not uniform (such as existence of one district hospital in the whole district, a tertiary hospital without any feeder hospital). These imbalances require urgent attention. Murray and Pearson (2006) listed a number of requisites for successful maternity referral systems including administrative factors (referral strategy based on population need assessment and health system capabilities; an adequately resourced referral facility, formalised communication and transport arrangements); health professional factors (active collaboration between up and down referral levels and across public and private sectors, guidelines for referrer and receiver; supervision and accountability for providers' performance), societal factors (affordable service costs; the capacity to monitor effectiveness; and management support). The DCST members had managed to address the health professional factors such as active collaboration between up and down referral levels (through mobile communication), development and implementation of guidelines for up and down-referral.

EFFECTIVE PATIENT TRANSPORT SYSTEMS

Emergency transport and referral mechanisms, and enhanced communications systems are important strategies to improve maternal health outcomes (Abouzahr, 1998). An effective patient transport system was also highlighted as another challenge for a referral system: *'Transport is quite a big problem there in terms of the referral of the patient. Transport, really a big problem'* (P07). ... *'the ambulance services It's still a problem. We were hoping that we get to the onsite ambulances in all the CHCs, but because of this shortages of ambulance, we are unable to get and you find that sometimes for the patients to be taken to the hospitals, it takes longer by the time they reach the hospital, some have complications and because of this ambulance that is not available..'* (P01). In the *'Saving mothers report'* (NCCEMD, 2018), it was recommended that the DCST members should play a role in *negotiation for priority inter-facility emergency transport for pregnant women* as efficient transport between facilities is essential for an effective maternal health services, which is also mentioned by the participants *'My expectation for her [DCST-OBST] to also maybe fix the issue of referral system in terms of the EMS, us and the hospital'*. Murray and Pearson (2006) also highlighted the need for effective transport arrangements as a pre-requisite for a functional referral system. This study has shown the contribution of the DCST members in this component of the MNCWH services

by engaging with emergency transport services as and when necessary which was confirmed one participant: *'But our mother and child together with the DCSTs, we are putting efforts in place with EMS, because you know, all of those factors works together to improve'* (P08).

9.3.1.2 CLINICAL AUDITS

In 2010, the United Nations (UN) launched the Global Strategy for Women's and Children's Health to accelerate progress on MNCWH. Subsequently, a *'UN Commission on Information and Accountability'* was established to ensure oversight and accountability for women's and children's health. It outlined a framework with three processes: monitor, review, and act (WHO Commission on Information and Accountability, 2011). Five years later, Scott and Daniel (2016) reviewed global progress and proposed that the principles of accountability relied on monitoring, analyzing to determine if improvements have been made and commitments kept, and the use of the information to guide recommendations that are accountable. They proposed that birth and death registration, including reporting on all maternal and neonatal deaths as well as stillbirths, was central to accountability for MNCWH as monitoring of maternal morbidity and the closely related issue of quality of care.

Many countries have introduced clinical audit functions for improving maternal health such as France (Deneux-Tharoux, Saucedo 2021), South Africa (NDoH, 1997c) through national confidential enquiry into maternal deaths. However, these audits may not be able to capture the enablers and barriers at an operational level. The DCST members could assist in that process by conducting similar enquiries at district and sub-district levels and operationalising their recommendations at the same time.

Clinical audits are an important tool used by health professionals to improve maternal health services (Graham, 2009). However, it must be supported with training, leadership and adequate resources to use it (Rousseva, Kammath, Tancred, et al, 2020). The analysis of quarterly DCST reports showed that clinical audit of maternity records (such as antenatal cards, labour ward records and family planning cards) were conducted regularly by the DCST members. Information from the clinical audit was used by DCST members to inform the health facilities on their performance as well as to conduct training based on the gaps (such as viral loads not checked before delivery, TB Management, nutrition status of mothers); The results showed that there was slow improvement, such as partogram recording. The participants also acknowledged the role of DCST members in terms of the clinical audit in areas such as review of clinical records, guideline implementation and operational research to address the deficiencies identified during the clinical audit (P13): *'It is the audit, it will be nice if they can*

audit us more frequently, because I can be bias to myself on how I'm doing so if they can just maybe audit us quarterly.'

Operational research is essential to supplement the clinical audits with research evidence appropriate for local conditions. This would assist in formulation of strategies for improving the obstetric care experience of pregnant women at a sub-district/ district level (Kyei-Nimakoh, et al, 2017). The DCST reports and comments from participants highlighted their contribution to operational research in the District. *'we have been having research....DCST-O&G and the DCSTs was also involved in that'* (P08). However, it was not clear if any of these research findings were used for evidence-based decision-making.

From the above analysis, it can be concluded that the majority of the participants acknowledged the important roles played by the DCST members in terms of improving clinical effectiveness in MNCWH services in the Ekurhuleni District. Clinical effectiveness is ensuring the right care is provided to the right patient who is informed and involved in their care at the right time by the right clinician with the right skills in the right way. It was mentioned that the DCST members were providing this through maintaining clinical standards through clinical support (such as support visits, availability to PHC staff, collaboration with MNCWH team for offering integrated care), as well as through off-site support using mHealth), ensuring availability of the skilled health worker at the point of service delivery, improving accessibility, and strengthening referral systems between PHC facilities and hospitals. Clinical audit was mentioned as another tool, which includes activities such as review of clinical records, guideline implementation and operational research.

9.3.2 CLINICAL RISK MANAGEMENT

Clinical risk management is about minimizing risks and harm to patients by identifying what can and does go wrong during care, understanding the factors that influence this, learning lessons from adverse events and poor outcomes, ensuring action is taken to prevent recurrence, putting systems in place to reduce risks (Government of Western Australia Department of Health, 2019). It is an important mechanism to improve the performance both in terms of patient safety and quality of treatments especially in maternal and child pathways (Sardi, Sorano, Guerrieri, et al, 2020). Clinical risk management is also part of the Domain 2 (Patient Safety, Clinical Governance and Clinical Care) of the National Core Standards. (NDoH, 2014a). Feucht et al (2018) advocated clinical risk management through specific and local problem identification across a catchment area that had the potential to rapidly reduce maternal mortality. They propose that it would require a multi-disciplinary approach involving

facility managers as well as DCST members as well as other structures within the District. This study documented a number of activities under this category that could be categorized into management of risks related to patients, health professionals and organization, which are discussed in the following sections.

9.3.2.1 MANAGEMENT OF RISK ASSOCIATED WITH PATIENTS

Maternal mortality and morbidity meetings are probably the most important forum for clinical risk management related to patients. Meetings of maternal mortality review committees provide a forum to develop systematic understanding in proximate and distal contributing causes of maternal mortality by convening multidisciplinary teams of experts to review details of each maternal death and to make recommendations for systems-level interventions to reduce clinical risk (Collier and Molina, 2019; Kramer, Strahan, Preslar, et al, 2019). The WHO recommends that maternal and perinatal death reviews should be conducted in all hospitals globally (WHO, 2016). Willcox, et al (2020), in a Cochrane review, found maternal death audit and reviews, as well as development of local leadership and training, probably reduces inpatient maternal mortality in low-income country district hospitals, and probably slightly improves quality of care. However, maternal mortality review meetings in isolation might not be sufficient for the achievement of reductions in mortality, unless this is associated with changes in organizational culture. The QUARITE (Quality of care, risk management, and technology) trial conducted in Mali and Senegal found effectiveness of a change management package that included maternal death audit as well as local capacity building and support visits for supervision and mentorship (Dumont, Fournier, Abrahamowicz, et al, 2016). This is similar to the roles of the DCST members suggested in the '*Saving mothers reports*' (NCCEMD, 2014; NCCEMD, 2018). It highlights the comprehensive roles of the DCST members beyond meeting attendance including development of action plans for preventing recurrence of maternal and perinatal deaths and taking follow up measures at the follow-up meetings as well as local capacity building and clinical support visits (NCCEMD, 2018). The DCST intervention reports showed that after the introduction of DCST, MMM meetings had been organized regularly (monthly at six hospitals and quarterly at nine MOUs) for discussion of both maternal and perinatal deaths and near-misses. In addition, action plans were developed and implemented. For example, auditing of all maternal deaths due to hypertension in all hospitals was initiated. It is similar to the findings of a DCST case study conducted by Fuecht et al (2018) in the Tshwane District in South Africa, that found local mapping of all maternal deaths drawn by DCST members resulted in reduction of previously reported unknown deaths and improved reporting of maternal deaths within 72 hours.

The roles of DCST members in these meetings as leaders were also acknowledged by the participants in terms of organisation, provision of support after the meetings and for implementing action plans as well as capacity building programmes through CPD activities. The DCST members has been assisting organanisers by regular attendance, generating a spirit of team-building among the health professionals working in the PHC facilities, ensuring regularity of these meetings, whereas in the past, these meetings were more sporadic: *'I must be honest, I think at many of our hospitals, the MMR meetings was not held as it should have been held. You know by looking at all the cases and I think, with their intervention, I can really see there is a difference'* (P08).

According to the participants, they had also managed to integrate the health professionals by bringing the health professionals from PHC and hospitals, different hospital specialties and provincial and local governments into one meeting, whereas these meetings were held separately in the past: *'I am talking about this relationship between the hospitals and the clinics and the MOUs, there's what we call maternal mortality and morbidity meetings that are happening in all these 6 hospitals and then the clinics also attend those meetings. The coordinators, the sub-district coordinators'* (P02). As a result of these interventions, health professionals felt empowered to identify root causes of maternal deaths in the district *'if we have M&M for example, to participate and their contribution and questions that they help us to answer'* (P06) and to develop appropriate intervention measures.

Discussion at these meetings on both mortality and morbidity also assisted in reduction of maternal deaths in the district: *'they are also discussing like for example if there are serious advert events or maternal deaths then that case will be discussed on the MMR with the assistance of the district clinical specialist team. They also support the hospitals.....We managed to reduce the maternal mortality rate'* (P01). As a result of these interventions, there was consensus about the role of DCST members in improving MMM *'the fact that we see the results of those indicators improving you know they have got a role to play'* (P06). However, it was not clear from DCST intervention reports or the participants' comments that these meetings were dealing with severe maternal morbidity (SMM) or near misses, which is defined by the WHO as *'a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy'* (WHO, 2011). The problem of SMM in South Africa was highlighted in a study performed at a tertiary hospital. where 39.3% of the women with life-threatening conditions were referred from primary level of care (Soma-Pillay, Pattinson, Langa-Mlambo, et al, 2015). A number of countries have already started moving in this direction (Geller, Koch, Garland, et al. 2018) and formed an International Network of Obstetric Surveillance Systems (INOSS) (Knight and INOSS, 2014; Schaap,

Bloemenkamp, Deneux-Tharaux, et al. 2017). In addition, Willcox, et al (2020) suggested the introduction of perinatal death audit and review, as measured by perinatal morbidity related to suboptimal care, where maternal mortality was reducing. The Ekurhuleni District should consider this due to the steady decline of their maternal mortality in the last few years.

9.3.2.2 MANAGEMENT OF RISK ASSOCIATED WITH HEALTH PROFESSIONALS

The DCST reports revealed the main tools used by the DCST members for reduction of organizational risk was EOST training, as mentioned by one participant: *'In a month, they can come twice, to just come re-educate us with the fire drills so that we can be at par with what is happening. And when if there are changes, they inform us'* (P17). This was in line with the recommendations of the *'Saving mothers report'* which proposed that EOST exercises should be conducted at least monthly (NCCEMD, 2018). This has resulted in reduction of maternal death in the District as per one participant: *'they need to give us those visits and supports more. They used to come and do us the fire drills, by doing that it makes our work so easier like we can able to minimize the maternal deaths'* (P12).

Obstetrics simulation training was found to be associated with better outcomes among mothers (such as instrumental delivery, postpartum hemorrhage, efficiency in performing emergency caesarean section) and neonates (such as trauma) (Satin. 2018). The reduction of maternal deaths in this study could partially be attributed to saturation of EOST training in the District, which is similar to the findings of Pattinson, et al (2019) *'Where the majority of healthcare professionals involved in maternity care had been trained, there was a significant reduction in maternal deaths'*. A systematic review conducted by Yucel, Hawley, Terzioglu, et al (2020), found simulation, at the very least, could play an important role in improving staff positivity around managing obstetric emergencies besides improvement in outcomes especially for neonatal outcomes.

9.3.2.3 MANAGEMENT OF RISK ASSOCIATED WITH ORGANIZATIONS

Clinical risk management also involved management of risk to organizations. The role of DCST members was acknowledged by one participant in terms of this type of risk: *'What I've noticed is that they visit all the institutions where there is a death and then they would go to that institution and see what was the reason for the death. That was not there before because there ama-, we wouldn't even know ukuthi what we are supposed to be doing.'* (P14). Provision of infrastructure, equipment, drugs, and supplies are all integral components that are required to achieve SDGs by reducing maternal mortality and improving maternal health (Lassi,

Musavi, Maliqi, et al, 2016). The DCST reports highlighted the involvement of DCST members in these areas within the District.

From the inception, activities of the DCST members were in alignment of the signal functions, which are key medical interventions that are used to treat the direct obstetric complications (that cause the vast majority of maternal deaths around the globe) (WHO, 2009). This was reflected in the intervention reports compiled by DCST members for reduction of organization risks, which are listed below:

- Assessment of functionality of equipment: It was derived from DCST quarterly reports that DCST members actively participated in assessment of functionality of equipment during the clinical support visits to health facilities, as they recognized the importance of equipping PHC facilities with appropriate medical equipment for delivery of health services. According to the participants, this support assisted them to procure the right equipment at the right time for provision of the right care as stated by one participant *'I know they were instrumental, a lot of things they were getting'* (P10).
- Assessment of availability of medication: DCST reports also mentioned their roles in terms of engaging the DHMT for improving availability of basic medications such as injectable contraceptives, which had a direct effect on the CYPR. Because of their intervention, this medication was regularly available resulting in improvement of CYPR. This is similar to the findings of Assegaai, et al (2018) in the North West Province.

Human resource management was identified as another challenge associated with MNCWH services. According to the participants, it included lack of understanding between doctors and midwives at MOUs; lack of skilled staff; lack of designated staff to MNCWH due to regular rotation of staff; unequal distribution of staff; staff attitudes and lack of administration staff, as one participant mentioned *'1st one is shortage of staff in facilities'* (P01). Participants also pointed out the negative impact on services due to human resource challenges resulting in increasing numbers of medico-legal cases (P13) *'We have a lot of litigations'*. It is reported that medical negligence claims against the Department of Health had increased as the GDoH budgeted R2.6-million for medico-legal claims in 2019/20 and ended up paying out R501-million that year. (Brodie and Stevenson, 2021; Ngatane, 2021). Recently, the GDoH recognized the role of DCST in the management of medico-legal cases related to MNCWH and set up a working group consisting of DCST members (GDoH, 2021).

In spite of all the human resource challenges mentioned above, the participants still felt that staff have been doing their best: *'Just the only thing to keep on supporting staff, be on their side, keep motivating, because some other times it brings negativity at work'* (P13). As another participant mentioned *'generally I can say we are trying our level best to perform to the level of our abilities'* (P19). The participants felt that DCST could assist them by raising these issues with the DHMT *'DCST-O&G & DCST-AM attend higher meetings they able to be like a channel between the clinics and decision makers'* (P06). The perception of the participants about the power of DCST is important in this type of setting. However, it is not clear, if DCST could really be able to address some of these issues through the DHMT.

Management of clinical risk in an organization should be a core component of its quality improvement plan. It seems that DCST members could manage to achieve this through addressing key areas of underperformance, such as late ANC booking, ensuring HIV test being performed at first and subsequent visits, as mentioned in Section 9.3.2. The findings of this study are similar to a recent study performed in the District (Nsibande, et al, 2020). However, it should include other components for health systems strengthening such as improving emergency transport or having functioning operating theatres (Pattinson, et al, 2019).

9.3.3 PROFESSIONAL DEVELOPMENT

The purpose of professional development and management is to identify the competency levels of health workers and thereby to determine the level of intervention required to address the gap in the competency level. The importance of the availability of skilled human resources at the point of services was found to be a key component for improvement of maternal health services. (Lassi, et al, 2016). The professional development programme offered in the District in terms of DCST interventions reports were: informal (such as clinical training, designing educational activities, giving presentations, mentorship of health professionals) and formal programmes (such as training of family physicians and medical officers in ESMOE and MNCWH) as well as continuous professional development through in-service training based on the gaps identified by DCST members during their clinical work. The importance of these training programmes was acknowledged by the participants as well (P06) *'the DCST as their role and also the fact that they have put much effort in terms of educations and they supporting the clinics and hospitals'*. The practical nature of these training programmes was more valued than the theoretical training by the participants: *'It's not about theory because we used to get theory, ... It is not a matter of you are just told you can do this. They do the drills. They do in-service'* (P14).

The participants believed the DCST members could do a lot to support them through communication with DHMT as well as training '*We do have trainings in the sub district that is conducted by our DCSTs*' (P19). Professional development of staff and capacity building of staff were identified as one of the key factors for changing organizational culture especially for development of local leadership in studies performed in Mali and Senegal (Dumont, et al, 2016; Willcox, et al, 2020) and in South Africa (Feucht et al, 2018). Feucht et al (2018) in a DCST case study found an on-site customised modular training programme (consisting of a theoretical component and a focus on practical skills and procedures) in response to the identified gaps could be useful.

The '*Saving mothers report*' also highlighted the roles of the DCST members in terms of professional development by ensuring: 80% of staff members in the maternity units trained in ESMOE (NCCEMD, 2018). The DCST reports as well as comments from the participants demonstrated that the District made significant progress in this issue: '*they run effective program of ESMOE, good schedule program and when we go to our hospital and say how many we do have and say how many doctors training as mark in our case 100% and will rely on them*' (P06). However, a number of challenges were highlighted both in the DCST reports as well as comments from the participants, including logistics and finance (such as lack of funds, transport, space), staff shortage in the PHC clinics resulting in poor attendance and lack of support from senior managers to implementation. This is similar to findings of Al-Abri (2007), who found failure to change was associated with a number of district factors such as lack of vision and commitment from senior management, limited integration with other systems and processes in the organization.

9.3.4 ACCOUNTABILITY FOR MATERNAL CHILD NEWBORN AND WOMEN'S HEALTH

The accountability of DCST for the MNCWH within a DHS was clearly articulated in a number of policy documents mentioned in Chapter 2 of this report, which could be categorized into accountability to (a) community and (b) DHMT.

9.3.4.1 ACCOUNTABILITY TO COMMUNITY

A community -based approach to maternal health that addresses contemporary challenges and patterns of diseases, where women are in contact with healthcare systems not only through pregnancy to six-weeks postpartum, but also through community dialogue using a broader life-course perspective including pre-pregnancy care, longer-term health care, and

improved integration with existing health programmes and services (Firoz, McCaw-Binns, Filippi, et al, 2018). The DCST reports mentioned a number of these activities such as (a) training of WBOTs and staff working in school health services; (b) involvement in community dialogue; (c) preparation of IEC materials on general health topics; (d) field visits to support household and community interventions and lastly, (e) institutional visits to community-based organizations. These activities are critical for identification of community-based factors that could contribute to the under or over utilisation of services. Without active support of the community and their understanding of the services and risk associated with maternal and newborn services, it would be nearly impossible to improve these services and the indicators associated with them. This could be achieved through direct links to the community or indirectly through liaison with PHC staff, WBOTs, and health promoters. One participant mentioned a dialogue with a patient *'We are able to see coming early, knowledge of danger signs have increased. We know when the first visit we can go, sit with the sisters, they will explain, what you are told, they will tell you once I have bleeding, I must come, I must go to hospital, once I have headache'* (P16). Community dialogue is expected to break the silos and synergize intervention through shared decision-making (Declercq, Cheng, Sakala, 2018). Sthuizen, Bergh, Grimbeek et al (2020) found that multi-disciplinary team- based interventions at MOUs could provide positive experience of childbirth among patients. Fuecht et al (2018) advocated multi-disciplinary targeted interventions to improve multi-factorial diseases (such as severe acute malnutrition among children) under the leadership of the DCST including HCWs from the sub-districts as well as local community.

9.3.4.2 ACCOUNTABILITY TO DISTRICT MANAGEMENT

DCST members are expected to be accountable to the DHMT (NDoH, 2014a). The DCST intervention reports highlighted some of the examples of these engagements with DHMT, such as regular interactions with DHMT and program managers (such as regular meeting attendance and submission of reports) and participations in provincial and national activities (such as quarterly review meetings and symposiums). Engagements with DHMT and programme managers were reported in both formal and informal settings. In a formal setting *'DCST-O&G & DCST-AM attend higher meetings they able to be like a channel between the clinics and decision makers'* (P06). One participant felt that DCST members could play an important bridging role between the DHMT and PHC facilities staff as the PHC staff did not have access to the DHMT *'Sometimes you find that it is difficult to connect with the people above'* (P18). Thwala, Blaauw, Ssengooba (2018) postulated that the poor delivery of emergency obstetric services was often due to weakness in the organization of DHS. The DCST members could assist the DHMT in improving clinical accountability.

The accountability of the DCST members to the community as well as senior management and policy makers put them into a unique position in shared decision making. This could assist in broadening the maternal health community beyond maternal mortality to wellness and attainment of the highest achievable level of health for all women as reported in other studies (Declercq, et al, 2018; Firoz, et al, 2018; Fuecht et al, 2018; Oosthuizen, et al, 2020). Interventions that incorporate open dialogue are found to enable more equitable communication with patients, and decision-making and, ultimately, better health outcomes (Wegs, Creanga, Galavotti, et al, 2016). Because of their unique position within the DHMT, DCST members could assist a district in achieving that.

9.4 CLINICAL WORK

Although clinical work did not feature prominently in the DCST Policy framework (NDOH, 2014a; NDoH, 2014b), it was mentioned both in the DCST intervention reports as well as by the participants. *'I was told that 80% of their work supposed to be clinical and 20% admin but that one I cannot attest to say they are doing that. But shame they are trying their level best'* (P01). The analysis of quarterly DCST reports revealed that clinical work is being performed by the DCST members at various health facilities. The following areas were reported to be covered during the clinical work performed by the DCST members: clinical consultation, in-service trainings, and ward rounds at the hospitals. It was reported that these clinical activities improved communication and cooperation from the health care workers at the hospitals particularly the district hospital, MOUs and PHC clinics, which in turn improved health indicators. It was felt by the participants that their clinical work should be scheduled in both hospitals and PHC clinics, so that both patients and health professionals could benefit from skill-transfer in doing clinical examination, diagnosis (such as ultrasound) and operations in hospitals (such as hysterectomy): *'the clinical work should be such that it involves a lot of teaching and skill transfer from them to other medical officers in a particular institution'* (P04).

The *Global health initiative*, called *'Saving Mothers, Giving Life (SMGL)'* was launched for strengthening DHS to address the three key delays to accessing effective maternity care in a timely manner: delays in seeking, reaching, and receiving quality obstetric services. (Conlon, Serbanescu, Marum, 2019). A number of countries have implemented this model and found positive results (Morof, Serbanescu, Goodwin, et al, 2019; Serbanescu, Goodwin, Binzen, et al, 2019). The clinical work of the DCST addresses the third delay, i.e., providing the clinical care at health facilities, whereas their other activities covered the other two delays namely first delay in seeking care (such as accountability to community) and the second delay in reaching care (such as organization of obstetrics ambulances). The clinical works undertaken by the

DCST members at district health facilities should be viewed in that context.

9.5 LEADERSHIP AND GOVERNANCE

This is another concept that emerged from the qualitative research component of the study. Schneider et al (2020) highlighted the need for district-level initiatives to improve MNCWH services using governance as their primary lens on health system strengthening. They have introduced a governance structure comprising of managers (“drivers”), clinicians (“experts”) and information officers (“navigators”), spanning community, primary health care (PHC), hospitals and district levels to enable coordinated action across key interfaces by forming non-hierarchical collaborative networks for improved coordination between community, PHC and hospital services. They concluded that innovations in governance could add significant value to the DHS strengthening for improved MNCWH services. The DCST members being the most senior clinicians in their respective disciplines within a DHS have an important role to play as role models to the rest of the health professionals working within a district: *‘in terms of performance, everybody is trying to play their role and we can see also in the outcome that yes, they do have a positive impact’* (P04). This could provide an opportunity for providing a coordinated role within their specialty in all the facilities within the district and they should on a regular basis interact with the Clinical Head of Units (CHoUs) based at district or regional hospitals within a DHS. Thus, they could become a voice of the district when issues of that particular speciality are being discussed with tertiary and central hospitals.

In some metro districts (such as Johannesburg), there are central hospitals (such as Charlotte Maxeke Academic Hospital), which employ more senior clinicians [such as a clinical head of Department (CHoDs) or director of nursing]. In these districts, the DCST members could face challenges to manage clinicians who are more senior to them. To address this dilemma, one participant suggested elevating their level from a CHoU to a CHoD to fulfil the oversight responsibilities mentioned above: *‘one way to do it is to appoint district specialist team at higher level’*. (P05) This would probably assist them to implement some of the recommendations from the ‘Saving mothers’ reports’. which were either not implemented or not reported in DCST intervention reports such as: establishment of high-risk antenatal clinics that are accessible to all pregnant women requiring their services and establishment of OMBUs at large regional and provincial tertiary hospitals. (NCCEMD, 2020).

A case study from the James Cook University Hospital, in Australia demonstrated that an obstetrician could take a leadership role (to impart clinical knowledge, guideline development, risk management, clinical audit and the communication functions) in a multi-disciplinary team

that enable an integrated approach to the woman and the family (Simpson and Baker, 2008). The DCST members could play a similar role within South African DHS.

9.6 DCST AS CHANGE AGENTS

The DCST members were launched in 2012, as a part of PHC re-engineering to strengthen MNCWH services. Appointments of senior clinicians as the DCST members, were expected to strengthen MNCWH services within the DHS, as the majority of the senior clinicians were employed by hospitals. Since its inception a decade ago, it was shown that they have been fulfilling key responsibilities towards improving the quality of MNCWH services, based on the findings of this study as well as other studies conducted on DCST (Nathan and Rautenbach, 2013; Voce, Bhana, Montevcelli, et al, 2014; Feucht, van Rooyen, Skhosana, et al, 2016; Feucht, et al, 2018; Oboirien et al, 2018; Oboirien, et al, 2019; Oosthuizen, Bergh, Grimbeek, et al, 2019; Oosthuizen, et al, 2020). Although no studies have been performed to compare the outcomes of the districts with and without DCST (such as Western Cape and some rural districts), no study has shown any negative effect of DCST. A study found that the cost of their support to each health facility was low as the proportion of time allocated to support each clinic was low (\$1 022.76- \$1 221.63) (Lebina, Kawonga, Oni, et al, 2020).

Organizational change is a complex phenomenon especially in health care, where the human dimension is a primary factor to be managed (Portoghese, et al, 2011; Lipsitz, 2012; Pomare, et al, 2019). Therefore, any change in health services entails incremental improvement in existing organizational capabilities, more empowerment to the changing agents and continuous support to the changing leaders (Al-Abri, 2007; Choi and Ruona, 2011). The success of DCSTs could be seen against this background due to the support it has received from all levels of government since its inception, which are identified as key to success of any change agent in the health sector (Cunningham et al, 2002; Jones, et al, 2005; Meyer, et al, 2007).

There is a need to explore the uniqueness of DCSTs as change agents in the context of the South African health system. They are senior clinicians (doctors and nurses) grouped in dyads (doctors and nurses), with minimum training (except for a few induction courses) in various districts to address a specific topic 'MNCWH'. This study showed that in their own district, they assisted in development and implementation of MNCWH plans, capacity building programmes for HCWs, extending support to district-level organizational activities, ensuring collaboration and integration between health services and programmes, and lastly, providing strong clinical governance, supervision, and leadership.

The DCST was formulated at a time when global changes were happening to drive health systems in developing countries to change accordingly, in order to improve poor MNCWH services and their failures to meet the targets for MDGs four and five. These changes could be listed into the following categories according to the themes of this study:

- (a) Clinical effectiveness such as supervisory support visits (Marquez and Kean, 2002, Bailey, et al, 2016; Willcox, et al, 2020), clinical outreach services (Gruen, et al, 2002; Magann, et al, 2011; Ramos, et al, 2020), additional emergency transport and streamlined referral mechanisms (Abouzahr, 1998);
- (b) Clinical risk management such as better organization of MMM review meetings (Knight and INOSS, 2014; Dumont, et al, 2016; Schaap, et al. 2017; Willcox, et al, 2020); obstetrics simulation (Satin. 2018; Yucel, et al, 2020), improved provision of infrastructure, equipment, drugs, and supplies (Lassi, Musavi, Maliqi, et al, 2016). deployment of additional staff (Assegai, et al, 2018);
- (c) Professional development such as training of managers, policy makers, health professionals (Dumont, et al, 2013; Ojemeni, et al, 2017; Feucht et al, 2018; Xiong, et al, 2019; Metwally, et al, 2020; Schneider, et al, 2020);
- (d) Accountability for MNCWH, such as accountability to community (Declercq, et al, 2018; Fuecht et al, 2018; Firoz, et al, 2018; Sthuijzen, et al, 2020). accountability to the DHMT (Thwala, et al, 2018); and
- (e) Leadership and governance (Simpson and Baker, 2008. Schneider et al; 2020).

However, none of these studies looked at their long term of effects on MNCWH and their sustainability unlike in this study.

Another interesting feature of DCSTs was the presence of senior clinicians within the DHS and accountable to DHS, unlike their peers, who work predominantly in the larger hospital setting (such as tertiary or central hospitals) and are not accountable to the DHS. This fragmentation of the South African health system between the PHC and hospital services has created a major problem of clinical accountability. Whereas the DHS is accountable for the MNCWH indicators, the majority of the mortalities and morbidities happen in hospitals. In addition, their root-causes often lie within the DHS. As a result of that, conducting regular MMM meetings or action plan generated from these meetings often failed to yield desired results. The DCST members were probably successful, as change agents to bridge that gap and to create an integrated health system by provision of coordinated care for the community.

For a number of years, there has been a widespread and persistent gap between the quality-based delivery models, many health systems aspire to provide and the current quantity-based reality in the public health system in South Africa and many developing countries. This would

require clinical leaders at the executive level (such as clinical head of department (CHoD), clinical head of units (CHoUs), clinical managers, nursing managers) to function as key agents of innovation needed to bridge this gap. This is only possible, if they could combine the knowledge of local culture and operations with in-depth clinical training and experience. They can be effective in persuading fellow clinicians to embrace new strategies and initiatives, such as evidence-based treatment protocols, population-based health management, cost-saving measures, and the related principles of value-based delivery systems. They also can be effective in persuading administrative leaders (such as CEOs and district managers) to empower physicians with the highest level of clinical autonomy possible and allow them to play their dual role. The result can be a hospital or health system with a united staff, common goals, and a clear path to achieving them (AMN Healthcare Advisory Services, 2021). The DCST members probably have managed to fulfil this role by dividing their time between clinical duties and obligations and management or leadership duties assigned to them. This study showed that clinical leaders such as the DCST members were able to effect meaningful and innovative changes, if provided with real support, power, and a sustainable role. They could acquire the “*will*” and the “*skill*” to do these changes, which could then be developed further during their deployment.

A DHS is more complex than a hospital model. A hospital draws upon the power of its high-skilled autonomous clinicians, who are in charge, to fulfil operational tasks in a professional and specific way (Huppertz, et al, 2014; Walshe and Chambers, 2010). On the other hand, within the DHS, services are mostly rendered by the nursing staff and managed by mid-level managers, who often can not handle complex medical problem-solving processes due to their lack of knowledge and skill set (Schultz and Pal, 2004; Huppertz et al. 2014). The DCST was planned in that context as a change agent within DHS, to provide support to bring clinical accountability into DHS and to bridge the gap between hospitals and DHS.

Any innovative change management process would require responsiveness of the system to change and requires time in planning, roll-out, phasing, and monitoring (Oboirien et al, 2018). This study also found that over time, the DCST could be integrated within DHS and be accountable to DHMT, and no separate governance structure is required as proposed by Schenider et al (2020). This would ensure sustainability and shared decision-making, and creation of collective mind-sets among DHMT about the DCST.

9.7 IMPLICATIONS OF NHI AND PUBLIC HEALTH

The current National Health Insurance Bill (Republic of South Africa, 2019). clearly articulated

the role of DCST for effective implementation of the NHI:

‘Significant progress has been made in establishing DCSTs across the country. The DCSTs will support capacity building and mentorship, strengthening the use of clinical guidelines and protocols and strengthening the use of information to improve health outcomes. Deployment of DCSTs also contributes to reduction in institutional maternal and neonatal mortality rates. The composition of the DCST will be reviewed on an ongoing basis to ensure that issues of public health care are continuously monitored’.

The DCST members being expert in their respective fields could play an important role for maintaining quality of MNCWH services as a part of the UHC across all the 52 districts in the country. The NHI Bill clearly stated *‘As the NHI pilots phase has come to an end, some useful lessons have been learnt in the implementation of integrated school health services, maternal and child health initiatives, district clinical specialist teams and the PHC outreach teams will be taken forward during this phase. These lessons will be scaled up in the next phases of implementation’* (Republic of South Africa, 2019).

It was felt that successful implementation of NHI would require alignment of Human Resources for Health (HRH) policies which are underpinned by the National Development Plan (NDP) to address widespread inequality and inequity as well as inequitable distribution of human resources across the provincial and public–private sectors (Mofolo, Heunis, Kigozi, 2019). This alignment should be able to shift the focus from hospi-centric care to PHC. The deployment of DCST within DHS was an important step towards that and should be replicated by similar deployment of other senior health professionals (Nathan and Rautenbach, 2013).

Feucht, et al (2018) in a multicentre study found that DCSTs were able to initiate service delivery improvements, with documented reductions in institutional deaths and fatality rates over time, although in confined areas. Oosthuizen, et al (2020) also found multi-disciplinary team-based interventions including patients and led by a DCST member could achieve high-quality obstetric care in MOUs as well as positive experience of childbirth among the patients, besides significant declines in in-facility fresh stillbirths, meconium aspiration and birth asphyxia, which is similar to other studies (Oosthuizen, et al, 2019; Schneider, et al, 2020).

This study and a study conducted by Oborien et al (2019) found that the location of DCST within DHS has helped to reorganize MNCWH services within a district and to shape care practices by re-framing issues and exerting power to influence organizational changes, which was not possible in the past by the MNCWH teams. Thus, DCST innovations provide an opportunity to promote institutional changes in a broader context beyond MNCWH services

within the South African public service environment because, it could even influence change within a constrained context.

Maternal, Newborn Child and Women's Health Services are multi-factorial, and require concurrent implementation of a range of evidence-based interventions to achieve reductions in maternal and neonatal deaths. Improved processes and skills that these DCST innovations introduced were stated to be enabling success factors within public health system found in some districts (Feucht, et al, 2018; Rhoda, Velaphi, Gebhardt, 2018). This is in line with the NHI bill (Republic of South Africa, 2019).

This study highlighted activities undertaken by DCST members such as capacity building and mentorship, strengthening the use of clinical guidelines and protocols, and strengthening the use of information to improve health outcomes, which are in line with the NHI Bill (Republic of South Africa, 2019).

9.8 STRENGTHS OF THE STUDY

This study has a number of strengths and uniqueness, some of which are listed below:

- Sub-district level analysis of DHIS data on MNCWH over a period of nine years
- Accurate collection and analysis of maternal death data that identified underreporting of DHIS. Sub-district level variations in causes of maternal deaths were not reported elsewhere.
- Analysis of DCST interventions
- Articulating the information from DCST reports with a wider section of stakeholders within the District to verify the presence of any inaccuracy in DCST reports.

9.9 LIMITATIONS OF THE STUDY

This study was influenced by the following limitations:

- The first objective of the study was focused on analysis of routine data collected for the DHIS. It was not possible for the researcher to verify the quality of the data. However, the researcher made every attempt to verify maternal deaths (second objective of the study)
- The analysis of document review was a major challenge due to the unavailability of all the reports during the nine-year study period.
- The views of the key informant interviewees may have been influenced by the researcher

who worked in the same district. Therefore, it was decided to use an independent interviewer who did not work at the Ekurhuleni District.

- This study was conducted in only one district. This was to ensure the richness of data collected. Therefore, the findings of this study may not be generalized to the other parts of South Africa.

9.10 SUMMARY AND CONCLUSION OF THE CHAPTER

This chapter focused on the discussion of the key findings of the study and compared them with other published studies. The findings were interpreted as per the objectives of this study. The next and concluding chapter of this report will focus on conclusions based on study objectives, recommendations based on the findings of the study, scope of future research and the plan for dissemination of the findings of this study.

CHAPTER 10

CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the results are assessed in relation to the objectives of the study, so that conclusions can be drawn. The recommendations are made with reference to the findings of the study. These recommendations focus on the role of DCST for the improvement in the provision of maternal health services in the Ekurhuleni Health District. Finally, ideas for further research are presented.

10.1 CONCLUSIONS RELATED TO THE AIMS OF THE STUDY

The broad objective of this study was to explore, in a district health setting (Ekurhuleni District), the various obstetric intervention measures undertaken by DCST members over the nine years (from 2011-12 to 2019-20) within the current policy framework for the establishment of the DCST and to document the effect of DCST interventions on the changes in maternal health indicators during the nine-years and lastly to document the knowledge and perceptions about DCST among the district managers and health professionals.

10.1.1 MATERNAL HEALTH INDICATORS IN THREE SUB-DISTRICTS IN EKURHULENI DISTRICT

This study analysed the data in quarters (from 2011-12 quarter 1 to 2019-20 quarter 4) as reported in the DHIS and demonstrated overall improvements in the majority of reproductive health (such as CYPR), antenatal (such as *Antenatal First visit before 20 weeks rate* as well as *ANC patients initiated on ART rate*) and postnatal (such as *Mother Postnatal visits within 6 days rate*) indicators with equivocal success with the intranatal indicators. However, there was lack of progress in certain areas such as *Termination of pregnancy rate*, teenage pregnancy (measured as *Delivery in facility under 18 years rate*) and *Live birth to HIV positive women*. The increase in *total number of deliveries and caesarean section rate* without addition of any new health infrastructure and resources are of concern. During the same period, there were significant decreases in all mortality indicators (*Maternal mortality ratio, Stillbirth rate, Neonatal mortality rate and Perinatal Mortality rate*) across all three sub-districts with best performance in the East Sub-district. This showed that there is overall improvement in the MNCWH care in the District, although certain areas need further attention. The variations among the three sub-districts are interesting, where East Sub-district was performing better than the other two sub-districts, which needs further exploration.

10.1.2 MATERNAL DEATHS IN THREE SUB-DISTRICTS IN THE EKURHULENI DISTRICT

There was a significant decrease in *total maternal deaths* from 2014/15. Although *In-facility maternal deaths* decreased significantly, *Maternal deaths outside health facilities* increased slightly. The *Total Maternal death* in the East Sub-district was consistently lower than the North and South Sub-districts. Since 2014/15, there has been a decrease in *total maternal deaths* in all periods, which was most significant during the postnatal periods. This was possibly due to improved postnatal services as a result of better coordination between different sectors as a part of DCST initiatives of the integrated care model. Exploration of causes of maternal deaths revealed that the data for primary causes of maternal deaths were collected from the second quarter in 2014-15, as a part of DCST interventions. There were significant declines in maternal deaths due to hemorrhage, HIV, and medical and surgical conditions during this period with no changes in deaths due to other causes and more importantly slight increases in death due hypertension.

10.1.3 OBSTETRIC INTERVENTION MEASURES UNDERTAKEN BY THE DCST IN THE EKURHULENI DISTRICT

The study reviewed various DCST reports generated in the last nine years and categorized the findings in accordance with the DCST policy framework. The analysis showed that the DCST members were active in all the four pillars, namely clinical effectiveness, clinical risk management, professional development and accountability for MNCWH services. However, it was difficult to link their activities directly with the performance of the District in terms of cause-and-effect relationship.

10.1.4 KNOWLEDGE AND PERCEPTION ABOUT DCST AMONG DISTRICT HEALTH MANAGERS AND HEALTH PROFESSIONALS IN THE EKURHULENI DISTRICT

Interviews with key stakeholders from different levels of the DHS in the Ekurhuleni Health District (n=20) revealed seven themes, four of which are similar to the DCST policy framework (namely clinical effectiveness, clinical risk management, professional development, accountability for MNCWH) and another three new themes (namely clinical work, monitoring and evaluation, leadership and governance). There is overall agreement between the comments from the participants with DCST reports, thus providing some integrity to these reports. All the participants acknowledged the important role by the DCST members as change

agents and their positive impact for improvement of MNCWH services, which reflected on the improvement of MNCWH indicators as, confirmed in Section 10.1.1. Their role as a clinician, communicator, mentor, negotiator, trainer and researcher were highlighted. Lastly, their positions within DHMT structure and positive impact thereof were acknowledged.

10.2 RECOMMENDATIONS

The recommendations made below are based on the findings from this study. Some of the points have been taken directly from suggestions or requests made by the participants, while others have been determined based on the analysis of the data by the researcher. The suggestions and recommendations of the supervisor as well as from members of the audience at various research symposium and conferences, where this study was presented were also considered. For example, the researcher decided to add a section on the role of DCST in the NHI environment especially within the public sector based on their recommendations. Possible new topics of research have been suggested. Some of the participants recommended establishment of similar specialist teams in other disciplines. This study was not able to include any effect of DCST in other disciplines and further studies are recommended to determine, if implementation of DCST would be beneficial in other disciplines of medicine.

10.2.1 USE OF FINDINGS OF THIS STUDY

The findings of this study were presented to the DHMT, which resulted in some key decisions being taken for the improvement of MNCWH services in the district for example,

- Allowing DCST team members to have a panoramic view over all the facilities.
- Establishing a centre of excellence for evidence-based decision making for MNCWH in the District to rally around all the resources.
- Development of targets for all the MNCWH indicators for the District and then to develop action plans for achieving these targets, so that DCST activities could be linked to these action plans
- DCST members to be involved with more operational research activities within the District

10.2.2 FURTHER RESEARCH

The researcher recommends the district should engage itself in the following operational research to further improve maternal health in the District:

- Qualitative study to understand differences in indicators among the three sub-districts.

- Instituting confidential enquiries of all maternal and perinatal deaths within the District stratified by the three sub-districts.
- Study on severe maternal morbidity: A better understanding of the extent of maternal morbidity is needed to address the limited availability of valid, routine measurements of maternal morbidity in the Ekurhuleni District and overall, in South Africa. The District should embark on a study to develop common definitions and identification criteria; standardized assessment tools, especially at a PHC level; and common indicators to measure maternal morbidity relevant to South Africa (WHO, 2018).
- Surveillance on stillbirth and perinatal mortality: Although the District has made significant progress in this area, there is still a need to study the factors associated with stillbirths and perinatal mortality, so that action plan can be developed to manage them.

10.3 SUMMARY AND CONCLUSIONS

Since the beginning of the 21st century, global changes have been happening to drive health systems in developing countries to improve MNCWH services. This is to ensure moving maternal health services beyond the focus on emergency obstetric care, to a broader approach that encompasses preventive and early interventions and integration with existing services. The DCSTs were launched in 2012, with a mandate to ensure quality in clinical services; to provide clinical training, monitoring and evaluation, support district-level organisational activities, to support health systems and logistics, collaboration, communication and reporting, teaching and research activities (NDoH, 2011c).

This study was planned against this background to develop a comprehensive understanding of MNCWH within a district in South Africa. It further studied the role of DCST members, as change agents for improvement of maternal health services within that District. The study looked at their activities through the lens of the DCST policy framework and found that their relative success in improvement of maternal health services which was evidenced in improvement of maternal health indicators as well as maternal deaths in the DHIS report. The researcher then made an attempt to link these findings with DCST intervention reports and responses from key stakeholders in the District to develop an understanding of their positive roles in these changes. The findings of this study should be used by DHMT in the District to further improve its maternal health services by instituting evidenced -based action plans and further operational research into severe maternal morbidity, stillbirths and perinatal mortality. The broader discussion about generalisation of findings of this study and its recommendation should happen next.

REFERENCES

- Abouzahr, C, 1998. Improving access to quality maternal health services. *Planned Parenthood Challenges*, no.1, pp. 6–9.
- Al-Abri, R, 2007. Managing change in healthcare. *Oman Medical Journal*, vol. 22, no. 3, pp. 9-10.
- Alkema, L, Chou, D, Hogan, D & Zhang, S, 2016. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *Lancet*, vol. 387, no. 10017, pp. 462-74, doi: 10.1016/S0140-6736(15)00838-7.
- Allanson, ER, Muller, M & Pattinson, RC, 2015. Causes of perinatal mortality and associated maternal complications in a South African province: challenges in predicting poor outcomes. *BMC Pregnancy and Childbirth*, vol. 15, no. 37, doi: 10.1186/s12884-015-0472-9.
- Alves, DS, Times, VC, da Silva, ÉMA, Melo, PSA & Novaes, MA, 2020. Advances in obstetric telemonitoring: a systematic review. *International Journal of Medical Informatics*, vol. 134, no. 104004, doi: 10.1016/j.ijmedinf.2019.104004.
- American Academy of Family Physicians, 2020. Family Physician, Definition. viewed 21 July 2021, <https://www.aafp.org/about/policies/all/family-physician-definition.html>.
- American Board of Obstetrics and Gynecology, 2021. Definition of an Obstetrician and Gynecologist, viewed 21 July 2021, <https://www.abog.org/about-abog/policies/definition-of-an-obstetrician-and-gynecologist>.
- American Board of Pediatrics, 2021. What is Pediatrics? viewed 21 July 2021, <https://www.abp.org/content/about-us>.
- AMN Advisory Services, 2021. Clinical Leaders as Change Agents: 3 Keys, viewed 20 April 2021, <https://www.amnhealthcare.com/clinical-leaders-change-agents-3-keys>.

Andreasson, J, Ljungar, E, Ahlstrom, L, Hermansson J & Dellv, L, 2018. Professional Bureaucracy and Health Care Managers' Planned Change Strategies: Governance in Swedish Health Care. *Nordic Journal of Working Life Studies*, vol. 8, no. 1, pp. 23-42, doi: 10.18291/njwls.v8i1.104849.

African National Congress, 1994. A national health plan for South Africa. Johannesburg: ANC. viewed 31 December 2020, https://www.africa.upenn.edu/Govern_Political/ANC_Health.html.

Assegaai, T, Reagon, G & Schneider H, 2018. Evaluating the effect of ward-based outreach teams on primary healthcare performance in North West Province, South Africa: A plausibility design using routine data. *South African Medical Journal*, vol.108, no. 4, pp. 329-335, doi: 10.7196/SAMJ.2017.v108i4.12755.

Bailey, C, Blake, C, Schriver, M, Cubaka, VK, Thomas, T & Hilber, AM, 2016. A systematic review of supportive supervision as a strategy to improve primary healthcare services in Sub-Saharan Africa. *International Journal of gynecology & obstetrics*, vol. 132, no. 1, pp. 117-25, doi: 10.1016/j.ijgo.2015.10.004.

Barron, P, 2012. Re-engineering PHC for the District Health System. viewed 30 July 2021, http://shs.ukzn.ac.za/Libraries/Information_Brochure_Registration_2012/PHC_Re-Engineering_-_Dr_P_Barron.sflb.ashx.

Baxter, C & Moodley, D, 2015. Improving adolescent maternal health. *South African Medical Journal*, vol. 105, no. 11, pp. 948-52, doi: 10.7196/samj.2015.v105i11.10126.

Benjamin, M & Haendel, M, 1991. Cuba. A healthy revolution? *Links*, vol. 8, no. 3, pp. 3-6.

Bergevin, Y, Fauveau, V & McKinnon, B, 2015. Towards ending preventable maternal deaths by 2035', *Seminars in Reproductive Medicine*. vol. 33, no. 1, pp. 23-9, doi: 10.1055/s-0034-1395275.

Blaauw, D & Penn-Kekana, L, 2010. Maternal Health. In: Fonn S, Padarath A, editors, *South African Health Review*, Durban: Health Systems Trust.

Bomela, NJ, 2015. A cross-sectional analysis of the geographic distribution and causes of maternal mortality in South Africa: 2002-2006. *BMC Public Health*, vol. 15, no. 273, doi: 10.1186/s12889-015-1597-5.

Botha, MH & Dreyer G, 2015. Guidelines for cervical cancer screening in South Africa. *Southern African Journal of Gynaecological Oncology*, vol. 9 no. 1, pp. 8-12. viewed 5 July 2021, <https://hdl.handle.net/10520/EJC-9584c6bc7>.

Brodie M & Stevenso S, 2021. Court again steps in to plug the gap left by the legislature on medico-legal claims. *Daily Maverick*, 6 May. viewed 5 July 2021, <https://www.dailymaverick.co.za/article/2021-05-06-court-again-steps-in-to-plug-the-gap-left-by-the-legislature-on-medico-legal-claims>.

Brown, JB & Ryan BL, 2018. Processes that influence the evolution of family health teams. *Canadian Family Physician*, vol. 64, no. 6, pp. e283-e289.

Burton, R, 2013. Maternal health: there is cause for optimism. *South African Medical Journal*, vol. 103, no. 8, pp. 520-1, doi:10.7196/SAMJ.7237.

Campbell, SM, Sheaff, R, Sibbald, B, Marshall, MN, Pickard, S, Gask, L, Halliwell, S, Rogers, A & Roland, MO, 2002. Implementing clinical governance in English primary care groups/trusts: reconciling quality improvement and quality assurance. *Quality and Safety in Health Care*, vol. 11, no. 1, pp. 9-14, doi: 10.1136/qhc.11.1.9.

CARMMA, 2013. Status report on maternal newborn and child health. viewed 30 November 2015, <http://www.carmma.org/resource/2013-status-report-maternal-newborn-and-child-health-africa>.

Choi, M, Ruona, WEA, 2011. Individual Readiness for Organizational Change and Its Implications for Human Resource and Organization Development. *Human Resource Development Review*, vol. 10, no. 1, pp. 46-73, doi: 10.1177/1534484310384957.

Chopra, M, Daviaud, E, Pattinson, R, Fonn, S & Lawn, JE, 2009. Saving the lives of South Africa's mothers, babies, and children: can the health system deliver? *Lancet*, vol. 374, no. 9692, pp. 835-46, doi: 10.1016/S0140-6736(09)61123-5.

Colaizzi, PF, 1978. Psychological research as a phenomenologist views it. In Valle RS and King M. (editors), *Existential-phenomenological alternatives for psychology*. Oxford University Press, New York.

Collender, G, Gabrysch, S & Campbell OM, 2012. Reducing maternal mortality: better monitoring, indicators and benchmarks needed to improve emergency obstetric care. Research summary for policymakers. *Tropical Medicine and International Health*, vol. 17, no. 6, pp. 694-6. doi: 10.1111/j.1365-3156.2012.02983.x

Collier, AY & Molina, RL, 2019. Maternal Mortality in the United States: Updates on Trends, Causes, and Solutions. *NeoReviews*, vol. 20, no. 10, pp. e561-e574, doi: 10.1542/neo.20-10-e561.

Collins, T, 2005. Health policy analysis: a simple tool for policy makers. *Public Health*, vol. 119, no. 3, pp. 192-6, doi: 10.1016/j.puhe.2004.03.006.

Conlon, C.M., Serbanescu, F., Marum, L., Healey, J., LaBrecque, J., Hobson, R., Levitt, M., Kekitiinwa, A., Picho, B., Soud, F. and Spigel, L., 2019. Saving Mothers, Giving Life: It Takes a System to Save a Mother. *Global Health Science and Practice*, vol. 7(Suppl 1), pp. S6-S26, doi: 10.9745/GHSP-D-18-00427.

Connelly, LM, 2016. Trustworthiness in Qualitative Research. *Medsurg Nursing*, vol. 25, no. 6, pp. 435-6.

Cooper, D, Morroni, C, Orner, P, Moodley, J, Harries, J, Cullingworth, L, Hoffman, M, 2004. Ten years of democracy in South Africa: documenting transformation in reproductive health policy and status. *Reproductive Health matters*, vol. 12, no. 24, pp. 70-85, doi: 10.1016/s0968-8080(04)24143-x.

Coovadia, H, Jewkes, R, Barron, P, Sanders, D & McIntyre, D, 2009. Health in South Africa 1: The health and health system of South Africa; historical roots of current public health challenges. *Lancet*, vol. 374, no. 9692, pp. 817-34, doi: 10.1016/S0140-6736(09)60951-X.

Creswell, JD and Creswell, JW, 2003. *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. 2nd edition, Thousand Oaks, Sage Publications, Inc.

Cunningham, CE, Woodward, CA, Shannon, HS, MacIntosh, J, Lendrum, B, Rosenbloom, D & Brown, J, 2002. Readiness for organizational change: A longitudinal study of workplace, psychological and behavioural correlates. *Journal of Occupational & Organizational Psychology*, vol. 75, no. 4, pp. 377- 392, doi: 10.1348/096317902321119637.

Damian, DJ, Njau, B, Lisasi, E, Msuya Se, Boulle, A, 2019. Trends in maternal and neonatal mortality in South Africa: a systematic review. *Systematic Reviews*, vol. 8, no. 76. viewed 20 December 2020, /doi: 10.1186/s13643-019-0991-y.

Daniels, K, Lewin, S & Practice Policy Group, 2008. Translating research into maternal healthcare policy: a qualitative case study of the use of evidence in policies for the treatment of eclampsia and pre-eclampsia in South Africa. *Health Research policy and systems*, vol. 6, no. 12, doi: 10.1186/1478-4505-6-12.

Declercq, ER, Cheng, ER, Sakala, C, 2018. Does maternity care decision-making conform to shared decision- making standards for repeat cesarean and labor induction after suspected macrosomia? *Birth*, vol. 45, no. 3, pp. 236-244, doi: 10.1111/birt.12365.

Deneux-Tharaux, C, Saucedo, M; Comité National d'Experts sur la Mortalité Maternelle, 2021. Enquête Nationale Confidentielle sur les Morts Maternelles en France, contexte et méthode [Enhanced system for maternal mortality surveillance in France, context and Methods]. *Gynecologie, obstetrique, Fertilité & Senologie*, vol. 49, no. 1, pp. 3-8, doi: 10.1016/j.gofs.2020.11.005.

DeNicola, N, Grossman, D, Marko, K, Sonalkar, S, Tobah, YSB, Ganju, N, Witkop, CT, Henderson, J T, Butler, J L & Lowery, C, 2020. Telehealth Interventions to Improve Obstetric and Gynecologic Health Outcomes: A Systematic Review. *Obstetrics and Gynecology*, vol. 135, no. 2, pp. 371-382. doi: 10.1097/AOG.0000000000003646.

Dodson, J & Koepsell, A, 2014. *The Policy Process: Evaluation, Analysis and Revision*. Centre of Disease control & prevention. viewed 31 July 2019, <https://www.academia.edu/10093266>.

Drife, J, 2012. The value of confidential enquiries. *South African Journal of Obstetrics and Gynaecology*, vol. 18, no. 2, pp. 32-36.

Dumont, A, Fournier, P, Abrahamowicz, M, Traoré, M, Haddad, S & Fraser, WD, 2013. Quality of care, risk management, and technology in obstetrics to reduce hospital-based maternal mortality in Senegal and Mali (QUARITE): a cluster-randomised trial. *Lancet*, vol. 382, no. 9887, pp. 146-57.

Dumont A, Fournier P, Abrahamowicz M, Traore M, Haddad S, Fraser, WD, 2016. Quality of care, risk management, and technology in obstetrics to reduce hospital-based maternal mortality in Senegal and Mali (QUARITE): a cluster-randomised trial. *Lancet*, vol. 382, no. 9887, pp. 146-57, doi: 10.1016/S0140-6736(13)60593-0.

Ekurhuleni Health District, 2019. District Health Plan 2019-20, Ekurhuleni, Ekurhuleni Health District.

Feucht, U, van Rooyen, E, Skhosana, R, Bergh, AM, 2016. Taking kangaroo mother care forward in South Africa: The role of district clinical specialist teams. *South African Medical Journal*, vol. 106, no. 1, pp. 49-52, doi: 10.7196/SAMJ.2016.v106i1.10149.

Feucht, U, Marshall, C, Kauchali, S, Barron, P, Slavin, L, Bhardwaj, S, & Pillay, Y, 2018. Innovations in the clinical care of mothers and children in South Africa: The contribution of district clinical specialist teams. *South African Medical Journal*, vol. 108, no. 3 (Suppl 1), pp. S38-S43.

Firoz, T, McCaw-Binns, A, Filippi, V, Magee, LA, Costa, ML, Cecatti, JG, Barreix, M, Adanu, R, Chou, D & Say L, 2018. A framework for healthcare interventions to address maternal morbidity. *International Journal of Gynaecology and Obstetrics*, vol. 141, no. Suppl 1, pp. 61-68, doi: 10.1002/ijgo.12469.

Frank, K, Lombaard, H & Pattinson, RC, 2009. Does completion of the Essential Steps in Managing Obstetric Emergencies training package improve knowledge and skills in managing obstetric emergencies? *South African Journal of Obstetrics and Gynaecology*, vol. 15, no. 3, pp. 94-99.

Garenne, M, McCaa, R & Nacro, K, 2011. Maternal mortality in South Africa: An update from the 2007 Community Survey. *Journal of Population Research (Canberra)*, vol. 8, no. 1, pp. 89-101, doi: 10.1007/s12546-010-9037-y.

GDoH, 2014. Annual Performance Plan 2014/15. Johannesburg: Gauteng Department of Health.

GDoH, 2019. Annual Performance Plan 2019/20 - 2021/22: Johannesburg: Gauteng Department of Health.

GDoH, 2021. Proceedings of the Gauteng Department of Health Executive Management Committee meeting held at Johannesburg on 2021/08/02. Johannesburg: GDoH.

Gilpin, M, 1991. Update - -Cuba: on the road to a family medicine nation. *Journal of Public Health Policy*, vol. 12, no. 1, pp. 83-103.

Giangreco, A & Peccei, R, 2005. The Nature and Antecedents of Middle Managers Resistance to Change: Evidence from an Italian Context. *The International Journal of Human Resource Management*, vol. 16, no. 10, pp. 1812–1829, doi: 10.1080/09585190500298404.

Geller, SE, Koch, AR, Garland, CE, MacDonald, EJ, Storey, F & Lawton, B, 2018. A global view of severe maternal morbidity: moving beyond maternal mortality. *Reproductive Health*, vol. 15, no. 98, doi: 10.1186/s12978-018-0527-2.

Gerdtz, C, DePiñeres, T, Hajri, S, Harries, J, Hossain, A, Puri, M, Vohra, D & Foster, DG, 2015. 'Denial of abortion in legal settings', *Journal of Family Planning and Reproductive Health Care*, vol. 41, no. 3, pp. 161-3, doi: 10.1136/jfprhc-2014-100999.

Gabrysch, S and Campbell, OM, 2009. Still too far to walk: literature review of the determinants of delivery service use. *BMC Pregnancy and Childbirth*, vol. 9, no. 34, doi: 10.1186/1471-2393-9-34.

Government of Western Australia Department of Health, 2019. Clinical risk management. viewed 31 March 2021, https://ww2.health.wa.gov.au/Articles/A_E/Clinical-risk-management.

Graham, WJ, 2009. Criterion-based clinical audit in obstetrics: bridging the quality gap? *Best Practice and Research. Clinical Obstetrics and Gynaecology*, vol. 23, no. 3, pp. 375-88. doi: 10.1016/j.bpobgyn.2009.01.017.

Gruen, RL, Weeramanthri, TS & Bailie RS, 2002. Outreach and improved access to specialist services for indigenous people in remote Australia: the requirements for sustainability. *Journal of Epidemiology and Community Health*, vol. 56, no. 7, pp. 517-21, doi: 10.1136/jech.56.7.517.

Harrison, A, Montgomery, ET, Lurie, M & Wilkinson, D, 2000. Barriers to implementing South Africa's Termination of Pregnancy Act in rural KwaZulu/Natal. *Health Policy and Planning*, vol. 15, no. 4, pp. 424-31, doi: 10.1093/heapol/15.4.424.

Hensher, M, Price, M & Adomakoh, S, 2006. Referral Hospitals. In: Jamison DT, Breman JG, Measham AR, et al., editors, *Disease Control Priorities in Developing Countries*, 2nd edition. New York: Oxford University Press.

Heward, S, Hutchins, C & Keleher, H, 2007. Organizational change--key to capacity building and effective health promotion. *Health Promotion International*, vol. 22, no. 2, pp. 170-8, doi: 10.1093/heapro/dam011.

Hirschhorn, LR, Baynes, C, Sherr, K, Chintu, N, Awoonor-Williams, JK, Finnegan, K, Philips, JF, Anatole, M, Bawah, AA, Basinga, P, 2013. Population Health Implementation and Training – Africa Health Initiative Data Collaborative. Approaches to ensuring and improving quality in the context of health system strengthening: a cross-site analysis of the five African Health Initiative Partnership programs. *BMC Health Services Research*, vol. 13, no. (Suppl 2), pp. S8, doi: 10.1186/1472-6963-13-S2-S8.

Holloway, M, 1994. Trends in women's health: a global view. *Scientific American*, vol. 271, no.2, pp. 76–83, <https://www.jstor.org/stable/24942805>.

Horwood, C, Butler, L, Barker, P, Phakathi, S, Haskins, L, Grant, M, Mntambo, N & Rollins, N, 2017. A continuous quality improvement intervention to improve the effectiveness of community health workers providing care to mothers and children: a cluster randomised controlled trial in South Africa. *Human Resources for Health*, vol. 15, no. 1, pp. 39, doi: 10.1186/s12960-017-0210-7.

Human Rights Watch, 2011. South Africa: Stop Making Excuses: Accountability for Maternal Health Care in South Africa. New York: Human Rights Watch. viewed 30 July 2016, <https://www.hrw.org/sites/default/files/reports/sawrd0811webwcover.pdf> .

Huppertz, JW, Strosberg, M, Burns, S, Chaudhri, I, 2014. The Uniqueness of U.S. Healthcare Management: A Linguistic Analysis of Competency Models and Application to Health Administration Education. *The Journal of health administration education*, vol. 31, no. 3, pp. 197-214.

Jayaprakash, K, Raju, HG & Thanuja, R, 2011. Employees State Insurance (ESI) Corporation. *Journal of the Indian Association of Public Health Dentistry*, vol. 9, no. 18, pp. 246-250.

Jones, RA, Jimmieson, NL & Griffiths, A, 2005. The impact of organizational culture and reshaping capabilities on change implementation success: The mediating role of readiness for change. *Journal of Management Studies*, vol. 42, no. 2, pp. 361-386, Doi: 10.1111/j.1467-6486.2005.00500.x.

Kaswa, R & Yogeswaran, P, 2020. Abortion reforms in South Africa: An overview of the Choice on Termination of Pregnancy Act. *South African Family Practice* (2004), vol. 62, no. 1, pp. e1-e5, doi: 10.4102/safp.v62i1.5240.

Kaswa, R, 2021. Barriers to access second-trimester abortion: A case report. *South African Family Practice* (2004), vol. 27, no. 63(1), pp. e1-e3, doi: 10.4102/safp.v63i1.5028

Kessner, DM, Kalk, CE & Singer, J, 1973. Assessing health quality- the case for tracers. *The New England Journal of Medicine*, vol. 288, no. 4, pp. 189-194, doi: 10.1056/NEJM197301252880406.

Khupakonke, S, Beke, A & Amoko, DHA, 2017. Maternal characteristics and birth outcomes resulting from births before arrival at health facilities in Nkangala District, South Africa: a case control study. *BMC Pregnancy Childbirth*, vol. 17, no. 1, pp. 401, doi: 10.1186/s12884-017-1580-5.

Klugman, B, Stevens, M & Van den Heever, A, 1998. Sexual and Reproductive Rights, Health Policies and Programming in South Africa 1994–1998. Johannesburg', Women's Health Project, South Africa.

Knight M, 2014. The International Network of Obstetric Survey Systems (INOSS): benefits of multi-country studies of severe and uncommon maternal morbidities. *Acta Obstetrica et Gynecologica Scandinavica*, vol. 93, no. 2, pp. 127-31, doi: 10.1111/aogs.12316.

Kramer, MR, Strahan, AE, Preslar, J, Zaharatos, J, St Pierre, A, Grant, JE, Davis, NL, Goodman, DA & Callaghan, WM, 2019. Changing the conversation: applying a health equity framework to maternal mortality reviews. *American Journal of Obstetrics and Gynecology*, vol. 221, no. 6, pp. 609.e1-609.e9, doi: 10.1016/j.ajog.2019.08.057.

Krefting, L, 1991. Rigor in qualitative research: the assessment of trustworthiness', *American Journal of Occupational Therapy*, vol. 45, no. 3, pp. 214-22, doi: 10.5014/ajot.45.3.214.

Kruse, C, Betancourt, J, Ortiz, S, Valdes, Luna SM, Bamrah, IK & Segovia, N, 2019. Barriers to the Use of Mobile Health in Improving Health Outcomes in Developing Countries: Systematic Review. *Journal of medical Internet research*, vol. 21, no. 10, pp. e13263, doi: 10.2196/13263.

Lassi, ZS, Musavi, NB, Maliqi, B, Mansoor, N, de Francisco, A, Toure, K & Zulfiquir A, Bhutta, 2016. Systematic review on human resources for health interventions to improve maternal health outcomes: evidence from low- and middle-income countries. *Human Resources for Health*, vol. 14, no.10, doi: 10.1186/s12960-016-0106-y.

Lebina, L, Kawonga, M, Oni, T, Kim, H-Y & Alaba, OA, 2020. The cost and cost implications of implementing the integrated chronic disease management model in South Africa. *PLoS ONE*, vol. 15, no. 6, pp. e0235429, doi: 10.1371/journal.pone.0235429.

Lavin, T, Preen, DB & Pattinson, R, 2016. Timing and cause of perinatal mortality for small-for-gestational-age babies in South Africa: critical periods and challenges with detection. *MaternalHealth, Neonatology and Perinatology*, vol. 2, no. 11, doi: 10.1186/s40748-016-0039-4.

Lavin, T & Pattinson, RC, 2018. Does antenatal care timing influence stillbirth risk in the third trimester? A secondary analysis of perinatal death audit data in South Africa', *BJOG*, vol. 125, no. 2, pp. 140-147, doi: 10.1111/1471-0528.14645.

Linneberg, MS & Korsgaard, S, 2019. Coding qualitative data: a synthesis guiding the novice. *Qualitative Research Journal*, vol. 19, no. 3, pp. 259 – 270. viewed 20 July 2020, doi: 10.1108/QRJ-12-2018-0012.

Lipsitz, LA, 2012. Understanding Health Care as a Complex System: the foundation for unintended consequences. *The Journal of the American Medical Association*, vol. 308, no. 3, pp. 243-244, doi: 10.1001/jama.2012.7551.

Magann, EF, McKelvey, SS, Hitt, WC, Smith, MV, Azam, GA & Lowery, CL, 2011. The use of telemedicine in obstetrics: a review of the literature. *Obstetrical and Gynecological Survey*, vol. 66, no. 3, pp. 170-8, doi: 10.1097/OGX.0b013e3182219902

Marquez, L and Kean, L, 2016. Making Supervision Supportive and Sustainable: New Approaches to Old Problems. MAQ Paper No. 4 2002, Washington, DC, USAID; 2002. viewed 20 April 2021, <https://www.usaidassist.org/sites/assist/files/maqno4final.pdf>.

Massyn, N, Day, C, Damboo, M, Baron, P, English, R & Padarth, A, 2013. editors, *District Health Barometer 2012/13*. Durban: Health Systems Trust.

Massyn, N, Day, C, Ndlovu, N & Padachy, T, 2020. editors, *District Health Barometer 2019/20*. Durban: Health Systems Trust.

Meara, JG, Leather, AJM, Hagander, L, Alkire, BC, Alonso, N, Ameh, EA, Bickler, SW, Conteh, L, Dare, AJ, Davies, J, MÉRISIER, ED, El-Halabi, S, Farmer, PE, Gawande, A, Gillies, R, Greenberg, SL, Grimes, CE, Gruen, RL, Ismail, EA, Kamara, TB, Lavy, C, Lundeg, G, Mkandawire, NC, Raykar, NP, Riesel, JN, Rodas, E, Rose, J, Roy, N, Shrimé, MG, Sullivan, R, Verguet, S, Watters, D, Weiser, TG, Wilson, IH, Yamey, G & Yip W, 2015. Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. *Lancet*, vol. 386, no. 9993, pp. 569–624, doi: 10.1016/S0140-6736(15)60160-X.

Medelyan, A, 2020. Coding Qualitative Data: How to Code Qualitative Research. viewed 23 May 2021, <https://getthematic.com/insights/coding-qualitative-data>.

Meel, L, Kaswa, RP, 2009. The impact of the choice on termination of pregnancy act of 1996 (Act 92 of 1996) on criminal abortions in the Mthatha area of South Africa. *African Journal of Primary Health Care and Family Medicine*, vol. 1, no. 1, pp. 79–81, doi: 10.4102/phcfm.v1i1.36.

Metwally, AM, Abdel-Latif, GA, Mohsen, A, El Etreby, L, Elmosalami, DM, Saleh, RM, El-Sonbaty, MM, Amer, HA, El Deeb, SE, Fathy, AM, Hanna, C, Azmy, O, Taha, TF, Abbassy, A, Alalfy, M, Hasan, HM, Abdelrahman, M, 2020. Strengths of community and health facilities based interventions in improving women and adolescents' care seeking behaviors as approaches for reducing maternal mortality and improving birth outcome among low income communities of Egypt. *BMC Health Services Research*, vol. 20, no. 1, pp. 592, doi: 10.1186/s12913-020-05412-1.

Meyer, JP, Srinivas, ES, Lal, JB, Topolnytsky, L, 2007. Employee commitment and support for an organizational change: Test of the three-component model in two cultures. *Journal of Occupational and Organizational Psychology*, vol. 80, no. 2, pp. 185-211. doi: 10.1348/096317906X118685

Mofolo, N, Heunis, C, Kigozi, GN, 2019. Towards national health insurance: Alignment of strategic human resources in South Africa. *African Journal of Primary Health Care and Family Medicine*, vol. 11, no. 1, pp. e1-e7, doi. 10.4102/phcfm.v11i1.1928.

Moodley, J, Fawcus, F & Pattinson R, 2018. Improvements in maternal mortality in South Africa. *South African Medical Journal*, vol. 108, no. (S1), pp. s4-s8, <http://www.samj.org.za/index.php/samj/article/view/12244>.

Morof, D, Serbanescu, F, Goodwin, MM, Hamer, DH, Asiimwe, AR, Hamomba, L, Musumali, M, Binzen, S, Kekitiinwa, A, Picho, B, Kaharuza, F, Namukanja, PM, Murokora, D, Kamara, V, Dynes, M, Blanton, C, Nalutaaya, A, Luwaga, F, Schmitz, MM, LaBrecque, J, Conlon, CM, McCarthy, B, Kroelinger, C & Clark T, 2019. Addressing the Third Delay in Saving Mothers, Giving Life Districts in Uganda and Zambia: Ensuring Adequate and Appropriate Facility-Based Maternal and Perinatal Health Care. *Global health, science and practice*, vol. 7 (Suppl 1), pp. S85–S103, doi: 10.9745/GHSP-D-18-00272.

Murray, SF & Pearson, SC, 2006. Maternity referral systems in developing countries: current knowledge and future research needs. *Social Science and Medicine*, vol. 62, no. 9, pp. 2205-15, doi: 10.1016/j.socscimed.2005.10.025.

Mutale, W, Chintu, N, Amoroso, C, Awoonor-Williams, K, Phillips, J, Baynes, C, Michel, C, Taylor, A, & Sherr, K, 2013. Population Health Implementation and Training – Africa Health Initiative Data Collaborative. Improving health information systems for decision making across five sub-Saharan African countries: Implementation strategies from the African Health Initiative', BMC Health Services Research, Vol. 13 (Suppl 2), no. S9, doi: 10.1186/1472-6963-13-S2-S9.

Mutale, W, Cleary, S, Olivier, J, Chilengi, R & Gilson, L, 2018. Implementing large-scale health system strengthening interventions: experience from the better health outcomes through mentoring and assessments (BHOMA) project in Zambia. BMC Health Services Research, vol. 18, no. 1, pp. 795, doi: 10.1186/s12913-018-3619-3.

Naidoo, M, 2017. An evaluation of the emergency care training workshops in the province of KwaZulu-Natal, South Africa. African Journal of Primary Health Care and Family Medicine, vol. 9, no. 1, pp. 1283, doi: 10.4102/phcfm.v9i1.1283.

Nathan, R & Rautenbach, P, 2013. Risks identified in implementation of District Clinical Specialist Teams. South African Medical Journal, vol. 103, no. 3, pp. 144-6, doi: 10.7196/SAMJ.6551.

NCCEMD, 1998. Saving Mothers: Report on Confidential Enquiries into Maternal Deaths in South Africa 1998. Pretoria: National Department of Health.

NCCEMD, 1999. Second Report on Confidential Enquiries into Maternal Deaths in South Africa. Pretoria: National Department of Health.

NCCEMD, 2005. Third Report on Confidential Enquiries into Maternal Deaths in South Africa. Pretoria: National Department of Health.

NCCEMD, 2009. Fourth Report on Confidential Enquiries into Maternal Deaths in South Africa. Pretoria: National Department of Health.

NCCEMD, 2012. Saving Mothers 2008-2010: Fifth report on the confidential enquiries into maternal deaths in South Africa. Pretoria: National Department of Health.

NCCEMD, 2014. Saving Mothers 2011-2013 Sixth report on the confidential enquiries into maternal deaths in South Africa. Pretoria: National Department of Health.

NCCEMD, 2018. Saving Mothers 2014-2016: Seventh report on the confidential enquiries into maternal deaths in South Africa. Pretoria: National Department of Health.

NCCEMD, 2020. Saving Mothers and Babies Report 2017-2019: Eighth report on the confidential enquiries into maternal deaths in South Africa. Pretoria: National Department of Health.

NDoH, 1995a. Maternal Child and Women Health Draft Policy, viewed 30 July 2016, <http://www.health.gov.za>.

NDoH, 1995b. A policy for the Development of a District Health System in South Africa. Pretoria: National Department of Health.

NDoH, 1997a. Maternal death as a notifiable condition. Government Gazette on 3 October 1997. Pretoria: National Department of Health.

NDoH, 1997b. White paper for the transformation of the health system in South Africa. Notice 667 of 1997 Department of Health. Pretoria: National Department of Health.

NDoH, 1997c. Standing Committee for Confidential Enquiries into Maternal Deaths. viewed 30 July 2016, <http://www.health.gov.za>.

NDoH, 1999. Patients' Rights Charter. Pretoria: Government Printer.

NDoH, 2000. National Guideline for cervical cancer screening. Pretoria: Government Printer.

NDoH, 2002. District Hospital service package for South Africa. Pretoria: Government Printer.

NDoH, 2003a. National Contraception Policy Guidelines. Pretoria: Government Printer.

NDoH, 2003b. South African Government amend plan to provide anti-retroviral drugs to people with AIDS through public health services. Pretoria: Government Printer.

NDoH, 2003c. Provision of HIV post-exposure prophylaxis to survivors of rape in public sector facilities. Pretoria: Government Printer.

NDoH, 2007a. Guidelines for maternity care in South Africa: A manual for clinics, community health centers and district hospitals. Pretoria: National Department of Health.

NDoH, 2007b. Essential steps in the management of common conditions associated with maternal mortality. Pretoria: Government Printer.

NDoH, 2008. Every death counts. Saving the lives of mothers, babies and children in South Africa. Viewed 31 January 2020, <https://www.samrc.ac.za/sites/default/files/attachments/2016-06-30/edcrptfinal.pdf>.

NDoH, 2009. Human Development Cluster: Health: Government's Programme of Action: Ten point Plan. Viewed 30 July 2016, <http://www.health.gov.za>.

NDoH, 2010a. Negotiated Service Delivery Agreement: A long and Health Life for all South Africans. Pretoria: National Department of Health.

NDoH, 2010b. Clinical Guidelines: PMTCT (Prevention of Mother-to-Child Transmission). Pretoria: National Department of Health.

NDoH, 2010c. A monograph of the management of postpartum hemorrhage. Pretoria: National Department of Health.

NDoH, 2011a. Policy document on Primary Health care Re-engineering. Pretoria: National Department of Health.

NDoH, 2011b. Provincial guidelines for the implementation of the three streams of PHC re-engineering. Pretoria: National Department of Health.

NDoH, 2011c. Ministerial Task Team Report. District Clinical Specialist Teams in South Africa. In: Ministerial Task Team Report to the Honourable Minister of Health, Dr Aaron Motsoaledi; Pretoria: National Department of Health.

NDoH, 2011d. National Health Act (61/2003): Policy on National Health Insurance 554 (34523). Pretoria: National Department of Health.

NDoH, 2011e. Health Data Advisory and Co-Ordination Committee (HDACC) Report. Pretoria: Government Printer.

NDoH, 2011f. Human Resources for Health for South Africa: 2030. Pretoria: National Department of Health.

NDoH, 2011g. District Health Management Information System (DHMIS) Policy. Pretoria: National Department of Health.

NDoH, 2011h. Policy on Categories of hospitals. Pretoria: National Department of Health.

NDoH, 2011i. Policy on the Management of Hospitals. 34522 R656. Pretoria: National Department of Health.

NDoH, 2012a. National launch and induction of the district clinical specialists teams: Speech for the Minister. Launch of the induction programme of the clinical specialist teams. 27 September 2012. viewed 10 October 2016,
[http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=312 83&tid=86339](http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=312%2083&tid=86339).

NDoH, 2012b. Strategic Plan for Maternal, Neonatal, Child and Women's Health (MNCWH) and Nutrition in South Africa 2009 – 2014. Pretoria: National Department of Health

NDoH, 2012c. National Health Insurance (NHI) - Green Paper, viewed 30 June 2016,
<http://www.mm3admin.co.za/documents/docmanager/f447b607-3c8f-4eb7-8da4-11bca747079f/00090701.pdf>.

NDoH, 2013a. The South African Antiretroviral Treatment Guidelines. Pretoria: National Department of Health.

NDoH, 2013b, Ideal Clinic Programme. Viewed 30 June 2016, <https://www.idealclinic.org.za>.

NDoH, 2013c. National Contraception Clinical Guideline (amended). Pretoria: Government Printer.

NDoH, 2013d. South Africa's National Strategic Plan for a Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMA). Pretoria: National Department of Health.

NDoH, 2013e. Induction document for DCST. Pretoria: National Department of Health.

NDoH, 2014a. Handbook for District Clinical Specialist Teams (DCST). Pretoria: National Department of Health. viewed 31 July 2019, <http://www.health-e.org.za/wp-content/uploads/2015/06/Handbook-for-DCSTs.pdf>.

NDoH, 2014b. A Clinical Governance Handbook for District Clinical Specialist teams. Pretoria: National Department of Health.

NDoH, 2014c. Essential steps in the management of obstetrics emergency (ESMOE), viewed 21 April 2021, <https://www.knowledgehub.org.za/elibrary/esmoe-obstetric-haemorrhage>.

NDoH, 2014d. Strategic Plan of Department of Health: 2014/15 to 2018/19. viewed 30 June 2016, <http://www.health.gov.za>.

NDoH, 2014e. DCST standardized format. Pretoria: National Department of Health.

NDoH, 2014f. Standard treatment guidelines and essential medicines list for South Africa: primary health care and hospital level. Pretoria: Government Printer.

NDoH, 2014g. Expanded terms of reference from the maternal, child and women's health committee. viewed 30 April 2021, https://www.gov.za/sites/default/files/gcis_document/201409/childwomenhealth0.pdf.

NDoH, 2014h. Committed to maternal, women and child health. viewed 31 August 2016, <http://www.health.gov.za/index.php/2014-03-17-09-48-36/edition-latest-item/25-deputy-minister-marks-pregnancy-awareness-week>.

NDoH, 2015a. National consolidated guidelines for the prevention of mother-to-child transmission of HIV (PMTCT) and the management of HIV in children, adolescents and adults Pretoria: Government Printer.

NDoH, 2015b. Health professions act, 1974 (Act no.56 of 1974): Regulations defining the scope of practice of clinical associates, no R433. Pretoria: Government Printers.

NDoH, 2015c. MomConnect project, viewed 30 April 2021, <http://www.health.gov.za/index.php/mom-connect>.

NDoH, 2015d. National Health Insurance (NHI) – White Paper 2015c, viewed 31 May 2018, <http://www.mm3admin.co.za/documents/docmanager/f447b607-3c8f-4eb7-8da4-11bca747079f/00090702.pdf>.

NDoH, 2016a. Guidelines for Maternity care in South Africa Pretoria: Government Printer.

NDoH, 2016b. National Policy for Patient Safety Incident Reporting and Learning in the Public Health Sector of South Africa. Pretoria: National Department of Health.

NDoH, 2017. NIDS Data Element. Pretoria: National Department of Health.

NDoH, 2018a. Health Patient Record System (HPRS), viewed 31 May 2018, <https://hprs.health.gov.za>.

NDoH, 2018b. Standard treatment guidelines and an essential medicines list: Primary Health Care level. viewed 25 April 2021, <https://www.idealhealthfacility.org.za/docs/guidelines/STG%20and%20EML%20PHC%202018>.

NDoH, 2019a. National sexual & reproductive health and rights policy. Pretoria: National Department of Health.

NDoH, 2019b. Guideline for the Prevention of Mother to Child Transmission of Communicable Infections. Pretoria: National Department of Health.

NDoH, 2019c. National Clinical Guideline for Implementation of the Choice of Termination of Pregnancy Act. Pretoria: National Department of Health.

NDoH, 2019d. National contraception clinical guidelines. Pretoria: National Department of Health.

NDoH, 2019e. Standard treatment guidelines and an essential medicines list: Hospital level adults. viewed 25 April 2021, https://www.sapc.za.org/Media/Default/Documents/STG%20hospital%20level%20adult%202019_v2.0.pdf.

NDoH, 2020a. National Strategic Plan 2020/21 – 2024/25. Pretoria: National Department of Health.

NDoH, 2020b. National clinical guidelines for safe conception and infertility, 2019. Pretoria: National Department of Health.

NDoH, 2021a. South African national maternal, perinatal, and neonatal Health policy. Pretoria: National Department of Health.

NDoH, 2021b. South African national maternal, perinatal, and neonatal Health policy: Annexure 3: Challenges for maternal perinatal and neonatal services in South Africa. Pretoria: National Department of Health.

NDoH and NDoBE, 2012. Integrated School Health Policy. viewed 30 June 2016, https://www.health-e.org.za/wp-content/.../10/Integrated_School_Health_Policy.pdf.

NDoH, Statistics South Africa, South African Medical Research Council, and ICF, 2019. South Africa Demographic and Health Survey 2016. Pretoria, South Africa, and Rockville, Maryland, USA: NDoH, Stats SA, SAMRC, and ICF.

National Department of Cooperative Governance and Tradition affairs, 2020. City of Ekurhuleni, Gauteng. viewed 20 March 2021, https://www.cogta.gov.za/ddm/wp-content/uploads/2020/08/Take2_DistrictProfile_EKURHULENI-2.pdf.

National Department of Social Development, 2015. National Adolescent Sexual and Reproductive Health and Rights Framework Strategy 2014—2019. Pretoria: National Department of Social Development.

National Department of Science and Technology, 2015. Strategic Plan for the fiscal years 2015 - 2020. Pretoria: National Department of science and technology.

National Department of Social Development, 2015. National Adolescent Sexual and Reproductive Health and Rights Framework Strategy 2014—2019. Pretoria: National Department of Social Development.

National Department for Women, children and People with disabilities. 2013. Policy guidelines on child and adolescent mental health. viewed 31 August 2016,

http://www.gov.za/sites/www.gov.za/files/childmentalhealth_0.pdf.

National Planning Commission, 2012. National Development Plan 2030. viewed 31 May 2018,

<http://www.poa.gov.za/.../NPC%20National%20Development%20Plan%20Vision%202030>.

National Progressive Primary Health Care Network, 1997. Phila Summary Brief. White Paper for Transformation of the Health System in South Africa. Chapter 8: Maternal, Child and Women's Health. Gatesville: NPPHCN/PHILA.

Nemutandani, SM, Hendricks, SJ & Mulaudzi, MF, 2016. Perceptions and experiences of allopathic health practitioners on collaboration with traditional health practitioners in post-apartheid South Africa. *African Journal of Primary Health Care and Family Medicine*, vol. 10, no. 8(2), pp. e1-8, doi: 10.4102/phcfm.v8i2.1007.

Ngatane N, 2021. Gauteng paid R501 million in medical negligence claim. *Eye Witness News*, 31 March. viewed 31 March 2021, <https://ewn.co.za/2021/03/31/gauteng-paid-r501-million-in-medical-negligence-claims-ag-maluleke>.

Nkwanyana, NM, Voce, AS, Mngayi, SO, Sartorius, B & Schneider, H, 2019. A health system framework for perinatal care in South African district hospitals: A Delphi technique. *BMC Health Services Research*, vol. 19 (1), no. 402, doi: 10.1186/s12913-019-4200-4.

Nsibandé, DF, Goga, A, Laubscher, R, Lombard, C, Cheyip, M, Jackson, D, Larsen, A, Mogashoa, M, Dinh, T-H & Ngandu, NK 2020. Uptake of antenatal care in high HIV-prevalence settings: Results from three population-based surveys in South Africa. *South African Medical Journal*, vol. 110, no. 7, pp. 671-677, doi: 10.7196/SAMJ.2020.v110i7.14325.

Oboirien K, Harris B, Goudge, J & Eyles, J, 2018. Implementation of district-based clinical specialist teams in South Africa: Analysing a new role in a transforming system. *BMC Health Services Research*, vol. 18(1): no. 600, doi: 10.1186/s12913-018-3377-2.

Oboirien, K, Goudge, J, Harris, B & Eyles, J, 2019. Can institutional entrepreneurship strengthen clinical governance and quality improvement: a case study of a district-based clinical specialist team in South Africa. *Health Policy and Planning*, vol. 34(Supp 2), pp. ii121-ii134, doi: 10.1093/heapol/czz110.

Ojemeni, MT, Niles, P, Mfaume, S, Kapologwe, NA, Deng, L, Stafford, R, Voeten, MJ, Theonestina, K, Budin, W, Chhun, N and Squires, A, 2017. A case study on building capacity to improve clinical mentoring and maternal child health in rural Tanzania: the path to implementation. *BMC Nursing*, vol. 16, no. 57, pp. 1-9, doi: 10.1186/s12912-017-0252-0.

Ofori, B, Ofori, D, Ntumi, M, Asah-Opoku, K & Boafor, T, 2021. Assessing the functionality of an emergency obstetric referral system and continuum of care among public healthcare facilities in a low resource setting: an application of process mapping approach. *BMC Health Services Research*, vol. 21, no. 402, pp. 1-14, doi: 10.1186/s12913-021-06402-7.

Oosthuizen, SJ, Bergh, AM, Grimbeek, J & Pattinson, RC, 2019. Midwife-led obstetric units working 'CLEVER': Improving perinatal outcome indicators in a South African health district. *South African Medical Journal*, vol. 109, no. 2, pp. 95-101, doi: 10.7196/SAMJ.2019.v109i2.13429.

Oosthuizen, SJ, Bergh, AM, Grimbeek, J & Pattinson RC, 2020. CLEVER maternity care: A before-and-after study of women's experience of childbirth in Tshwane, South Africa, *African journal of primary health care & family medicine*, vol. 12, no. 1, pp. e1–e8, doi: 10.4102/phcfm.v12i1.2560.

Pattinson, R, 2007. Basic Antenatal care, MRC Maternal and Infant Health Care Strategies Research Unit, Pretoria.

Pattinson, R, 2012. Reducing maternal deaths. *South African Journal of Obstetrics and Gynaecology*, vol. 18, no. 2, pp. 30-31.

Pattison, R & Buchman E, 2016. Basic antenatal care plus Handbook, MRC Maternal and Infant Health Care Strategies Research Unit, Pretoria.

Pattinson, RC, Bergh, AM, Ameh, C, Makin, J, Pillay, Y, Van den Broek, N & Moodley, J, 2019, Reducing maternal deaths by skills-and-drills training in managing obstetric emergencies: A before-and-after observational study. *South African Medical Journal*, vol. 109, no. 4, pp. 241-245. doi: 10.7196/SAMJ.2019.v109i4.13578.

Peres, EM, Andrade, AM, Dal Poz, MR & Grande, NR, 2006. The practice of physicians and nurses in the Brazilian Family Health Programme - evidences of change in the delivery health care model. *Human Resources for Health*, vol. 4, no. 25, pp. 1-8, doi.org/10.1186/1478-4491-4-25.

Phillips, TK, Clouse, K, Zerbe, A, Orrell, C, Abrams, EJ & Myer, L, 2018. Linkage to care, mobility and retention of HIV-positive postpartum women in antiretroviral therapy services in South Africa. *Journal of the International AIDS Society*, vol. 21(Suppl 4): pp. e25114. doi: [10.1002/jia2.25114](https://doi.org/10.1002/jia2.25114).

Pomare, C, Churruca, K, Long, JC, Ellis, LA & Braithwaite, J. 2019. Organisational change in hospitals: a qualitative case-study of staff perspectives. *BMC Health Services Research*, vol. 19(1), no. 840, pp. 1-9, doi: 10.1186/s12913-019-4704-y.

Portoghese, I, Galletta, M, Battistelli, A, Saiani, L, Penna, MP & Allegrini, E, 2012. Change-related expectations and commitment to change of nurses: the role of leadership and communication. *Journal of Nursing Management*, vol. 20, no. 5, pp. 582-91. doi: 10.1111/j.1365-2834.2011.01322.x.

Ramos, MC, Barreto, JOM, Shimizu, HE, Moraes, APG & Silva, END, 2020. Regionalization for health improvement: A systematic review. *PLoS One*, vol. 15, no. 12, pp. e0244078, doi: 10.1371/journal.pone.0244078.

Rees, H, 1994. Background document Prepared for the Special Programme of Research, Development and Research Training in Human Reproduction, WHO: Johannesburg.

Reproductive Rights Alliance, 2002. Five year review of the implementation of the Choice on Termination of Pregnancy Act, 92 of 1996, Johannesburg: Progress Press.

Republic of South Africa, 1994. Free health services for pregnant women and children under the age of 6 years. NOTICE 657 of 1994, 1 July 1994, Pretoria, Republic of South Africa.

Republic of South Africa, 1995. Ratification of the United Nations Commission on the elimination of all forms of discrimination against women (CEDAW). viewed 30 June 2016, <http://www.gov.za>.

Republic of South Africa, 1996a. Constitution of the Republic of South Africa. Act 108 of 1996, Pretoria, Republic of South Africa.

Republic of South Africa, 1996b. Choice of Termination of Pregnancy Act. Act 92 of 1996, Pretoria, Republic of South Africa.

Republic of South Africa, 1998a. Sterilization Act. Act 44 of 1998, Pretoria, Republic of South Africa.

Republic of South Africa, 1998b. Domestic violence Act, Act 116 of 1998, Pretoria, Government Printers.

Republic of South Africa, 1998c. Medical schemes Act, Act no. 131 of 1998. Pretoria: Government Printers.

Republic of South Africa, 1998d. Population policy for South Africa, Pretoria, Government Printers.

Republic of South Africa, 1998e. Formation of South African National AIDS Council, viewed 31 December 2016, <http://sanac.org.za>.

Republic of South Africa, 2000. Pharmacy Amendment Act, Act no 1 of 2000, Pretoria, Government Printer.

Republic of South Africa, 2002a. Medicines and Related Substances Amendment Act, 59 of 2002, Pretoria, Government Printer.

Republic of South Africa, 2002b. Medical Schemes Amendment Act 62 of 2002, Pretoria, Government Printer.

Republic of South Africa, 2004a. National Health Act as amended. Act no 61 of 2003, Pretoria, Republic of South Africa.

Republic of South Africa, 2004b. Choice on termination of pregnancy Amendment Act. Act No 38, 2004, Pretoria, Republic of South Africa.

Republic of South Africa, 2005. Sterilization Amendment Act. Act No. 3 of 2005, Pretoria, Republic of South Africa.

Republic of South Africa, 2007a. Sexual Offences and Related Matters Amendment Act, Act No. 32 of 2007, Pretoria, Government Printer.

Republic of South Africa, 2007b. Traditional Health Practitioners Act, Act no 22 of 2007 Pretoria: Government Printer.

Republic of South Africa, 2007c. Health Professions Amendment Act, Act No. 29 of 2007, Pretoria: Government Printer.

Republic of South Africa, 2008. Choice on termination of pregnancy Amendment Act. Act no 1, Pretoria: Republic of South Africa.

Republic of South Africa, 2010. Millennium Development Goals: Country Report 2010. Pretoria: Government Press, viewed 30 January 2020, http://www.statssa.gov.za/news_archive/Docs/MDGR_2010.pdf.

Republic of South Africa, 2011. National Development Plan: Vision for 2030, Pretoria: Government Printer.

Republic of South Africa, 2013a. Establishment of the Office of Health Standard Compliance. National Health Amendment Act no 12 of 2013, Pretoria: Government Printer.

Republic of South Africa, 2013b. Millennium Development Goals in Country Report. Compiled by Statistics South Africa. Pretoria: Department of Health.

Republic of South Africa, 2015. Medicines and Related Substances Amendment Act, 2015. Act No. 14, Pretoria: Government Press.

Republic of South Africa, 2018a. Medical Schemes Amendment Bill, no 636, Pretoria: Government Press.

Republic of South Africa, 2018b. Strengthening the South African health system towards an integrated and unified health system, Presidential Health Summit Compact, 25 July 2019, viewed 25 April 2021, <http://www.thepresidency.gov.za/download/file/fid/1650>.

Republic of South Africa, 2019. National Health Insurance Bill, Pretoria: Government Printers.

Rhoda, NR, Velaphi, S, Gebhardt, GS, Kauchali, S & Barron, P, 2018. Reducing neonatal deaths in South Africa: Progress and challenges. *South African Medical Journal*, vol. 108 (3 Suppl 1), no. 9, pp. S9-S16. doi: 10.7196/SAMJ.2017.v108i3b.12804.

Ritchie, J, Lewis, J & Elam G, 2003. Designing and Selecting Samples Sampling strategies. In: Ritchie J, Lewis J, editors, *Qualitative research practice a guide for social science students and researchers*, London: SAGE Publications.

Rousseva, C, Kammath, V, Tancred, T & Smith, H, 2020. Health workers' views on audit in maternal and newborn healthcare in LMICs: a qualitative evidence synthesis. *Tropical Medicine and International Health*, vol. 25, no. 5, pp. 525-539, doi: 10.1111/tmi.13377.

Saldana, J, 2016. *The coding manual for qualitative research*. 3rd edition, London: Sage Publishers.

Sardi, A, Sorano, E, Guerrieri, A, Fiandra, U, 2020. Improvement of health performance through clinical risk management: the maternal and child pathway. *Measuring Business Excellence*, vol. 25, no. 4, pp. 372-389, doi: 10.1108/MBE-12-2019-0125

Satin, AJ, 2018. Simulation in Obstetrics. *Obstetrics and Gynecology*, vol. 32, no. 1, pp. 199-209, doi: 10.1097/AOG.0000000000002682.

Schaap, T, Bloemenkamp, K, Deneux-Tharaux, C, Knight, M, Langhoff-Roos, J, Sullivan, E, vanden Akker, T and INOSS, 2019. Defining definitions: a Delphi study to develop a core outcome set for conditions of severe maternal morbidity. *British Journal of Obstetrics and Gynecology*, vol. 126, no. 3, pp. 394-401, doi: 10.1111/1471-0528.14833.

Schneider, H, George, A, Mukinda, F & Tabana, H, 2020. District Governance and Improved Maternal, Neonatal and Child Health in South Africa: Pathways of Change', *Health Systems and Reform*, vol. 6, no. 1, pp. e1669943, doi: 10.1080/23288604.2019.1669943.

Scott, H, and Danel, I, 2016. Accountability for improving maternal and newborn health. *Best Practice and Research. Clinical Obstetrics and Gynaecology*, vol. 36, pp. 45-56, doi: 10.1016/j.bpobgyn.2016.05.009.

Serbanescu, F, Goodwin, MM, Binzen, S, Morof, D, Asiimwe, AR, Kelly, L, Wakefield, C, Picho, B, Healey, J, Nalutaaya, A, Hamomba, L, Kamara, V, Opio, G, Kaharuza, F, Blanton, C, Luwaga, F, Steffen, M & Conlon, CM, 2019. Addressing the First Delay in Saving Mothers, Giving Life Districts in Uganda and Zambia: Approaches and Results for Increasing Demand for Facility Delivery Services. *Global Health Science and Practice*, Vol. 7, no. Suppl 1, pp. S48-S67, doi: 10.9745/GHSP-D-18-00343.

Solanki, GC, Cornell, JE, Daviaud, E, Fawcus, S, 2020. Caesarean section rates in South Africa: A case study of the health systems challenges for the proposed National Health Insurance. *South African Medical Journal*, vol. 110, no. 8, pp. 747-750, doi: 10.7196/SAMJ.2020.v110i8.14699.

Soma-Pillay, P, Pattinson, RC, Langa-Mlambo, L, Nkosi, BS & Macdonald AP, 2015. Maternal near miss and maternal death in the Pretoria Academic Complex, South Africa: A population-based study. *South African Medical Journal*, vol. 105, no. 7, pp. 578-63, doi: 10.7196/SAMJnew.8038.

South African Human Rights Commission, 2009. Public Inquiry: Access to Health Care Service. viewed 30 July 2020, www.sahrc.org.za/home/21/files/Health%20Report.pdf.

Sanneving, L, Kulane, A, Iyer, A & Ahgren, B, 2013. Health system capacity: maternal health policy implementation in the state of Gujarat, India. *Global Health Action*, vol. 6, pp 1-8, doi: 10.3402/gha.v6i0.19629.

Schultz FC & Pal S, 2004. Who should lead a healthcare organization: MDs or MBAs?', *Journal of Healthcare Management*, vol. 49, no. 2, pp. 103-116, doi:10.1097/00115514-200403000-00007.

Soklaridis S, Oandasan I & Kimpton S, 2007. Family health teams: can health professionals learn to work together? *Canadian Family Physician*, vol. 53, no. 7, pp. 1198-9.

Simpson, H & Barker, D, 2008. Role of the midwife and the obstetrician in obstetric critical care- a case study from the James Cook University Hospital. *Best Practice and Research. Clinical Obstetrics and Gynaecology*, vol. 22, no. 5, pp. 899-916, doi: 10.1016/j.bpobgyn.2008.06.007.

Som, CV, 2004. Clinical governance: a fresh look at its definition. *Clinical Governance: An International Journal*, vol. 9, no. 2, pp. 87 – 90, doi: 10.1108/14777270410536358.

South African Human Rights Commission, 2009. Public Inquiry: Access to Health Care Service. viewed 30 July 2016. www.sahrc.org.za/home/21/files/Health%20Report.pdf.

Statistics South Africa, 2020. Maternal health care in SA shows signs of improvement. viewed 27 April 2021. <http://www.statssa.gov.za/?p=13102>.

Stinson, K, Jennings, K & Myer, L, 2013. Integration of Antiretroviral Therapy Services into Antenatal Care Increases Treatment Initiation during Pregnancy: A Cohort Study. *PLOS ONE*, vol. 8, no. 5, pp. e63328, doi: 10.1371/journal.pone.0063328.

Tait, AR, 2004. Clinical governance in primary care: a literature review. *Journal of Clinical Nursing*, vol. 13, no. 6, pp. 723-30, doi: 10.1111/j.1365-2702.2004.00949.x.

Turner, KL, Hyman, AG & Gabriel, MC, 2008. Clarifying values and transforming attitudes to improve access to second trimester abortion. *Reproductive Health Matters*, vol. 16, no. 31 Suppl, pp. 108–116, doi: 10.1016/S0968-8080(08)31389-5.

Thwala, SBP, Blaauw, D & Ssengooba, F, 2019. 'It needs a complete overhaul...' district manager perspectives on the capacity of the health system to support the delivery of emergency obstetric care in an urban South African district'. *Global Health Action*, vol. 12, no. 1, pp 642644. doi: 10.1080/16549716.2019.1642644.

United Nations, 2009. The Millennium Development Goals Report. viewed 14 August 2019, https://www.un.org/millenniumgoals/pdf/MDG_Report_2009_ENG.pdf.

United Nations (UNO), 2015. Open Working Group proposal for Sustainable Development Goals. viewed 14 August 2019, <<https://sustainabledevelopment.un.org/sdgsproposal>.

University of KwaZulu Natal. MEPI ESMOE Activities. Undated. viewed 20 December 2020, <http://mepi.ukzn.ac.za/MEPIComponents/ESMOE/New-developments-in-the-planned-MEPI-activities.aspx>.

University of Pretoria Centre for Maternal, Fetal, Newborn and Child Health, 2021. ESMOE, viewed 21 April 2021, <https://www.up.ac.za/centre-for-maternal-fetal-newborn-and-child-healthcare/article/2819785/esmoe>.

USAID, 2010. Maternal and Child Health/ Family Planning, viewed 30 October 2019, <http://sa.usaid.gov/south_africa/node/77.

Van den Broek, N, Ameh, C, Madaj, B, Makin, J, White, S, Hemming, K, Moodley, J & Pattinson, R, 2019. Effects of emergency obstetric care training on maternal and perinatal outcomes: a stepped wedge cluster randomised trial in South Africa. *BMJ Global Health*, vol. 4, no. 6, pp. e001670. Doi: 10.1136/bmjgh-2019-001670.

vjen-Olsen, B, Olsen, OE & Kvåle, G, 2009. Achieving progress in maternal and neonatal health through integrated and comprehensive healthcare services - experiences from a programme in northern Tanzania. *International Journal for Equity in Health*, vol. 8, no. 27, pp. 1-14, doi: 10.1186/1475-9276-8-27.

Voce, A, Bhana, R, Montevcelli, F, Makua, M, Pillay, Y, Ngubane, G, & Kauchali, S, 2014. District Clinical Specialist Teams. In: Padarath A, English R, editors, *South African Health Review 2013/14*, Durban: Health Systems Trust.

Walshe, K & Chambers N, 2010. Healthcare Reform and Leadership, In: Brookes S, Grint K. Editors, *The New Public Leadership Challenge*, Palgrave: Macmillan UK.

Walt, G, & Gilson, L, 1994. Reforming the health sector in developing countries: the central role of policy analysis. *Health Policy and Planning*, Vol. 9, no. 4, pp. 353-70, doi: 10.1093/heapol/9.4.353.

Walt, G, Shiffman, J, Schneider, H, Murray, SF, Brugha, R & Gilson, L, 2008. Doing' health policy analysis: methodological and conceptual reflections and challenges', *Health Policy and Planning*, vol. 23, no. 5, pp. 308-317, doi: 10.1093/heapol/czn024.

Wegs, C, Creanga, AA, Galavotti, C & Wamalwa, E, 2016. Community Dialogue to Shift Social Norms and Enable Family Planning: An Evaluation of the Family Planning Results Initiative in Kenya', *PLOS ONE*, vol. 11, no. 4, pp. e0153907, doi: 10.1371/journal.pone.0153907.

Wells, M, 2012. Organisational Change and Acceptance: perspectives of the technology acceptance model. In: *Organisational Change and Acceptance: Perspectives of the Technology Acceptance Model*, 99-118. doi: 10.4018/978-1-60960-768-5.ch007.

Wigley, AS, Tejedor-Garavito, N, Alegana, V, Carioli, A, Ruktanonchai, CW, Pezzulo, C, Matthews, Z, Tatem, AJ & Nilsen, K, 2020. Measuring the availability and geographical accessibility of maternal health services across sub-Saharan Africa. *BMC Medicine*, vol. 18, no. 237, pp. 1-10, doi: 10.1186/s12916-020-01707-6.

Wilkin, D, Gillam, S, & Leese B, eds, 2000. *The national tracker survey of primary care groups and trusts. Progress and challenges 1999/2000*. Manchester: National Primary Care Research and Development Centre, University of Manchester. viewed 31 December 2020, <http://www.npcrdc.man.ac.uk>.

Wooldridge, B, Schmid, T & Floyd, SW, 2008. The Middle Management Perspective on Strategy Process: Contributions, Synthesis and Future Research. *Journal of Management*, vol. 34, no. 6, pp. 1190–1221, doi: 10.1177/0149206308324326.

WHO, 1999. *HEALTH21: The health for all policy framework for the WHO European region*, Copenhagen: World Health Organization Regional Office for Europe.

WHO, 2004. *Beyond the Numbers: Reviewing maternal deaths and complications to make pregnancy safer*, Geneva: World Health Organization. viewed 30 January 2020, <http://www.who.int/making_pregnancy_safer/documents/9241591838.

WHO, 2007. *Strengthening health systems to improve health outcomes, WHO's framework for action*, Geneva: World Health Organization, viewed 30 January 2020, <https://apps.who.int/iris/handle/10665/43918>.

WHO, 2009. *Monitoring emergency obstetric care, a handbook*, Geneva: World Health Organization. viewed 31 July 2019, <https://apps.who.int/iris/handle/10665/44121>.

WHO, 2011. *Evaluating the quality of care for severe pregnancy complications: the WHO near-miss approach for maternal health*, Geneva: World Health Organization, viewed 1 July 2019. <https://apps.who.int/iris/handle/10665/44692>.

WHO, 2013. World health statistics, Geneva: WHO. viewed 1 July 2019, <https://apps.who.int/iris/handle/10665/81965>.

WHO, 2015a. Glossary of terms used. viewed 31 July 2019, <http://www.who.int/hia/about/glos/en/index1.html>.

WHO, 2015b. Health statistics and information systems. viewed 31 July 2019, <http://www.who.int/healthinfo/statistics/indmaternalmortality/en>.

WHO, 2016. Making every baby count: audit and review of stillbirths and neonatal deaths, Geneva: World Health Organization. viewed 1 July 2019, <http://apps.who.int/iris/bitstream/10665/249523/1/9789241511223-eng.pdf>.

WHO, 2018. Uncovering the true burden of health complications experienced by women, Geneva: World Health Organization. viewed 31 July 2019, <https://www.who.int/reproductivehealth/maternal-morbidity/en>.

WHO, 2019. Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, Geneva: World Bank Group and the United Nations Population Division. viewed 31 July 2019, <https://apps.who.int/iris/handle/10665/327596>.

WHO, 2020a. Maternal mortality. viewed 30 July 2020, <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>.

WHO, 2020b. Sustainable Development Goal 3: Health. viewed 30 July 2020, <https://www.who.int/topics/sustainable-development-goals/targets/en>.

WHO, 2021. Maternal Health, viewed 27 April 2021, <https://www.afro.who.int/health-topics/maternal-health>.

WHO Commission on Information and Accountability, 2011. Keeping promises, measuring results: commission on information and accountability for women's and children's health, Geneva: World Health Organization. viewed 20 April 2021, https://www.who.int/topics/millennium_development_goals/accountability_commission/Commission_Report_advance_copy.pdf.

Willcox, ML, Price, J, Scott, S, Nicholson, BD, Stuart, B, Roberts, NW, Allott, H, Mubangizi, V, Dumont, A, Harnden, A, 2020. Death audits and reviews for reducing maternal, perinatal and child mortality. The Cochrane Database of Systematic Reviews, vol. 3, no. 3, pp. CD012982, doi:10.1002/14651858.CD012982.pub2.

Worcestershire Acute Hospital NHS trust, 2018. Clinical effectiveness plan 2018-2021. viewed 31 September 2021, <https://www.worcsacute.nhs.uk/patient-information-and-leaflets/documents/2119-clinical-effectiveness-plan-2018-2021/file>.

Xiong, X, Carter, R, Lusamba-Dikassa, PS, Kuburhanwa, EC, Kimanuka, F, Salumu, F, Clarysse, G, Tutu, KB, Yuma, S, Iyeti, AM, Hernandez, JH, Shaffer, JG, Villeneuve, S, Prual, A, Pyne-Mercier, L, Nigussie, A & Buekens, P, 2019. Improving the quality of maternal and newborn health outcomes through a clinical mentorship program in the Democratic Republic of the Congo: study protocol. Reproductive Health, vol.16, no.147, pp. 1-10, doi: 10.1186/s12978-019-0796-4.

Yucel, C, Hawley, G, Terzioglu, F & Bogossian, F, 2020. The Effectiveness of Simulation-Based Team Training in Obstetrics Emergencies for Improving Technical Skills: A Systematic Review. Simulation in Healthcare, vol. 15, no. 2, pp. 98-105, doi: 10.1097/SIH.0000000000000416.

APPENDICES

APPENDIX A: RESEARCH FRAMEWORK

Research question	Study aim	Study objectives	Study design	Data collection	Data analysis
Has the maternal health indicators improved in Ekurhuleni District after the introduction of DCST?	To analyse the maternal health indicators from 2011 April to March 2020 among three sub-districts in Ekurhuleni District	• To describe the trends in maternal health indicators in Ekurhuleni Sub-districts • To compare these indicators between the 3 sub-districts	Secondary data analysis	• To collect maternal health indicators from DHIS data source.	Quantitative analysis • Inferential statistics to compare the indicators before and after DCST initiation. • Inferential statistics to compare the indicators between the 3 sub-districts.
Has the maternal mortality indicators improved in Ekurhuleni District after the introduction of DCST?	To analyse the maternal mortality data from 2011 April to March 2020 among three sub-districts in Ekurhuleni District	• To describe the trends in maternal health indicators in Ekurhuleni Sub-districts • To compare these indicators between the 3 sub-districts	Primary data collection	• To collect maternal mortality data from various sources.	Quantitative analysis • Inferential statistics to describe the trends during the study period • Inferential statistics to compare the maternal mortality between the 3 sub-districts.
What are various obstetric intervention measures	To describe the various obstetric intervention measures	• To describe DCST policy framework as recommended	• Document review of DCST policy framework, training	• To describe National DCST working Policy	Document review

Research question	Study aim	Study objectives	Study design	Data collection	Data analysis
undertaken by the DCST at the Ekurhuleni district?	undertaken by the DCST in Ekurhuleni District since July 2012 and to compare these interventions against the DCST policy framework	• d by NDoH. • To summarize all interventions performed by DCST. • To review DCST annual & quarterly reports. • To compare the DCST interventions as against the DCST policy framework.	• material, quarterly, annual reports. • Inferential statistics	• framework. • To describe all interventions performed by DCST using DCST reports, training materials and work plans.	
What is the knowledge and perception about DCST among the district managers and health professionals	To establish the knowledge and perception about DCST among the district health managers and health professionals' in Ekurhuleni District	• To investigate district managers and health professionals' knowledge and perception about DCST in the Ekurhuleni District • To investigate their opinion about the influence of DCST on the changes in maternal health indicators in the District relevant health managers involved in maternal health.	• Cross sectional descriptive survey of 20 managers and health professionals from 3 sub-districts. • Self-administered open ended questionnaire survey.	Key informant interviews	Qualitative analysis

APPENDIX B: LETTERS OF PERMISSION

APPENDIX B1: LETTER FROM HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL) OF THE UNIVERSITY OF THE WITWATERSRAND



R14/49 Dr Jayati Kusari Basu

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160231

NAME: Dr Jayati Kusari Basu
(Principal Investigator)
DEPARTMENT: Clinical Medicine
Ekurhuleni District, Gauteng Province

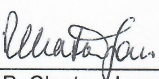
PROJECT TITLE: Evaluation of the Effect of District Clinical Specialist
Team on the Maternal and Women's Health Services

DATE CONSIDERED: 26/02/2016

DECISION: Approved unconditionally

CONDITIONS:

SUPERVISOR: Prof Aimee Stewart

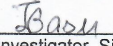
APPROVED BY: 
Professor P. Cleaton-Jones, Chairperson, HREC (Medical)

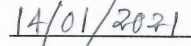
DATE OF APPROVAL: 18/05/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/2nd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit to the Committee. **I agree to submit a yearly progress report.** The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in February and will therefore be due in the month of February each year.


Principal Investigator Signature


Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES



Office of the Deputy Vice-Chancellor (Research and Postgraduate Affairs)

TO: Dr JK Basu
School of Clinical Medicine
Department of Obstetrics and Gynaecology
Medical School
University

E-mail: Jayati.Basu@wits.ac.za

CC: Supervisor: Professor A Stewart
<Aimee.Stewart@wits.ac.za>
and <HREC-Medical Research Office@wits.ac.za>

FROM: Mr Iain Burns
Human Research Ethics Committee (Medical)
Tel: 011 717 1252

E-mail: Iain.Burns@wits.ac.za

DATE: 2021/02/11

REF: R14/49

PROTOCOL NO: **M210167** (This is your ethics application reference number. Please quote it in all enquiries, oral or written, relating to this study.)

PROJECT TITLE: *Evaluation of the effect of a district clinical specialist team on maternal and women's health services in Ekurhuleni District*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to Government funding of the University.

APPENDIX B2: LETTER FROM THE EKURHULENI HEALTH DISTRICT RESEARCH COMMITTEE



EKURHULENI HEALTH DISTRICT RESEARCH PERMISSION

Research Project Title: Evaluation of the effects of a District clinical specialist team on maternal and women's health services in the Ekurhuleni District.

NHRD No: GP_201807_004

Research Project Number: 08/08/2018-03

Name of Researcher(s): Dr Jayati Basu

Division/Institution/Company: University of Witwatersrand

Date of review by the EHDRC: 08 August 2018

DECISION TAKEN BY THE EKURHULENI HEALTH DISTRICT RESEARCH COMMITTEE (EHDRC)

- This document certifies that the above research project has been reviewed by the EHDRC and permission is granted for the researcher(s) to commence with the intended research project.
- Facilities approved for the research: Ekurhuleni Metropolitan Municipality Offices
- The researcher will report to the relevant manager/facility manager before initiating the study
- Participants' rights and confidentiality must be maintained throughout the study period and when disseminating the findings
- No resources (financial, material and human resources) from the health facilities will be used for the study. Neither the district nor the health facilities will incur any additional cost for the study
- The study will comply with Publicly Financed Research and Development Act 2008 (Act 51 of 2008) and its related regulations.

- The EHDRC must be informed in writing before publication or presentation of research findings and a copy of the report/publications/presentation must be submitted to the EHDRC
- The district must be acknowledged in all the reports/publications generated from the research
- The researcher will be expected to provide the EHDRC with
 - Six monthly progress updates including any adverse events
 - The final study report in electronic format
 - Present the final research findings at the annual Ekurhuleni research conference if possible.
- The EDHRC reserves the right to withdraw the approval, if any of the conditions mentioned above have being breached
- The research committee wishes the researcher(s) the best of success

DR. J. SERUYA
 DEPUTY CHAIRPERSON: CITY OF EKURHULENI

Dated: 08/08/2018

Dr. Z. Kellerman
 CHAIRPERSON: GAUTENG DEPARTMENT OF HEALTH (EKURHULENI HEALTH DISTRICT)

Dated: 08/08/2018

APPENDIX B3: LETTER FROM THE FACULTY OF POSTGRADUATE COMMITTEE OF THE UNIVERSITY OF THE WITWATERSRAND



Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

17 May 2016
Person No: 9812911A
PAG

JK Basu
P O Box 1449
Houghton
2041
South Africa

Dear Basu

Doctor of Philosophy: Approval of Title

We have pleasure in advising that your proposal entitled *Evaluation of the effects of a district clinical specialist team on maternal and women's health services in the Ekurhuleni district* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely



Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

APPENDIX C: DCST POLICY FRAMEWORK

Objectives	Activities	Indicators
Conduct a situational analysis and develop plans to address major causes of MNCWH morbidity and mortality.	Review annual district health plan (DHP) MNCWH interventions Make inputs into DHP 2013/14 based on a full situational analysis.	Process of integration of MNCWH into DHP
DCST to function as a team.	Schedule DCST meetings. Ensure minutes are taken that include actions and assign responsibility.	Number of DCST meetings held per annum,
Support visits to health facilities.	Schedule regular support visits to district hospitals, CHCs and clinics to review MNCWH activities.	Number of regular support visits to district hospitals, CHCs and clinics to review MNCWH activities
Participate in district management meetings and review meetings.	Attend and provide input at DHMT meetings. Attend review meetings (e.g. maternal and perinatal mortality).	Number of DHMT and review meetings (e.g. maternal and perinatal mortality).
Conduct ESMOE training.	Help to identify the need for, schedule and participate in ESMOE training.	Number of ESMOE training held
Training (in-service, preferably on-site)	Help to identify the need for and schedule training sessions in key areas related to improving quality of MNCWH care.	Number and type of training held
Clinical work	Carry out clinical work in regional or district hospitals.	Number of Ward rounds performed Number of patients seen
Formal teaching and research – not related to in-service training	Identify and participate in teaching and research activities.	Number of research paper published Number of formal teaching session performed

Source: NDoH. 2014a. Handbook for District Clinical Specialist Teams (DCST). Pretoria:

NDoH. viewed 31/07/2015,

<http://www.health-e.org.za/wp-content/uploads/2015/06/Handbook-for-DCSTs.pdf>

ANNEXURE D. LIST OF DOCUMENTS

Year and Name	Type	HS Building Blocks	Reference
1994			
African National Congress. A national health plan for South Africa.	Policy	Leadership and Governance & service delivery	ANC. 1994. A national health plan for South Africa. Johannesburg: ANC.
Free health services for pregnant women and children under the age of 6 years	Notice	Health financing system	Republic of South Africa. 1994. Free health services for pregnant women and children under the age of 6 years. Government Notice 657, Government Gazette 15817. Pretoria: Government Printers.
1995			
South African government ratifies the United Nations Commission on the elimination of all forms of discrimination against women (CEDAW)	Policy	Leadership and Governance	Republic of South Africa. 1995. Ratification of the United Nations Commission on the elimination of all forms of discrimination against women (CEDAW). http://www.gov.za [accessed 30/06/2016]
Maternal Child and Women Health Draft Policy	Policy	Leadership and Governance	NDoH. 1995a. Maternal Child and Women Health Draft Policy. http://www.health.gov.za [accessed 30/07/2016]
A policy for the Development of a District Health System in South Africa	Policy	Leadership and Governance	NDoH. 1995b. A policy for the Development of a District Health System in South Africa. Pretoria: National Department of Health.
1996			
New South African Constitution	Legislation	Leadership and Governance	Republic of South Africa. 1996a. South African constitution, Act 108 of 1996. Pretoria: Government Printers.
Choice of Termination of Pregnancy Act	Legislation	Service delivery	Republic of South Africa. 1996b. Choice on Termination of Pregnancy Act 92 of 1996. Pretoria: Government Printers.
1997			
Maternal death as a notifiable condition	Notice	Leadership and Governance	NDoH. 1997a. In terms of the National Policy Health Act, Number 116 of 1990. Pretoria: National Department of Health.
The White Paper for the Transformation of the Health System in South Africa	Policy	Leadership and Governance	NDoH. 1997b. The White Paper for the Transformation of the Health System in South Africa. Government Gazette no. 17910, Notice no 667. Pretoria: National Department of Health.

Year and Name	Type	HS Building Blocks	Reference
National Department of Health established Standing Committee for Confidential Enquiries into Maternal Deaths.	Policy	Leadership and Governance	NDoH. 1997c. Standing Committee for Confidential Enquiries into Maternal Deaths. http://www.health.gov.za [accessed 30/07/2016]
1998			
	Report	Leadership and Governance	NCCEMD. 1998. Saving Mothers: Report on Confidential Enquiries into Maternal Deaths in South Africa 1998. Pretoria: National Department of Health.
Sterilization Act	Legislation	Service Delivery	Republic of South Africa. 1998a. Sterilization Act, Act 44 of 1998. Pretoria: Government Printers.
Domestic Violence Act	Legislation	Leadership and Governance	Republic of South Africa. 1998b. Domestic violence Act, Act 116 of 1998. Pretoria: Government Printers.
Medical schemes Act	Legislation	Health financing system	Republic of South Africa. 1998c. Medical schemes Act, Act no. 131 of 1998
Population Policy introduced delinked from population growth	Policy	Leadership and Governance	Republic of South Africa. 1998d. Population policy for South Africa. Pretoria: Government Printers.
Formation of South African National AIDS Council	Policy	Leadership and Governance	Republic of South Africa. 1998e. Formation of South African National AIDS Council http://sanac.org.za/ [accessed 31/12/2016]
1999			
Patients' Rights Charter launched	Policy	Leadership and Governance	NDoH 1999. Patients Rights Charter. Pretoria: National Department of Health.
Western Cape Government launched Prevention of Mother to child Transmission (PMTCT) HIV programme	Programme	Service Delivery	WCDoh. 1999. Prevention of Mother to child Transmission (PMTCT) programme. Cape Town: Western Cape Department of Health.
Saving Mothers: Second Report on Confidential Enquiries into Maternal Deaths in South Africa 1998	Report	Leadership and Governance	NCCEMD. 1999. Saving Mothers: First Report on Confidential Enquiries into Maternal Deaths in South Africa 1998. Pretoria: National Department of Health.

Year and Name	Type	HS Building Blocks	Reference
2000			
Pharmacy Amendment Act	Legislation	Access to essential medicines and technologies	Republic of South Africa. 2000. Pharmacy Amendment Act, Act no 1 of 2000. Pretoria: Government Printer.
National Guideline for cervical cancer screening launched	Guideline	Service delivery	NDoH. 2000. National Guideline for cervical cancer screening. Pretoria: National Department of Health.
2001			
Gauteng Province launched PMTCT programme	Programme	Service Delivery	GDoH. 2001. Prevention of Mother to child Transmission (PMTCT) HIV programme. Johannesburg: Gauteng Department of Health.
2002			
Medicines and Related Substances Amendment Act	Legislation	Access to essential medicines and technologies	Republic of South Africa. 2002. Medicines and Related Substances Amendment Act, 59 of 2002. Pretoria: Government Printer.
Medical Schemes Amendment Act	Legislation	Health care financing	Republic of South Africa. 2002b. Medical Schemes Amendment Act 62 of 2002. Pretoria: Government Printer.
District Hospital service package for South Africa	Guideline	Access to essential medicines and technologies	NDoH. 2002. District Hospital service package for South Africa. Pretoria: National Department of Health.
2003			
National Contraception Policy Guidelines	Guideline	Service Delivery	NDoH. 2003a. National Contraception Policy Guidelines. Pretoria: National Department of Health.
South African Government amend plan to provide anti-retroviral drugs to people with AIDS through public health services	Policy	Service Delivery	NDoH. 2003b. Provision of Anti-retroviral drugs to people with AIDS through public health services. Pretoria: National Department of Health.

Year and Name	Type	HS Building Blocks	Reference
South African government approves the provision of HIV post-exposure prophylaxis to survivors of rape in public sector facilities	Policy	Service Delivery	NDoH. 2003c. Provision of HIV post-exposure prophylaxis to survivors of rape in public sector facilities. Pretoria: National Department of Health.
Saving Mothers: Second Report on Confidential Enquiries into Maternal Deaths in South Africa 1999-2001.	Report	Leadership and Governance	NDoH. 2003d. Saving Mothers: Second Report on Confidential Enquiries into Maternal Deaths in South Africa 1999-2001. Pretoria: National Department of Health.
2004			
National Health Act	Legislation	Service delivery; Leadership and Governance	Republic of South Africa. 2004a. National Health Act, Act No. 61 of 2003. Pretoria: Government Printer.
Choice on termination of pregnancy Amendment Act	Legislation	Service delivery	Republic of South Africa. 2004b. Choice on termination of pregnancy Amendment Act. Act No 38, 2004. Pretoria: Republic of South Africa.
2005			
Sterilisation Amendment Act, (Republic of South Africa, 2005);	Legislation	Service Delivery	Republic of South Africa. 2005. Sterilisation Amendment Act No. 3 of 2005. Pretoria: Government Printer.
Basic Antenatal care (BANC) Guideline	Guideline	Service delivery	NDoH. 2005A. Basic Antenatal care (BANC) Guideline. Pretoria: National Department of Health.
Saving Mothers: Third Report on Confidential Enquiries into Maternal Deaths in South Africa 2002-2004.	Report	Leadership and Governance	NCCEMD. 2005. Saving Mothers: Third Report on Confidential Enquiries into Maternal Deaths in South Africa 2002-2004. Pretoria: Pretoria: National Department of Health.
2006			
None			
2007			
Sexual Offences and Related Matters Amendment Act	Legislation	Service delivery	Republic of South Africa. 2007a. Sexual Offences and Related Matters Amendment Act, Act No. 32 of 2007. Pretoria: Government Printer.

Year and Name	Type	HS Building Blocks	Reference
The Traditional Health Practitioners Act	Legislation	Health workforce	Republic of South Africa. 2007b. Traditional Health Practitioners Act, Act no 22 of 2007 Pretoria: Government Printer.
The Health Professions Amendment Act	Legislation	Health workforce	Republic of South Africa. 2007c. Health Professions Amendment Act, Act No. 29 of 2007. Pretoria: Government Printer.
Guidelines for maternity care in South Africa (1 st edition)	Guideline	Service delivery	NDoH. 2007A. Guidelines for maternity care in South Africa: A manual for clinics, community health centers and district hospitals (1 st edition). Pretoria: National Department of Health.
Essential steps in the management of common conditions associated with maternal mortality	Guideline	Service delivery	NDoH. 2007B. Essential steps in the management of common conditions associated with maternal mortality. Pretoria: National Department of Health.
Basic Antenatal care.	Guideline	Service delivery	Pattinson R. 2007. Basic Antenatal care Handbook. Pretoria: National Department of Health.
2008			
Choice on Termination of Pregnancy Amendment Act	Legislation		Republic of South Africa. 2008. Choice on Termination of Pregnancy Amendment Act No. 1 of 2008. Pretoria: Government Printer.
Every death counts. Saving the lives of mothers, babies and children in South Africa	Report	Service delivery	NDoH. 2008. Every death counts. Saving the lives of mothers, babies and children in South Africa. https://www.samrc.ac.za/sites/default/files/attachments/2016-06-30/edcrptfinal.pdf [accessed 31/01/2020]
2009			
Human Development Cluster: Health: Government's Programme of Action: Ten point Plan.	Policy	Service delivery	NDoH. 2009. Human Development Cluster: Health: Government's Programme of Action: Ten point Plan. http://www.health.gov.za [accessed 30/07/2016]
Saving Mothers: Fourth Report on Confidential Enquiries into Maternal Deaths in South Africa 2005-2007.	Report	Leadership and Governance	NCCEMD. 2009. Saving Mothers: Fourth Report on Confidential Enquiries into Maternal Deaths in South Africa 2005-2007. Pretoria: National Department of Health.
2010			
Negotiated Service Delivery Agreement: A long and Health Life for all South Africans	Policy	Service delivery	NDoH. 2010a. Negotiated Service Delivery Agreement: A long and Health Life for all South Africans. http://www.health.gov.za [accessed 30/07/2016]

Year and Name	Type	HS Building Blocks	Reference
Clinical Guidelines: PMTCT (Prevention of Mother-to-Child Transmission)	Guideline	Service delivery	NDoH. 2010b. Clinical Guidelines: PMTCT (Prevention of Mother-to-Child Transmission). Pretoria: National Department of Health.
A monograph of the management of postpartum haemorrhage	Guideline	Service delivery	NDoH. 2010c. A monograph of the management of postpartum haemorrhage. Pretoria: National Department of Health.
2011			
National Development Plan: Vision for 2030.	Policy	Leadership and Governance	Republic of South Africa. 2011. National Development Plan: Vision for 2030. Pretoria: Government Printer.
Policy document on Primary Health care Re-engineering	Policy	Leadership and Governance	NDoH. 2011a. Policy on Primary Health care Re-engineering. Pretoria: National Department of Health.
Provincial guidelines for the implementation of the three streams of PHC re-engineering	Guidelines	Leadership and Governance	NDoH. 2011b. Provincial guidelines for the implementation of the three streams of PHC re-engineering. Pretoria: National Department of Health.
Ministerial Task Team Report: District Clinical Specialist Teams in South Africa	Report		NDoH. 2011c. Ministerial Task Team Report: District Clinical Specialist Teams in South Africa. In: Ministerial Task Team Report to the Honourable Minister of Health, Dr Aaron Motsoaledi; Pretoria: National Department of Health.
Health Data Advisory And Co-Ordination Committee (HDACC) Report	Report	Health Information System	NDoH. 2011d. Health Data Advisory And Co-Ordination Committee (HDACC) Report. Pretoria: Government Printer.
Policy on National Health Insurance	Policy		NDoH. 2011e. National Health Act (61/2003): Policy on National Health Insurance 554 (34523). Pretoria: National Department of Health.
Human Resources for Health for South Africa: 2030.	Policy	Health workforce	NDoH. 2011f. Human Resources for Health for South Africa: 2030. Pretoria: National Department of Health.
District Health Management Information System (DHMIS) Policy	Policy	Health Information System	NDoH. 2011g. District Health Management Information System (DHMIS) Policy. Pretoria: National Department of Health.
Policy on Categories of hospitals.	Policy	Leadership and Governance	NDoH. 2011h. Policy on Categories of hospitals. Pretoria: National Department of Health.
Policy on the Management of Hospitals.	Policy	Leadership and Governance	NDoH. 2011i. Policy on the Management of Hospitals.34522 R656. Pretoria: National Department of Health.

Year and Name	Type	HS Building Blocks	Reference
		nce	
2012			
National launch and induction of the district clinical specialists teams	Report	Leadership and Governance	NDoH. 2012a. National launch and induction of the district clinical specialists teams: Speech for the Minister. Launch of the induction programme of the clinical specialist teams. 27 September 2012. http://www.info.gov.za/speech/DynamicAction?pageid=461&sid=31283&tid=86339 [accessed 10/10/2016]
National Strategic Plan for Maternal, Newborn, Child and Women's Health and Nutrition 2012-2016.	Policy	Leadership and Governance	NDoH. 2012b. National Strategic Plan for Maternal, Newborn, Child and Women's Health and Nutrition 2012-2016. Pretoria: National Department of Health.
National Health Insurance (NHI) - Green Paper	Legislation	Health financing system	NDoH. 2012c. National Health Insurance (NHI) - Green Paper http://www.mm3admin.co.za/documents/docmanager/f447b607-3c8f-4eb7-8da4-11bca747079f/00090701.pdf [accessed 30/06/2016]
Integrated School Health Policy	Policy	Service delivery	NDoH and NDoBE. 2012. Integrated School Health Policy https://www.health-e.org.za/wp-content/.../10/Integrated_School_Health_Policy.pdf [30/06/2016]
Saving Mothers: Fifth Report on Confidential Enquiries into Maternal Deaths in South Africa 2008-2010.	Report	Leadership and Governance	NCCEMD. 2012. Saving Mothers: Fifth Report on Confidential Enquiries into Maternal Deaths in South Africa 2008-2010. Pretoria: Government Printer.
2013			
Establishment of the Office of Health Standard Compliance.	Legislation	Leadership and Governance	Republic of South Africa. 2013a. National Health Amendment Act no 12 of 2013. Pretoria: Government Printer
The South African Antiretroviral Treatment Guidelines	Guideline	Service delivery	NDoH. 2013a. The South African Antiretroviral Treatment Guidelines. Pretoria: NDoH.
Ideal Clinic Programme	Policy	Service delivery	NDoH. 2013b. Ideal Clinic Programme. https://www.idealclinic.org.za/ [accessed 30/06/2016]
National Contraception Clinical Guideline (amended)	Guideline	Service delivery	NDoH. 2013c. National Contraception Clinical Guideline (amended). Pretoria: Government Printer

Year and Name	Type	HS Building Blocks	Reference
South Africa's National Strategic Plan for a Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMA).	Policy	Leadership and Governance	NDoH. 2013d. South Africa's National Strategic Plan for a Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMA). Pretoria: National Department of Health.
Induction document for DCST. Pretoria: National Department of Health.	Guideline	Service delivery	NDoH. 2013e. Induction document for DCST. Pretoria: National Department of Health.
Status report on maternal new-born and child health	Report	Leadership and Governance	CARMMA. 2013. Status report on maternal newborn and child health. http://www.carmma.org/resource/2013-status-report-maternal-newborn-and-child-health-africa [accessed 30/11/2015]
2014			
Handbook for District Clinical Specialist Teams (DCST)	Guideline	Service delivery	NDoH. 2014a. Handbook for District Clinical Specialist Teams (DCST). Pretoria: Government Printer
Clinical Governance Handbook for District Clinical Specialist teams	Guideline	Service delivery	NDoH, 2014b. A Clinical Governance Handbook for District Clinical Specialist teams. Pretoria: National Department of Health.
Essential steps in the management of obstetrics emergency	Guideline	Service delivery	NDoH, 2014c. Essential steps in the management of obstetrics emergency (ESMOE). Pretoria: Government Printer.
Strategic Plan of Department of Health: 2014/15 to 2018/19	Policy	Leadership and Governance	NDoH. 2014d. Strategic Plan of Department of Health: 2014/15 to 2018/19 http://www.health.gov.za [accessed 30/06/2016]
DCST standardized format	Guideline	Health information System	NDoH. 2014e. DCST standardized format. Pretoria: National Department of Health.
Standard treatment guidelines and essential medicines list for South Africa: primary health care and hospital level	Policy	Access to essential medicines and technologies	NDoH. 2014f. Standard treatment guidelines and essential medicines list for South Africa: primary health care and hospital level. Pretoria: Government Printer
Expanded terms of reference from the	Policy	Leadership and	NDoH, 2014g. Expanded terms of reference from the maternal, child and women's health

Year and Name	Type	HS Building Blocks	Reference
maternal, child and women's health committee.		Governance	committee. https://www.gov.za/sites/default/files/gcis_document/201409/childwomenhealth0.pdf [accessed 30/04/2021]
Committed to maternal, women and child health.	Strategy	Leadership and Governance	NDoH. 2014h. Committed to maternal, women and child health. http://www.health.gov.za/index.php/2014-03-17-09-48-36/edition-latest-item/25-deputy-minister-marks-pregnancy-awareness-week [accessed 31/08/2016]
Saving Mothers: Sixth Report on Confidential Enquiries into Maternal Deaths in South Africa 2011-2013.	Report	Leadership and Governance	NCCEMD. 2014. Saving Mothers: Sixth Report on Confidential Enquiries into Maternal Deaths in South Africa 2011-2013. Pretoria: Government Printer
2015			
Establishment of South African Health Product Regulatory Authority.	Legislation	Access to essential medicines and technologies	Republic of South Africa. 2015. Medicines and Related Substances Amendment Act, 2015. Act No. 14 of 2015:
National consolidated guidelines for the prevention of mother-to-child transmission of HIV (PMTCT) and the management of HIV in children, adolescents and adults	Guideline	Service delivery	NDoH. 2015a. National consolidated guidelines for the prevention of mother-to-child transmission of HIV (PMTCT) and the management of HIV in children, adolescents and adults Pretoria: Government Printer
Regulations defining the scope of practice of clinical associates		Human resources	NDoH. 2015b. Health professions act, 1974 (Act no.56 of 1974): Regulations defining the scope of practice of clinical associates, no R433. Pretoria: Government Printers.
MomConnect project launched	Programme	Health Information System	NDoH. 2015c. MomConnect project < http://www.health.gov.za/index.php/mom-connect > [accessed 30/06/2016]
National Health Insurance (NHI) – White Paper	Policy	Health financing system	NDoH. 2015d. National Health Insurance (NHI) – White Paper 2015c. http://www.mm3admin.co.za/documents/docmanager/f447b607-3c8f-4eb7-8da4-11bca747079f/00090702.pdf
National Adolescent Sexual and	Strategy		National Department of Social Development, 2015. National Adolescent Sexual and

Year and Name	Type	HS Building Blocks	Reference
Reproductive Health and Rights Framework Strategy 2014—2019.			Reproductive Health and Rights Framework Strategy 2014—2019. Pretoria: National Department of Social Development.
2016			
Guidelines for maternity care in South Africa (4 th edition)	Guideline	Service delivery	NDoH. 2016a. Guidelines for Maternity care in South Africa. Pretoria: Government Printer
National Policy for Patient Safety Incident Reporting and Learning in the Public Health Sector of South Africa	Policy	Service delivery	NDoH. 2016b. National Policy for Patient Safety Incident Reporting and Learning in the Public Health Sector of South Africa. Pretoria: National Department of Health.
Basic Antenatal care plus Handbook	Guideline	Service delivery	Pattison R, Buchman E. 2016. Basic Antenatal care plus Handbook. Pretoria: SAMRC/UP Maternal and Infant Health Care Strategies Research Unit
2017			
NIDS Data Element.	Guideline	Health Information System	NDoH. 2017. NIDS Data Element. Pretoria: National Department of Health.
2018			
Medical Schemes Amendment Bill	Legislation	Health care financing	Republic of South Africa. 2018a. Medical Schemes Amendment Bill, no 636. Pretoria: Government Press
Strengthening the South African health system towards an integrated and unified health system, Presidential Health Summit Compact, 25 July 2019	Strategy	Leadership and Governance	Republic of South Africa. 2019b. Strengthening the South African health system towards an integrated and unified health system, Presidential Health Summit Compact, 25 July 2019. Pretoria: government Printers.
Health Patient Record System	Policy	Health Information System	NDoH. 2018a. Health Patient Record System (HPRS). https://hprs.health.gov.za/ [accessed 31/05/2018]
Standard treatment guidelines and an essential medicines list: Primary Health Care level.	Guideline	Access to essential medicines and technologies	NDoH. 2018b. Standard treatment guidelines and an essential medicines list: Primary Health Care level. https://www.idealhealthfacility.org.za/docs/guidelines/STG%20and%20EML%20PHC%202018.pdf [accessed 25/04/2021]

Year and Name	Type	HS Building Blocks	Reference
Saving Mothers: Seventh Report on Confidential Enquiries into Maternal Deaths in South Africa 2014-2016.	Report	Leadership and Governance	NCCEMD. 2018. Saving Mothers 2014-2016: Seventh report on the confidential enquiries into maternal deaths in South Africa. Pretoria: National Department of Health.
2019			
National Health Insurance	Act	Health financing system	Republic of South Africa, 2019. National Health Insurance Bill. Pretoria: Government Printers.
National sexual & reproductive health and rights policy	Policy	Service delivery	NDoH. 2019a. National sexual & reproductive health and rights policy. Pretoria: National Department of Health.
Guideline for the Prevention of Mother to Child Transmission of Communicable Infections.	Guideline	Service delivery	NDoH. 2019b. Guideline for the Prevention of Mother to Child Transmission of Communicable Infections. Pretoria: National Department of Health.
National Clinical Guideline for Implementation of the Choice of Termination of Pregnancy Act.	Guideline	Service delivery	NDoH. 2019c. National Clinical Guideline for Implementation of the Choice of Termination of Pregnancy Act. Pretoria: National Department of Health.
National contraception clinical guidelines	Guideline	Service delivery	NDoH. 2019. National contraception clinical guidelines. Pretoria: National Department of Health.
Standard treatment guidelines and an essential medicines list: Hospital level adults.	Guideline	Essential medical products, vaccines and technologies	NDoH. 2019e. Standard treatment guidelines and an essential medicines list: Hospital level adults. https://www.sapc.za.org/Media/Default/Documents/STG%20hospital%20level%20adult%202019_v2.0.pdf [accessed 25/04/2021]
2020			
Strategic Plan 2020/21 – 2024/25.	Policy	Leadership and Governance	NDoH, 2020a. National Strategic Plan 2020/21 – 2024/25. Pretoria: National Department of Health.
National for safe conception and infertility clinical guidelines	Guideline	Service delivery	NDoH. 2020b. National clinical guidelines for safe conception and infertility, 2019. Pretoria: National Department of Health.
Saving Mothers: Eighth report on Confidential Enquiries into Maternal Deaths in South Africa 2017-	Report	Leadership and Governance	NCCEMD. 2020. Saving Mothers and Babies Report 2017-2019: Eighth report on the confidential enquiries into maternal deaths in South Africa. Pretoria: National Department of Health.

Year and Name	Type	HS Building Blocks	Reference
2019.			
2021			
South African national maternal, perinatal, and neonatal Health policy	Policy	Leadership and Governance	NDoH. 2021a. South African national maternal, perinatal, and neonatal Health policy. Pretoria: National Department of Health.
Addendum to the South African maternal, perinatal, and neonatal health policy. Annexure 3: Challenges for maternal perinatal and neonatal services in South Africa:	Policy	Leadership and Governance	NDoH. 2021b. South African national maternal, perinatal, and neonatal Health policy: Annexure 3: Challenges for maternal perinatal and neonatal services in South Africa. Pretoria: National Department of Health.

APPENDIX E: OBJECTIVE 1: TOOLS

APPENDIX E1: DATA COLLECTION TOOL

MATERNAL & WOMEN'S HEALTH INDICATORS

Data Element	Year (quarter)
Antenatal booking before 20 weeks	
Antenatal client HIV positive	
Antenatal client initiated ART	
Delivery in facility under 18 years	
Delivery in facility-total	
Normal delivery in facility	
Caesarean section in facility	
Unbooked delivery in facility	
Live birth to HIV positive woman	
Postnatal care mother within 6 days after delivery	
Maternal death (total)	
Maternal death (inpatient)	
Maternal death (outside facility)	
Stillbirth	
Inpatient death - neonatal	
Inpatient death - perinatal	
Termination of pregnancy rate (annualised)	
Couple year protection rate (annualised)	

(Source DHIS)

APPENDIX F: OBJECTIVE 1: RESULTS

Appendix F1 Couple Year Protection Rate in Ekurhuleni District

Quarters	Total (%)	East (%)	North (%)	South (%)
2011-12-Q1	20.3	20.6	20.0	20.5
2011-12-Q2	21.9	22.4	20.7	22.7
2011-12-Q3	21.3	22.5	20.6	21.2
2011-12-Q4	21.8	20.6	22.8	21.6
2012-13-Q1	22.1	21.6	21.9	22.6
2012-13-Q2	22.7	22.5	22.2	23.5
2012-13-Q3	22.2	22.6	21.0	23.3
2012-13-Q4	21.8	23.4	19.7	22.7
2013-14-Q1	24.1	24.0	22.1	26.3
2013-14-Q2	26.0	26.0	24.3	27.8
2013-14-Q3	26.7	25.3	21.7	32.9
2013-14-Q4	26.1	24.1	20.5	33.7
2014-15-Q1	29.7	31.1	24.5	34.2
2014-15-Q2	42.7	40.4	35.5	52.0
2014-15-Q3	41.2	41.3	32.0	50.7
2014-15-Q4	47.5	38.6	35.2	67.3
2015-16-Q1	42.2	40.8	32.9	53.0
2015-16-Q2	51.1	52.2	44.2	57.8
2015-16-Q3	28.3	36.0	27.6	23.1
2015-16-Q4	40.5	40.8	42.2	41.0
2016-17-Q1	53.3	60.0	54.2	51.9
2016-17-Q2	60.1	50.1	40.6	87.8
2016-17-Q3	36.9	30.3	28.8	50.2
2016-17-Q4	56.4	63.7	41.8	69.7
2017-18-Q1	43.7	45.1	35.0	54.1
2017-18-Q2	48.6	57.8	42.5	53.6
2017-18-Q3	57.5	65.9	32.2	78.8
2017-18-Q4	41.0	27.6	46.0	49.5
2018-19-Q1	33.5	24.9	30.3	45.2
2018-19-Q2	33.7	28.4	39.7	33.0
2018-19-Q3	41.1	51.5	30.0	48.3
2018-19-Q4	51.4	63.7	57.2	42.5
2019-20-Q1	41.8	62.1	33.8	39.7
2019-20-Q2	50.5	63.7	49.1	47.7
2019-20-Q3	33.7	57.7	27.7	27.4
2019-20-Q4	50.1	70.0	30.0	61.4

*Gauteng Provincial target for Couple year protection rate: 55%

Appendix F2 Termination of Pregnancy Rate in the Ekurhuleni District

Quarters	Total (%)	East (%)	North (%)	South (%)
2011-12-Q1	7.7	7.5	6.6	8.9
2011-12-Q2	8.6	9.0	• 7.4	9.4
2011-12-Q3	7.2	6.2	6.2	8.8
2011-12-Q4	6.9	5.8	5.6	8.9
2012-13-Q1	8.0	7.2	6.0	10.6
2012-13-Q2	8.7	8.6	6.7	10.8
2012-13-Q3	13.1	24.3	6.1	11.3
2012-13-Q4	11.8	21.7	5.7	10.1
2013-14-Q1	7.7	6.0	6.2	10.5
2013-14-Q2	7.3	5.1	6.2	10.1
2013-14-Q3	7.1	5.5	5.9	9.6
2013-14-Q4	7.7	5.1	6.8	10.7
2014-15-Q1	7.4	7.2	5.6	9.4
2014-15-Q2	5.6	5.0	4.0	7.5
2014-15-Q3	6.0	4.7	5.1	7.9
2014-15-Q4	6.1	5.0	5.6	7.3
2015-16-Q1	5.6	5.9	4.4	6.4
2015-16-Q2	5.6	3.9	5.5	7.1
2015-16-Q3	5.6	5.9	4.4	6.4
2015-16-Q4	5.6	3.9	5.5	7.1
2016-17-Q1	5.9	7.0	5.2	5.6
2016-17-Q2	5.2	3.2	4.5	5.9
2016-17-Q3	6.0	3.2	4.4	8.4
2016-17-Q4	6.2	3.3	3.8	9.3
2017-18-Q1	5.0	0.6	3.9	8.4
2017-18-Q2	5.4	0.0	4.5	9.3
2017-18-Q3	16.0	0.0	4.7	15.6
2017-18-Q4	3.7	0.0	2.0	5.8
2018-19-Q1	5.3	0.0	2.1	8.2
2018-19-Q2	5.2	0.0	3.3	7.5
2018-19-Q3	4.1	0.0	2.0	6.3
2018-19-Q4	4.7	0.0	2.5	6.5
2019-20-Q1	4.4	0.0	2.2	6.6
2019-20-Q2	5.0	0.0	2.6	7.4
2019-20-Q3	5.3	0.1	2.8	7.5
2019-20-Q4	5.8	0.4	2.8	7.6

Appendix F3 Antenatal first visit before 20-week' rate in the Ekurhuleni District

Quarters	Total (%)	East (%)	North (%)	South (%)
2011-12-Q1	33.7	34.2	34.4	31.9
2011-12-Q2	32.8	33.2	• 34.1	30.2
2011-12-Q3	34.6	36.2	35.6	31.9
2011-12-Q4	32.6	37.2	31.7	30.3
2012-13-Q1	32.7	39	31.1	29.4
2012-13-Q2	38.4	41.2	38	36.8
2012-13-Q3	36.8	36	38.1	36.1
2012-13-Q4	37.1	37.6	35.2	38.6
2013-14-Q1	43.4	46.4	38.6	46.4
2013-14-Q2	47.2	48.9	42.7	51
2013-14-Q3	46.4	47.8	44.9	47
2013-14-Q4	46.2	48.5	43	48.2
2014-15-Q1	46.0	49.3	42.5	47.7
2014-15-Q2	50.8	55.2	49.1	49.6
2014-15-Q3	49.3	52.6	46.4	50.3
2014-15-Q3	49.8	53.2	47.7	49.9
2015-16-Q1	50.9	54.4	51.3	47.9
2015-16-Q2	55.5	55.1	54.1	57.5
2015-16-Q3	56.7	55.5	57	57.8
2015-16-Q4	56.8	57.1	58	56.8
2016-17-Q1	57.1	58.2	56.9	58.9
2016-17-Q2	60.7	60.6	60.3	62.9
2016-17-Q3	57.6	55.6	57.7	61.5
2016-17-Q4	56	58.3	54.1	60.1
2017-18-Q1	59.6	63	58.4	58.7
2017-18-Q2	63.3	66.4	63.2	61.4
2017-18-Q3	62.2	68.3	60.1	60.5
2017-18-Q4	62.6	65.3	62.8	61.2
2018-19-Q1	64.6	66.4	63.3	65.2
2018-19-Q2	65.8	66.8	65.9	65.4
2018-19-Q3	67.6	67.4	70	65
2018-19-Q4	65.2	66.5	66	63.8
2019-20-Q1	65.4	67.1	65.4	64.4
2019-20-Q2	66.5	68.7	66.3	65.9
2019-20-Q3	67.7	69.8	66.4	68.4
2019-20-Q4	65.9	68.9	66.1	63.9

*Gauteng Provincial target for *Antenatal visits before 20 weeks rate*: 66%

Appendix F4 ANC patients initiated on ART rate in the Ekurhuleni District

Quarters	Total (%)	East (%)	North (%)	South (%)
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2011-12-Q1	29.7	29.2	34.5	25.8
2011-12-Q2	29.2	30.8	34.5	23.1
2011-12-Q3	32.2	31.3	34.4	30.9
2011-12-Q4	30.2	30.7	29.9	30.1
2012-13-Q1	34.1	33.0	38.5	31.0
2012-13-Q2	31.9	31.0	33.0	32.0
2012-13-Q3	30.7	33.2	31.3	29.0
2012-13-Q4	25.9	24.3	29.1	24.4
2013-14-Q1	61.0	62.3	61.6	59.4
2013-14-Q2	64.5	70.2	62.4	62.6
2013-14-Q3	75.8	87.7	69.2	74.7
2013-14-Q4	76.5	67.7	76.3	83.3
2014-15-Q1	90.2	77.8	99.5	88.9
2014-15-Q2	84.8	81.2	88.8	83.5
2014-15-Q3	78.7	70.8	86.7	75.9
2014-15-Q4	87.3	82.8	88.0	90.1
2015-16-Q1	87.6	99.2	91.3	76.2
2015-16-Q2	83.5	93.8	82.8	77.5
2015-16-Q3	90.7	99.2	86.0	85.7
2015-16-Q4	82.2	97.0	78.1	82.2
2016-17-Q1	91.1	99.8	89.8	87.0
2016-17-Q2	92.0	99.6	88.2	92.9
2016-17-Q3	94.0	94.4	90.5	96.4
2016-17-Q4	88.7	91.7	91.9	84.6
2017-18-Q1	89.9	98.8	88.7	89.2
2017-18-Q2	92.1	95.2	86.6	97.0
2017-18-Q3	92.6	99.4	92.4	90.4
2017-18-Q4	94.4	95.9	99.6	86.8
2018-19-Q1	95.1	98.2	92.3	97.3
2018-19-Q2	99	98.3	97.7	98.3
2018-19-Q3	97.3	97.2	96.1	98.6
2018-19-Q4	93.1	97.4	84.1	103.9
2019-20-Q1	100.7	97.5	104.9	99.2
2019-20-Q2	103	100.7	105.8	100.7
2019-20-Q3	95.7	95.3	94.2	97.5
2019-20-Q4	99.5	100.5	98.0	100.8

*Gauteng Provincial target for *ANC patients initiated on ART* rate: 90%

Appendix F5 Total births in facility in the Ekurhuleni District

period	Total	East	North	South
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2011-12-Q1	14,793	3,707	6,184	4,902
2011-12-Q2	14,886	3,815	6,264	4,807
2011-12-Q3	14,734	3,658	6,244	4,717
2011-12-Q4	14,226	3,737	5,802	4,687
2012-13-Q1	15,431	3,922	6,323	5,186
2012-13-Q2	15,596	3,904	6,589	5,103
2012-13-Q3	14,998	3,742	6,371	4,885
2012-13-Q4	14,960	3,583	6,415	4,962
2013-14-Q1	15,825	4,033	6,707	5,085
2013-14-Q2	16,077	4,083	6,869	5,125
2013-14-Q3	15,674	3,910	6,700	5,064
2013-14-Q4	15,163	3,034	6,869	5,260
2014-15-Q1	16,369	4,018	7,115	5,236
2014-15-Q2	16,506	3,984	7,199	5,323
2014-15-Q3	15,216	3,659	6,545	5,012
2014-15-Q4	15,674	3,947	6,717	5,010
2015-16-Q1	15,872	3,935	6,944	4,993
2015-16-Q2	15,564	3,802	6,707	5,055
2015-16-Q3	15,110	3,784	6,455	4,871
2015-16-Q4	14,714	3,690	6,385	4,639
2016-17-Q1	15,694	3,896	6,888	4,910
2016-17-Q2	15,917	3,933	6,941	5,043
2016-17-Q3	14,414	2,935	6,774	4,705
2016-17-Q4	14,312	3,953	5,399	4,960
2017-18-Q1	16,540	4,119	7,109	5,312
2017-18-Q2	16,435	4,031	6,999	5,405
2017-18-Q3	16,511	4,202	7,072	5,237
2017-18-Q4	16,280	3,950	7,166	5,164
2018-19-Q1	16,528	4,081	7,263	5,184
2018-19-Q2	17,127	4,198	7,662	5,267
2018-19-Q3	16,523	4,423	7,709	4,391
2018-19-Q4	16,739	4,228	7,878	4,633
2019-20-Q1	17,250	4,368	7,951	4,931
2019-20-Q2	17,549	4,539	7,649	5,361
2019-20-Q3	17,017	4,260	7,512	5,245
2019-20-Q4	17,393	4,383	7,679	5,331

**Gauteng Provincial target for *Total births in facility*: none

Appendix F6 Delivery in facility rate in the Ekurhuleni District

Quarters	Total (%)	East (%)	North (%)	South (%)
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2011-12-Q1	103.2	91.7	120.6	95.1
2011-12-Q2	104.1	94.8	122.3	93.2
2011-12-Q3	103.2	91.6	122.2	93.4
2011-12-Q4	96.4	89.2	109.7	89.0
2012-13-Q1	104.3	95.0	119.2	96.8
2012-13-Q2	106.8	96.8	126.0	95.8
2012-13-Q3	101.9	92.6	120.2	91.2
2012-13-Q4	100.2	87.2	120.6	90.3
2013-14-Q1	105.9	95.0	126.0	94.5
2013-14-Q2	109.3	97.5	129.0	99.1
2013-14-Q3	105.4	93.7	126.1	94.0
2013-14-Q4	105.6	76.0	133.6	100.8
2014-15-Q1	114.9	101.2	139.2	101.5
2014-15-Q2	117.6	102.9	140.8	106.1
2014-15-Q3	106.8	92.6	127.6	97.2
2014-15-Q4	118.7	111.8	138.9	103.8
2015-16-Q1	118.3	105.8	143.9	102.3
2015-16-Q2	116.2	102.3	139.3	103.9
2015-16-Q3	112.4	100.1	134.4	99.9
2015-16-Q4	89.0	89.8	103.6	73.9
2016-17-Q1	95.3	95.8	111.7	78.6
2016-17-Q2	95.6	95.5	111.9	79.2
2016-17-Q3	85.2	77.1	104.8	74.2
2016-17-Q4	85.1	94.0	87.8	76.6
2017-18-Q1	97.2	96.0	111.6	82.8
2017-18-Q2	96.4	96.6	109.8	82.8
2017-18-Q3	95.1	99.8	108.4	79.8
2017-18-Q4	94.3	91.3	110.4	79.4
2018-19-Q1	95.0	93.5	110.9	79.3
2018-19-Q2	97.3	95.6	114.6	80.4
2018-19-Q3	91.3	91.7	117.2	66.6
2018-19-Q4	92.9	88.4	122.1	68.7
2019-20-Q1	99.0	100.0	121.8	75.6
2019-20-Q2	101.1	110.0	116.8	80.5
2019-20-Q3	96.8	97.3	113.8	79.1
2019-20-Q4	103.1	107.1	119.7	83.2

*Gauteng Provincial target for *Delivery in facility rate*: 75%

Appendix F7 Delivery in facility under 18 years rate in the Ekurhuleni District

Quarters	Total (%)	East (%)	North (%)	South (%)
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2011-12-Q1	5.4	7.1	4.3	5.5
2011-12-Q2	5.9	7.6	4.8	5.9
2011-12-Q3	5.2	6.7	4.5	4.9
2011-12-Q4	5.4	6.1	4.6	5.8
2012-13-Q1	4.9	6.0	4.2	4.9
2012-13-Q2	5.0	6.3	3.5	5.7
2012-13-Q3	4.7	5.9	3.8	4.9
2012-13-Q4	5.1	5.8	4.3	5.6
2013-14-Q1	5.0	6.3	4.2	4.9
2013-14-Q2	5.2	7.2	4.0	5.1
2013-14-Q3	4.7	6.0	4.6	3.8
2013-14-Q4	4.6	5.9	4.9	3.8
2014-15-Q1	4.4	5.4	4.0	4.1
2014-15-Q2	5.0	7.1	3.4	5.3
2014-15-Q4	5.0	6.7	4.5	4.3
2014-15-Q3	6.0	6.2	6.8	4.6
2015-16-Q1	5.6	6.7	6.1	4.1
2015-16-Q2	6.3	6.5	7.3	4.8
2015-16-Q3	5.7	5.6	6.7	4.6
2015-16-Q4				
2016-17-Q1				
2016-17-Q2				
2016-17-Q3				
2016-17-Q4				
2017-18-Q1	6.8	6.6	4.2	8.7
2017-18-Q2	5.9	6.3	2.3	12.7
2017-18-Q3	4.5	3.8	1.7	10.9
2017-18-Q4	5.1	7.1	2.2	5.5
2018-19-Q1	6.2	10.5	2.8	8.5
2018-19-Q2	7.4	12.1	3.6	10.2
2018-19-Q3	6.1	10.0	3.7	10.8
2018-19-Q4	5.9	12.0	3.4	6.4
2019-20-Q1	6.5	12.8	4.3	5.8
2019-20-Q2	7.7	15.1	5.4	5.7
2019-20-Q3	7.0	13.8	3.8	6.7
2019-20-Q4	6.6	10.4	4.2	7.4

*Gauteng Provincial target for *Delivery in facility under 18 years rate*: 4.4%%

Appendix F8 Delivery by caesarean section rate in the Ekurhuleni District

Quarters	Total (%)	East (%)	North (%)	South (%)
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2011-12-Q1	20.8	23.1	21.5	18.2
2011-12-Q2	21.6	23.1	22.1	19.8
2011-12-Q3	21.9	23.7	22.5	19.7
2011-12-Q4	22.4	25.9	23.8	18.1
2012-13-Q1	22.8	26.9	24.1	18.1
2012-13-Q2	22.2	26.6	23.9	16.6
2012-13-Q3	22.7	26.1	25.6	16.4
2012-13-Q4	23.2	25.1	25.6	18.6
2013-14-Q1	23.2	23.9	28.1	16.3
2013-14-Q2	23.5	25.2	27.9	16.7
2013-14-Q3	24.8	27.6	27.9	18.4
2013-14-Q4	23.9	23.5	27.6	19.0
2014-15-Q1	23.0	23.9	25.1	19.4
2014-15-Q2	23.3	24.7	25.5	19.4
2014-15-Q3	24.1	26.3	25.6	20.6
2014-15-Q4	23.8	26.1	25.2	20.1
2015-16-Q1	23.7	23.9	24.2	23.0
2015-16-Q2	26.2	29.7	25.2	24.8
2015-16-Q3	26.9	33.5	24.0	25.7
2015-16-Q4	27.3	34.2	26.4	15.5
2016-17-Q1	27.1	34.4	27.2	14.8
2016-17-Q2	27.4	32.2	29.3	14.1
2016-17-Q3	27.4	19.4	33.4	13.8
2016-17-Q4	28.1	30.5	27.1	14.9
2017-18-Q1	27.5	30.8	30.1	14.6
2017-18-Q2	27.1	32.8	27.2	14.6
2017-18-Q3	28.4	31.5	30.8	14.8
2017-18-Q4	29.2	33.3	30.2	15.4
2018-19-Q1	27.5	30.5	28.9	14.6
2018-19-Q2	27.2	27.4	30.1	14.7
2018-19-Q3	28.7	32.0	30.6	15.9
2018-19-Q4	29.0	33.5	30.8	15.2
2019-20-Q1	27.4	25.3	31.6	15.0
2019-20-Q2	26.4	24.7	29.9	14.6
2019-20-Q3	26.6	27.3	29.7	13.6
2019-20-Q4	27.5	27.9	30.2	14.8

* Gauteng Provincial target for *Caesarean section rate*: none

Appendix F9. Live birth to HIV positive woman in the Ekurhuleni District

Quarters	Total (n)	East (n)	North (n)	South (n)
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2011-12-Q1	3,924	1,021	1,444	1,459
2011-12-Q2	4,006	1,017	1,491	1,498
2011-12-Q3	4,118	1,002	1,607	1,509
2011-12-Q4	4,052	1,009	1,568	1,475
2012-13-Q1	4,305	1,217	1,564	1,524
2012-13-Q2	4,325	1,202	1,568	1,555
2012-13-Q3	4,033	1,092	1,507	1,434
2012-13-Q4	4,132	1,118	1,490	1,524
2013-14-Q1	4,283	1,094	1,641	1,548
2013-14-Q2	4,194	1,108	1,655	1,431
2013-14-Q3	4,129	1,085	1,600	1,444
2013-14-Q4	4,080	844	1,772	1,464
2014-15-Q1	4,394	1,203	1,718	1,473
2014-15-Q2	4,244	1,000	1,785	1,459
2014-15-Q3	3,964	996	1,650	1,318
2014-15-Q4	4,183	1,158	1,648	1,377
2015-16-Q1	4,294	1,108	1,767	1,419
2015-16-Q2	4,141	1,092	1,636	1,413
2015-16-Q3	4,248	1,126	1,592	1,530
2015-16-Q4	4,200	1,184	1,596	1,420
2016-17-Q1	4,219	1,204	1,642	1,373
2016-17-Q2	5,201	1,203	2,519	1,479
2016-17-Q3	4,196	898	1,827	1,471
2016-17-Q4	4,061	1,233	1,436	1,392
2017-18-Q1	4,686	1,242	1,826	1,618
2017-18-Q2	4,509	1,215	1,758	1,536
2017-18-Q3	4,567	1,200	1,771	1,596
2017-18-Q4	4,445	1,195	1,771	1,479
2018-19-Q1	4,506	1,193	1,771	1,542
2018-19-Q2	4,680	1,166	1,901	1,613
2018-19-Q3	4,366	1,298	1,838	1,230
2018-19-Q4	4,345	1,033	1,887	1,425
2019-20-Q1	4,321	1,231	1,717	1,373
2019-20-Q2	4,442	1,216	1,801	1,425
2019-20-Q3	4,450	1,191	1,785	1,474
2019-20-Q4	4,623	1,212	1,907	1,504
	154,866	40,606	61,456	52,804

*Gauteng Provincial target for live births to *HIV positive women*: none

Appendix F10 Postnatal visits within 6 days rate in the Ekurhuleni District

Quarters	Total (%)	East (%)	North (%)	South (%)
2011-12-Q1	45.0	53.4	14.7	76.5
2011-12-Q2	49.2	44.6	25.9	83.5
2011-12-Q3	50.9	43.7	31.7	81.3
2011-12-Q4	65.1	59.0	32.2	109.4
2012-13-Q1	71.5	62.1	43.3	113.0
2012-13-Q2	72.5	65.4	45.2	113.4
2012-13-Q3	76.7	72.7	47.1	118.5
2012-13-Q4	78.2	76.3	54.7	111.0
2013-14-Q1	85.3	79.5	80.8	95.9
2013-14-Q2	80.6	75.6	84.8	78.9
2013-14-Q3	81.7	80.0	78.7	87.0
2013-14-Q4	74.5	79.9	70.6	76.7
2014-15-Q1	74.2	79.6	62.5	85.5
2014-15-Q2	81.1	76.5	71.2	98.1
2014-15-Q3	79.5	79.7	69.1	92.8
2014-15-Q4	79.6	82.1	64.8	97.7
2015-16-Q1	77.3	82.8	65.8	88.9
2015-16-Q2	86.0	87.5	71.9	103.8
2015-16-Q3	82.0	85.9	67.7	98.3
2015-16-Q4	83.5	91.6	80.5	120.5
2016-17-Q1	90.4	95.1	83.6	168.7
2016-17-Q2	93.0	88.9	83.0	212.4
2016-17-Q3	99.7	139.1	97.2	221.3
2016-17-Q4	110.5	90.0	155.4	226.9
2017-18-Q1	78.0	91.4	80.3	112.5
2017-18-Q2	78.5	88.8	74.4	143.6
2017-18-Q3	76.1	78.9	78.6	139.2
2017-18-Q4	81.5	92.3	81.2	143.4
2018-19-Q1	75.2	81.9	83.4	116.5
2018-19-Q2	68.9	67.1	79.3	105.8
2018-19-Q3	74.9	77.8	69.6	127.7
2018-19-Q4	78.7	90.9	73.1	130.7
2019-20-Q1	76.5	74.2	77.6	120.7
2019-20-Q2	75.8	73.7	81.7	120.9
2019-20-Q3	73.8	77.1	73.9	125.9
2019-20-Q4	74.4	70.8	76.2	124.4

*Gauteng Provincial target for *Postnatal visits within 6 days rate*: 80%

Appendix F11 Maternal mortality in facility ratio in the Ekurhuleni District

Quarters	Total	East	North	South
2011-12-Q1	228.2	83.3	298.3	248.8
2011-12-Q2	138.3	27.1	146.5	220.2
2011-12-Q3	132.2	55.0	130.8	193.9
2011-12-Q4	299.8	194.4	258.5	435.8
2012-13-Q1	222.5	176.8	195.0	293.6
2012-13-Q2	214.5	76.3	281.2	239.3
2012-13-Q3	211.5	107.9	211.4	292.9
2012-13-Q4	225.7	144.0	256.3	245.2
2013-14-Q1	148.2	24.4	245.1	120.8
2013-14-Q2	181.9	170.3	133.5	245.3
2013-14-Q3	196.1	106.8	213.9	240.7
2013-14-Q4	135.3	223.5	133.0	96.4
2014-15-Q1	179.9	74.3	159.1	288.8
2014-15-Q2	183.7	100.5	156.1	276.2
2014-15-Q3	177.1	167.5	142.7	228.3
2014-15-Q4	138.0	104.8	154.5	144.3
2015-16-Q1	153.4	104.4	161.0	180.9
2015-16-Q2	124.6	79.1	137.6	140.7
2015-16-Q3	124.1	164.4	113.6	106.2
2015-16-Q4	146.1	151.4	71.2	128.1
2016-17-Q1	94.4	271.3	54.6	25.7
2016-17-Q2	105.1	0.0	62.3	133.1
2016-17-Q3	171.9	162.5	331.5	11.7
2016-17-Q4	131.8	48.5	336.3	98.5
2017-18-Q1	101.4	143.9	84.4	59.2
2017-18-Q2	118.9	21.0	167.8	57.3
2017-18-Q3	91.3	186.4	30.1	60.4
2017-18-Q4	120.5	49.0	126.6	116.0
2018-19-Q1	103.2	133.0	91.0	50.8
2018-19-Q2	126.1	183.8	94.4	85.6
2018-19-Q3	95.2	0.0	133.5	73.6
2018-19-Q4	147.1	165.7	180.3	55.4
2019-20-Q1	68.3	43.1	82.7	38.6
2019-20-Q2	112.0	43.5	122.5	104.9
2019-20-Q3	138.9	135.0	137.1	82.9
2019-20-Q4	141.1	89.1	153.1	70.3

*Gauteng Provincial target for *Maternal mortality ratio*: less than 100 per 100,000 live births

Appendix F12 Stillbirth rate in the Ekurhuleni District

quarters	Total	East	North	South
2011-12-Q1	25.1	22.1	14.7	20.6
2011-12-Q2	24.5	27.5	15.9	23.1
2011-12-Q3	23.2	17.9	14.1	20.3
2011-12-Q4	20.4	19.0	14.0	19.0
2012-13-Q1	19.2	13.8	13.3	19.8
2012-13-Q2	21.3	18.4	12.7	16.2
2012-13-Q3	24.5	21.0	12.6	27.0
2012-13-Q4	20.6	20.7	13.9	18.0
2013-14-Q1	23.6	16.8	14.2	22.0
2013-14-Q2	20.9	17.0	12.6	19.4
2013-14-Q3	20.8	20.2	13.6	18.9
2013-14-Q4	22.1	19.6	13.0	17.9
2014-15-Q1	20.4	16.8	11.7	20.4
2014-15-Q2	18.7	15.5	11.1	16.2
2014-15-Q3	26.3	32.9	11.4	24.9
2014-15-Q4	20.7	14.9	10.8	18.0
2015-16-Q1	21.0	16.3	11.1	19.2
2015-16-Q2	20.0	17.8	11.7	15.0
2015-16-Q3	19.9	15.9	13.2	19.2
2015-16-Q4	19.8	15.6	11.3	14.7
2016-17-Q1	18.5	17.8	11.3	10.9
2016-17-Q2	18.8	16.7	12.0	11.8
2016-17-Q3	20.1	12.5	14.0	15.8
2016-17-Q4	20.8	19.5	8.9	17.3
2017-18-Q1	21.1	17.7	29.6	14.6
2017-18-Q2	18.9	15.0	37.6	13.9
2017-18-Q3	17.9	14.8	31.2	11.6
2017-18-Q4	19.9	18.5	13.0	11.2
2018-19-Q1	17.0	17.2	12.9	12.7
2018-19-Q2	18.5	18.6	11.9	11.7
2018-19-Q3	16.3	16.1	17.4	9.8
2018-19-Q4	18.6	15.3	20.5	15.7
2019-20-Q1	19.9	16.8	22.5	14.1
2019-20-Q2	17.7	16.6	16.3	14.6
2019-20-Q3	20.6	17.7	22.6	13.2
2019-20-Q4	18.3	14	21.4	12.2

*Gauteng Provincial target for Stillbirth rate: none

Appendix F13 Neonatal mortality rate in the Ekurhuleni District

quarters	Total	East	North	South
2011-12-Q1	15.7	11.2	20.5	14.5
2011-12-Q2	14.8	8.4	21.7	12.9
2011-12-Q3	15.3	13.8	19.4	12.5
2011-12-Q4	6.3	9.5	10.0	0.2
2012-13-Q1	15.2	13.0	19.1	13.0
2012-13-Q2	13.5	13.3	15.5	11.6
2012-13-Q3	14.3	12.8	16.3	13.6
2012-13-Q4	13.6	14.0	15.5	11.4
2013-14-Q1	14.1	13.3	15.3	13.5
2013-14-Q2	13.8	13.3	18.8	9.2
2013-14-Q3	16.2	13.5	17.4	17.0
2013-14-Q4	18.4	16.5	24.0	14.3
2014-15-Q1	17.4	9.7	24.2	16.5
2014-15-Q2	15.1	8.4	17.3	18.3
2014-15-Q3	17.9	11.2	18.5	22.4
2014-15-Q4	15.9	12.7	18.8	15.5
2015-16-Q1	18.0	10.4	19.7	22.2
2015-16-Q2	14.7	12.4	14.2	17.0
2015-16-Q3	14.3	10.1	15.7	16.1
2015-16-Q4	11.0	13.4	9.5	6.3
2016-17-Q1	14.0	9.5	15.5	8.8
2016-17-Q2	13.5	12.7	10.5	10.1
2016-17-Q3	15.0	27.6	9.5	14.0
2016-17-Q4	13.2	9.4	24.4	9.5
2017-18-Q1	13.5	11.2	12.5	8.9
2017-18-Q2	13.9	12.8	9.9	11.1
2017-18-Q3	13.7	10.7	11.4	10.5
2017-18-Q4	13.0	10.9	14.0	8.8
2018-19-Q1	12.3	8.5	13.9	7.3
2018-19-Q2	12.5	7.7	14.1	8.8
2018-19-Q3	10.7	10.3	12.9	5.0
2018-19-Q4	10.3	10.4	10.5	6.3
2019-20-Q1	10.6	10.7	9.1	7.9
2019-20-Q2	9.9	10.3	11.2	5.1
2019-20-Q3	13.0	10.1	12.6	8.5
2019-20-Q4	11.4	8.2	11.1	8.6

*Gauteng Provincial target for Neonatal mortality rate: <10 per 1000 live births.

Appendix F14 Perinatal mortality rate in the Ekurhuleni District

Quarters	Total	East	North	South
2011-12-Q1	39.6	30.0	53.9	32.9
2011-12-Q2	38.6	34.2	47.7	32.9
2011-12-Q3	37.4	28.7	52.5	29.2
2011-12-Q4	25.5	25.6	33.4	17.7
2012-13-Q1	33.1	24.3	42.8	30.3
2012-13-Q2	34.3	27.1	48.0	26.3
2012-13-Q3	36.0	29.1	40.6	37.0
2012-13-Q4	32.3	29.3	40.6	26.4
2013-14-Q1	35.9	25.5	47.8	32.3
2013-14-Q2	34.6	27.8	48.2	26.6
2013-14-Q3	35.2	30.8	41.6	32.3
2013-14-Q4	37.3	26.4	53.8	29.3
2014-15-Q1	36.6	24.1	49.7	33.4
2014-15-Q2	34.2	23.5	46	30.8
2014-15-Q3	42.3	39.7	45.8	40.7
2014-15-Q4	37.5	26.7	52.2	31.1
2015-16-Q1	39.2	23.9	52.5	37.9
2015-16-Q2	35.7	29.6	47.9	28.3
2015-16-Q3	33.5	24.2	42.6	31.6
2015-16-Q4	26.7	24.5	32	21.6
2016-17-Q1	29.6	25.4	40.4	20.9
2016-17-Q2	29.6	25.9	35	25.5
2016-17-Q3	29.0	19.4	35.3	28.5
2016-17-Q4	27.2	25.7	29.5	25.0
2017-18-Q1	32.3	27.7	40.4	25.8
2017-18-Q2	29.7	23.8	32.8	29.2
2017-18-Q3	28.8	22.8	36.8	23.8
2017-18-Q4	30.5	25.9	38.0	24.7
2018-19-Q1	26.1	22.9	32.3	20.8
2018-19-Q2	29.1	24.5	33.7	23.7
2018-19-Q3	24.7	22.1	27.6	14.6
2018-19-Q4	26.7	23.3	28.0	21.3
2019-20-Q1	28	23.1	29.2	21.1
2019-20-Q2	25.5	25.6	24.6	18.6
2019-20-Q3	30.3	24.6	30.6	20.7
2019-20-Q4	27	19.5	30.3	18.9

*Gauteng Provincial target for *Perinatal mortality rate*: none

Appendix F15 Livebirths under 2500 g in facility rate in the Ekurhuleni District

quarters	Total	East	North	South
2011-12-Q1	13.6	13.4	14.7	12.4
2011-12-Q2	13.7	12.7	15.9	11.6
2011-12-Q3	12.7	11.1	14.1	12.0
2011-12-Q4	12.7	12.6	14.0	11.1
2012-13-Q1	11.9	11.2	13.3	10.8
2012-13-Q2	12.3	12.3	12.7	11.7
2012-13-Q3	11.9	10.5	12.6	12.1
2012-13-Q4	12.3	8.4	13.9	13.0
2013-14-Q1	15.0	13.2	14.2	17.5
2013-14-Q2	12.5	13.1	12.6	12.0
2013-14-Q3	13.7	12.9	13.6	14.5
2013-14-Q4	13.0	12.8	13.0	13.2
2014-15-Q1	12.0	11.7	11.7	12.7
2014-15-Q2	11.6	13.2	11.1	11.2
2014-15-Q3	12.7	13.7	11.4	13.7
2014-15-Q4	12.1	12.6	10.8	13.5
2015-16-Q1	12.4	14.3	11.1	12.7
2015-16-Q2	12.5	12.6	11.7	13.4
2015-16-Q3	13.5	13.0	13.2	14.1
2015-16-Q4	12.6	14.4	11.3	9.8
2016-17-Q1	12.0	13.8	11.3	9.3
2016-17-Q2	12.4	12.8	12.0	10.4
2016-17-Q3	15.3	11.3	14.0	14.7
2016-17-Q4	12.5	13.0	8.9	10.6
2017-18-Q1	17.6	12.7	29.6	11.5
2017-18-Q2	20.6	12.5	37.6	11.0
2017-18-Q3	19.3	13.7	31.2	12.1
2017-18-Q4	13.6	13.4	13.0	11.1
2018-19-Q1	13.2	12.8	12.9	11.3
2018-19-Q2	7.4	12.1	3.6	10.2
2018-19-Q3	12.2	12.6	13.2	8.8
2018-19-Q4	12.3	11.8	12.2	11.0
2019-20-Q1	14.5	13.0	10.8	15.3
2019-20-Q2	12.2	14.3	11.2	8.9
2019-20-Q3	13.3	15.9	12.9	9.7
2019-20-Q4	13.3	14.1	12.4	11.0

*Gauteng Provincial target for *Livebirths under 2500 g in facility rate*: none

APPENDIX G: OBJECTIVE 2: DATA COLLECTION TOOLS

APPENDIX G1: FACILITY MONTHLY MATERNAL DEATH REPORTING TEMPLATE



EKURHULENI HEALTH DISTRICT CLINICAL SPECIALIST TEAM

MATERNAL AND PERINATAL REPORT: MONTH: _____ YEAR: _____

Name (hospitals/chc/mou)	Maternal deaths (no)	Total births	Live births	Stillbirths	Cs (no)	South African/ Non- South African

MATERNAL DEATH DETAILED REPORT:

Name (hospitals/ chc/ mou)	Causes of death (hypertension/ haemorrhage/ hiv/ early pregnancy complications/ sepsis/ others-specify Final events/ complications leading to death	Summary of events (age, parity, no of anc visits, booking clinic/mou, gestational age at first visit, any anc complications, gestational age & date of referral to hospital, reason for referral, final diagnosis at hospital, sequences of management at hospital)	Avoidable factors (Patients related/ Health care workers related/ Administrative)

Name of the person compiled:

Contact no of the person compiled:

Date:

APPENDIX G2: DATA COLLECTION TOOL (OBJECTIVES 2)

[illegible]

APPENDIX H: OBJECTIVE 2: RESULT TABLES

APPENDIX H1 NUMBER OF MATERNAL DEATHS IN THE EKURHULENI DISTRICT

maternal death	Total (n)	East (n)	North (n)	South (n)
2011-12-Q1	33	3	18	12
2011-12-Q2	20	1	9	10
2011-12-Q3	19	2	8	9
2011-12-Q4	42	7	15	20
2012-13-Q1	37	9	13	15
2012-13-Q2	34	4	18	12
2012-13-Q3	31	4	13	14
2012-13-Q4	33	5	16	12
2013-14-Q1	24	1	16	7
2013-14-Q2	30	8	9	13
2013-14-Q3	31	5	14	12
2013-14-Q4	20	6	9	5
2014-15-Q1	31	5	11	15
2014-15-Q2	29	4	9	16
2014-15-Q3	28	8	8	12
2014-15-Q4	22	4	8	10
2015-16-Q1	24	4	10	10
2015-16-Q2	19	4	6	9
2015-16-Q3	19	7	6	6
2015-16-Q4	17	3	5	9
2016-17-Q1	12	8	1	3
2016-17-Q2	18	1	6	11
2016-17-Q3	25	3	13	9
2016-17-Q4	20	2	7	11
2017-18-Q1	21	7	5	9
2017-18-Q2	20	1	12	7
2017-18-Q3	18	9	1	8
2017-18-Q4	21	2	4	15
2018-19-Q1	19	8	5	6
2018-19-Q2	25	8	5	12
2018-19--Q3	17	1	8	8
2018-19-Q4	25	7	8	10
2019-20-Q1	12	2	5	5
2019-20-Q2	23	2	4	17
2019-20-Q3	24	6	8	10
2019-20-Q4	26	4	15	7
Total	869	165	328	376

APPENDIX H2 NUMBER OF IN-FACILITY MATERNAL DEATHS IN THE EKURHULENI

DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
2011-12-Q1	33	3	18	12
2011-12-Q2	20	1	9	10
2011-12-Q3	19	2	8	9
2011-12-Q4	42	7	15	20
2012-13-Q1	34	7	12	15
2012-13-Q2	33	3	18	12
2012-13-Q3	31	4	13	14
2012-13-Q4	33	5	16	12
2013-14-Q1	24	1	16	7
2013-14-Q2	30	8	9	13
2013-14-Q3	31	5	14	12
2013-14-Q4	20	6	9	5
2014-15-Q1	31	5	11	15
2014-15-Q2	28	4	9	15
2014-15-Q3	28	8	8	12
2014-15-Q4	22	4	8	10
2015-16-Q1	24	4	10	10
2015-16-Q2	19	4	6	9
2015-16-Q3	19	7	6	6
2015-16-Q4	16	3	4	9
2016-17-Q1	12	8	1	3
2016-17-Q2	15	1	3	11
2016-17-Q3	22	3	10	9
2016-17-Q4	20	2	7	11
2017-18-Q1	20	6	5	9
2017-18-Q2	20	1	12	7
2017-18-Q3	17	8	1	8
2017-18-Q4	19	2	3	14
2018-19-Q1	18	7	5	6
2018-19-Q2	23	8	4	11
2018-19-Q3	15	1	7	7
2018-19-Q4	25	7	8	10
2019-20-Q1	12	2	5	5
2019-20-Q2	23	2	4	17
2019-20-Q3	24	6	8	10
2019-20-Q4	25	4	15	6
Total	847	159	317	371

APPENDIX H3 NUMBER OF MATERNAL DEATHS OUTSIDE HEALTH FACILITIES IN THE

EKURHULENI DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
2011-12-Q1	0	0	0	0
2011-12-Q2	0	0	0	0
2011-12-Q3	0	0	0	0
2011-12-Q4	0	0	0	0
2012-13-Q1	3	2	1	0
2012-13-Q2	1	1	0	0
2012-13-Q3	0	0	0	0
2012-13-Q4	0	0	0	0
2013-14-Q1	0	0	0	0
2013-14-Q2	0	0	0	0
2013-14-Q3	0	0	0	0
2013-14-Q4	0	0	0	0
2014-15-Q1	0	0	0	0
2014-15-Q2	1	0	0	1
2014-15-Q3	0	0	0	0
2014-15-Q4	0	0	0	0
2015-16-Q1	0	0	0	0
2015-16-Q2	0	0	0	0
2015-16-Q3	0	0	0	0
2015-16-Q4	1	0	1	0
2016-17-Q1	0	0	0	0
2016-17-Q2	3	0	3	0
2016-17-Q3	3	0	3	0
2016-17-Q4	0	0	0	0
2017-18-Q1	1	1	0	0
2017-18-Q2	0	0	0	0
2017-18-Q3	1	1	0	0
2017-18-Q4	2	0	1	1
2018-19-Q1	1	1	0	0
2018-19-Q2	2	0	1	1
2018-19--Q3	2	0	1	1
2018-19-Q4	0	0	0	0
2019-20-Q1	0	0	0	0
2019-20-Q2	0	0	0	0
2019-20-Q3	0	0	0	0
2019-20-Q4	1	0	0	1
Total	22	6	11	5

APPENDIX H4 NUMBER OF *MATERNAL DEATHS (ANTENATAL)* IN THE EKURHULENI DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
2011-12-Q1	8	2	6	0
2011-12-Q2	8	0	3	5
2011-12-Q3	8	1	3	4
2011-12-Q4	16	2	6	8
2012-13-Q1	10	1	3	6
2012-13-Q2	7	0	4	3
2012-13-Q3	11	0	7	4
2012-13-Q4	10	2	6	2
2013-14-Q1	7	0	6	1
2013-14-Q2	10	2	1	7
2013-14-Q3	10	3	4	3
2013-14-Q4	8	3	2	3
2014-15-Q1	12	0	5	7
2014-15-Q2	11	0	5	6
2014-15-Q3	11	2	4	5
2014-15-Q4	5	0	2	3
2015-16-Q1	15	2	6	7
2015-16-Q2	10	3	4	3
2015-16-Q3	6	0	5	1
2015-16-Q4	10	2	4	4
2016-17-Q1	5	4	1	0
2016-17-Q2	5	0	3	2
2016-17-Q3	12	0	8	4
2016-17-Q4	4	1	0	3
2017-18-Q1	8	3	2	3
2017-18-Q2	6	1	4	1
2017-18-Q3	4	2	1	1
2017-18-Q4	9	1	1	7
2018-19-Q1	10	4	3	3
2018-19-Q2	10	3	3	4
2018-19-Q3	7	0	2	5
2018-19-Q4	10	2	4	4
2019-20-Q1	6	2	3	1
2019-20-Q2	11	0	1	10
2019-20-Q3	10	1	5	4
2019-20-Q4	14	2	11	1
Total	324	51	138	135

APPENDIX H5 NUMBER OF *MATERNAL DEATHS (INTRANATAL)* IN THE EKURHULENI DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
2011-12-Q1	2	0	0	2
2011-12-Q2	1	1	0	0
2011-12-Q3	0	0	0	0
2011-12-Q4	0	0	0	0
2012-13-Q1	2	1	0	1
2012-13-Q2	0	0	0	0
2012-13-Q3	2	1	0	1
2012-13-Q4	2	1	1	0
2013-14-Q1	1	0	0	1
2013-14-Q2	3	0	3	0
2013-14-Q3	1	0	1	0
2013-14-Q4	2	1	1	0
2014-15-Q1	0	0	0	0
2014-15-Q2	0	0	0	0
2014-15-Q3	0	0	0	0
2014-15-Q4	1	0	1	0
2015-16-Q1	1	0	1	0
2015-16-Q2	0	0	0	0
2015-16-Q3	0	0	0	0
2015-16-Q4	0	0	0	0
2016-17-Q1	1	0	0	1
2016-17-Q2	1	0	0	1
2016-17-Q3	0	0	0	0
2016-17-Q4	0	0	0	0
2017-18-Q1	0	0	0	0
2017-18-Q2	0	0	0	0
2017-18-Q3	0	0	0	0
2017-18-Q4	0	0	0	0
2018-19-Q1	0	0	0	0
2018-19-Q2	0	0	0	0
2018-19-Q3	0	0	0	0
2018-19-Q4	1	0	0	1
2019-20-Q1	0	0	0	0
2019-20-Q2	0	0	0	0
2019-20-Q3	1	0	0	1
2019-20-Q4	1	0	1	0
Total	23	5	9	9

APPENDIX H6 NUMBER OF MATERNAL DEATHS (POSTNATAL) IN THE EKURHULENI DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
2011-12-Q1	23	1	12	10
2011-12-Q2	11	0	6	5
2011-12-Q3	11	1	5	5
2011-12-Q4	26	5	9	12
2012-13-Q1	22	5	9	8
2012-13-Q2	26	3	14	9
2012-13-Q3	18	3	6	9
2012-13-Q4	21	2	9	10
2013-14-Q1	16	1	10	5
2013-14-Q2	17	6	5	6
2013-14-Q3	20	2	9	9
2013-14-Q4	10	2	6	2
2014-15-Q1	19	5	6	8
2014-15-Q2	16	3	4	9
2014-15-Q3	8	3	4	1
2014-15-Q4	14	2	5	7
2015-16-Q1	7	2	2	3
2015-16-Q2	9	1	2	6
2015-16-Q3	13	7	1	5
2015-16-Q4	7	1	1	5
2016-17-Q1	6	4	0	2
2016-17-Q2	10	1	1	8
2016-17-Q3	13	3	5	5
2016-17-Q4	12	0	6	6
2017-18-Q1	9	2	3	4
2017-18-Q2	13	0	8	5
2017-18-Q3	12	6	0	6
2017-18-Q4	11	1	2	8
2018-19-Q1	8	3	2	3
2018-19-Q2	15	5	2	8
2018-19-Q3	10	1	6	3
2018-19-Q4	13	4	4	5
2019-20-Q1	5	0	2	3
2019-20-Q2	12	2	3	7
2019-20-Q3	13	5	3	5
2019-20-Q4	7	2	3	2
Total	483	94	175	214

APPENDIX H7 NUMBER OF MATERNAL DEATHS DUE TO GYNAECOLOGICAL CAUSES IN THE EKURHULENI DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
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2014-15-Q2	0	0	0	0
2014-15-Q3	2	0	0	2
2014-15-Q4	1	0	0	1
2015-16-Q1	0	0	0	0
2015-16-Q2	1	0	0	1
2015-16-Q3	1	0	1	0
2015-16-Q4	1	0	0	1
2016-17-Q1	2	0	1	1
2016-17-Q2	1	0	1	0
2016-17-Q3	2	0	0	2
2016-17-Q4	0	0	0	0
2017-18-Q1	1	1	0	0
2017-18-Q2	0	0	0	0
2017-18-Q3	0	0	0	0
2017-18-Q4	4	1	0	3
2018-19-Q1	5	1	2	2
2018-19-Q2	2	1	0	1
2018-19--Q3	0	0	0	0
2018-19-Q4	3	1	1	1
2019-20-Q1	2	0	1	1
2019-20-Q2	4	0	0	4
2019-20-Q3	4	0	2	2
2019-20-Q4	4	0	4	0
Total	40	5	13	22

APPENDIX H8 NUMBER OF *MATERNAL DEATHS DUE TO HAEMORRHAGE* IN THE EKURHULENI DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
2014-15-Q2	5	1	1	3

2014-15-Q3	6	3	3	0
2014-15-Q4	8	2	2	4
2015-16-Q1	6	2	2	2
2015-16-Q2	8	1	2	5
2015-16-Q3	11	6	1	4
2015-16-Q4	4	0	3	1
2016-17-Q1	3	2	0	1
2016-17-Q2	4	0	1	3
2016-17-Q3	6	1	3	2
2016-17-Q4	2	0	1	1
2017-18-Q1	5	1	2	2
2017-18-Q2	9	0	4	5
2017-18-Q3	4	2	1	1
2017-18-Q4	3	1	0	2
2018-19-Q1	3	2	1	0
2018-19-Q2	6	1	1	4
2018-19-Q3	6	1	3	2
2018-19-Q4	3	2	1	0
2019-20-Q1	1	0	0	1
2019-20-Q2	3	0	0	3
2019-20-Q3	7	4	0	3
2019-20-Q4	2	1	1	0
Total	115	33	33	49

APPENDIX H9 NUMBER OF *MATERNAL DEATHS DUE TO HIV* IN THE EKURHULENI DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
2014-15-Q2	2	0	1	1

2014-15-Q3	3	0	2	1
2014-15-Q4	1	0	1	0
2015-16-Q1	4	0	3	1
2015-16-Q2	1	0	1	0
2015-16-Q3	2	0	2	0
2015-16-Q4	2	0	1	1
2016-17-Q1	1	1	0	0
2016-17-Q2	1	1	0	0
2016-17-Q3	4	0	2	2
2016-17-Q4	4	0	0	4
2017-18-Q1	6	0	2	4
2017-18-Q2	3	0	2	1
2017-18-Q3	6	2	0	4
2017-18-Q4	3	0	0	3
2018-19-Q1	1	0	0	1
2018-19-Q2	5	1	1	3
2018-19-Q3	2	0	0	2
2018-19-Q4	3	0	2	1
2019-20-Q1	2	1	1	0
2019-20-Q2	6	1	0	5
2019-20-Q3	2	0	1	1
2019-20-Q4	2	0	2	0
Total	66	7	24	35

APPENDIX H10 NUMBER OF *MATERNAL DEATHS DUE TO HYPERTENSION* IN THE EKURHULENI DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
2014-15-Q2	9	2	2	5

2014-15-Q3	3	1	1	1
2014-15-Q4	4	0	1	3
2015-16-Q1	3	0	1	2
2015-16-Q2	3	2	1	0
2015-16-Q3	1	1	0	0
2015-16-Q4	1	1	0	0
2016-17-Q1	3	3	0	0
2016-17-Q2	2	0	0	2
2016-17-Q3	3	1	1	1
2016-17-Q4	4	0	2	2
2017-18-Q1	1	1	0	0
2017-18-Q2	3	0	3	0
2017-18-Q3	0	0	0	0
2017-18-Q4	3	0	1	2
2018-19-Q1	4	2	0	2
2018-19-Q2	5	2	1	2
2018-19-Q3	3	0	2	1
2018-19-Q4	8	2	3	3
2019-20-Q1	3	1	0	2
2019-20-Q2	4	1	2	1
2019-20-Q3	3	2	0	1
2019-20-Q4	4	1	3	0
Total	77	23	24	30

APPENDIX H11 NUMBER OF *MATERNAL DEATHS DUE TO MEDICAL AND SURGICAL CAUSES* IN THE EKURHULENI DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
2014-15-Q2	8	0	4	4

2014-15-Q3	5	1	2	2
2014-15-Q4	4	0	2	2
2015-16-Q1	8	2	2	4
2015-16-Q2	5	1	2	2
2015-16-Q3	1	0	0	1
2015-16-Q4	6	1	1	4
2016-17-Q1	0	0	0	0
2016-17-Q2	4	0	1	3
2016-17-Q3	6	1	4	1
2016-17-Q4	3	0	2	1
2017-18-Q1	1	1	0	0
2017-18-Q2	0	0	0	0
2017-18-Q3	3	2	0	1
2017-18-Q4	4	0	2	2
2018-19-Q1	3	1	2	0
2018-19-Q2	5	2	2	1
2018-19-Q3	3	0	1	2
2018-19-Q4	4	0	1	3
2019-20-Q1	2	0	2	0
2019-20-Q2	3	0	1	2
2019-20-Q3	1	0	1	0
2019-20-Q4	4	0	2	2
Total	83	12	34	37

APPENDIX H12 NUMBER OF MATERNAL DEATHS DUE TO OBSTETRICS CAUSES

Quarters	Total (n)	East (n)	North (n)	South (n)
2014-15-Q2	1	0	1	0
2014-15-Q3	0	0	0	0
2014-15-Q4	2	0	2	0

2015-16-Q1	2	0	1	1
2015-16-Q2	1	0	0	1
2015-16-Q3	1	0	0	1
2015-16-Q4	2	1	0	1
2016-17-Q1	1	0	0	1
2016-17-Q2	3	0	0	3
2016-17-Q3	2	0	1	1
2016-17-Q4	0	0	0	0
2017-18-Q1	0	0	0	0
2017-18-Q2	0	0	0	0
2017-18-Q3	1	0	0	1
2017-18-Q4	3	0	0	3
2018-19-Q1	0	0	0	0
2018-19-Q2	0	0	0	0
2018-19-Q3	0	0	0	0
2018-19-Q4	3	1	0	2
2019-20-Q1	0	0	0	0
2019-20-Q2	3	0	1	2
2019-20-Q3	3	0	2	1
2019-20-Q4	2	0	1	1
Total	30	2	9	19

APPENDIX H13 NUMBER OF *MATERNAL DEATHS DUE TO OTHER CAUSES* IN THE EKURHULENI DISTRICT

Quarters	Total (n)	East (n)	North (n)	South (n)
2014-15-Q2	1	0	0	1
2014-15-Q3	0	0	0	0
2014-15-Q4	0	0	0	0

2015-16-Q1	0	0	0	0
2015-16-Q2	0	0	0	0
2015-16-Q3	2	0	2	0
2015-16-Q4	1	0	0	1
2016-17-Q1	2	2	0	0
2016-17-Q2	0	0	0	0
2016-17-Q3	1	0	1	0
2016-17-Q4	2	1	0	1
2017-18-Q1	2	1	0	1
2017-18-Q2	4	1	3	0
2017-18-Q3	1	1	0	0
2017-18-Q4	0	0	0	0
2018-19-Q1	2	1	0	1
2018-19-Q2	2	1	0	1
2018-19-Q3	1	0	1	0
2018-19-Q4	0	0	0	0
2019-20-Q1	1	0	1	0
2019-20-Q2	0	0	0	0
2019-20-Q3	3	0	2	1
2019-20-Q4	4	2	2	0
Total	29	10	12	7

APPENDIX H14 COMPARATIVE ANALYSIS OF MATERNAL DEATH REPORTING

quarters	DHIS	Saving mothers	DCST
2014-15-Q2	30		29
2014-15-Q3	26		28
2014-15-Q4	21		22
2015-16-Q1	24		24

2015-16-Q2	19		19
2015-16-Q3	19		19
2015-16-Q4	21		17
2016-17-Q1	15		12
2016-17-Q2	17		18
2016-17-Q3	25		25
2016-17-Q4	19		20
2017-18-Q1	17		21
2017-18-Q2	20		20
2017-18-Q3	15		18
2017-18-Q4	20		21
2018-19-Q1	17		19
2018-19-Q2	24		25
2018-19--Q3	16		17
2018-19-Q4	25	25	25
2019-20-Q1	12	12	12
2019-20-Q2	20	20	23
2019-20-Q3	24	24	24
2019-20-Q4	25	25	26
TOTAL	471		484

APPENDIX I OBJECTIVE 3: DATA COLLECTION TOOLS

APPENDIX I1: TEMPLATE FOR DCST QUARTERLY REPORTING TO DISTRICT

Together, Moving Gauteng City Region Forward QUARTERLY DISTRICT CLINICAL SPECIALIST TEAM DISTRICT DATE  GAUTENG PROVINCE HEALTH REPUBLIC OF SOUTH AFRICA										 GAUTENG PROVINCE HEALTH REPUBLIC OF SOUTH AFRICA Together, Moving Gauteng City Region Forward DCST team 1																																																																																																																																																																																																															
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Causes of maternal deaths (per institution)

6

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Neonatal Deaths (early and late per institution)

7

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Causes of Neonatal deaths

8

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Deaths under 5 years per institution

9

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Causes of child under 5 deaths

10

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REPUBLIC OF SOUTH AFRICA

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Training

Activities	Annual Target 2014/2015	Quarterly Targets					Comments
		Targ et	Q1	Q2	Q3	Q4	

11



GAUTENG PROVINCE
REPUBLIC OF SOUTH AFRICA

Together, Moving Gauteng City Region Forward

M&M Meetings attended

Activities	Annual Target 2014/2015	Quarterly Targets						Comments
		Targ et	Q1	Q2	Q3	Q4	Annu al	

12



GAUTENG PROVINCE
REPUBLIC OF SOUTH AFRICA

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Achievements:

13



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Challenges

14



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Future plans

15

15

APPENDIX I2: TEMPLATE FOR DCST QUARTERLY REPORTING TO PROVINCE

DISTRICT CLINICAL SPECIALIST TEAM XXXXX DISTRICT QUARTERLY REVIEW: _____ DATE: _____  	  CONTENT - DCST Team - DHIS indicators: - Maternal Health - Child Health - Deliveries per MOU and Hospital - Activities - Challenges and Underperformance																																																																																																																																																									
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GAUTENG
REPUBLIC OF SOUTH AFRICA

GGT2030
GOVERNMENT OF THE PROVINCE OF

DELIVERIES PER MOU

Facility	2020/21 target	Quarter 1: 2020/21	Quarter 2: 2020/21	Quarter 3: 2020/21	Quarter 4: 2020/21


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GGT2030
GOVERNMENT OF THE PROVINCE OF

DELIVERIES PER HOSPITAL


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GOVERNMENT OF THE PROVINCE OF

Causes of Maternal deaths in Q1 2021/22 Regional; District and CHCs


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GOVERNMENT OF THE PROVINCE OF

Causes of Maternal deaths (per institution)


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GOVERNMENT OF THE PROVINCE OF

Causes of Still-births (per institution)


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GGT2030
GOVERNMENT OF THE PROVINCE OF

Causes of Neonatal deaths (per institution)

APPENDIX I3: DATA COLLECTION TOOL TO EXTRACT DATA FROM DCST REPORTS

quarters	activities	pillar	comments

APPENDIX J: OBJECTIVE 3: DCST INTERVENTION TEMPLATES AND RESULT TABLES

APPENDIX J1.1: TEMPLATE FOR DCST SUPPORT VISITS



DCST CLINIC SUPPORT VISIT

Facility:
Date:
Time:

Points to assess	Information obtained	Intervention planned
CLINICAL MANAGEMENT RELATED		
Are parity & gravidity documented? (Y/N)		
Are parity & gravidity calculated correctly? (Y/N)		
Is last menstrual period and expected date of delivery documented? (Y/N)		
Is expected date of delivery calculated correctly? (Y/N)		
Are the routine bloods done at first visit (Y/N)		
Which routine bloods are not done? (Specify)		
Are the results of the blood tests documented in maternity case record (Y/N)		
Which blood results are not documented in the maternity case records? (specify)		
Are blood tests repeated as per guideline? (Y/N)		
Which blood tests are not repeated as per guideline? (specify)		
Is each pregnant woman referred for routine SONAR for gestational age? (Y/N)		
Is symphysio-fundal height plotted for every visit? (Y/N)		
Is Symphysio-fundal height plotted correctly? (Y/N)		
Discuss management of hypertension in pregnancy (a case scenario given).		
Discuss management of anemia in pregnancy (a case scenario given).		
Discuss management of HIV in pregnancy (a case scenario given).		
Is abdominal examination done by the sister correctly (verify on inspection)? (Y/N)		
LOGISTICS RELATED		
First visit booking register (Y/N)		
Follow up booking register (number of		

Points to assess	Information obtained	Intervention planned
patients booked)		
Is obstetrics wheel available (manual or electronic)? (Y/N)		
Is Calcium, Iron and Folic acid tables available? (Y/N)		
Are above tablets given regularly? (Y/N)		
Is Bicillin available? (Y/N)		
Is haemoglobinometer, Glucometer, Doppler for fetal heart testing available? (Y/N)		
Is BANC check list available? (Y/N)		
Is maternity care guideline and HIV guidelines available at the ANC?		
Any problems/ concerns you want to discuss with us (open question)		

APPENDIX J1.2: LIST OF SUPPORT VISITS TO CLINICS, MOUs AND HOSPITALS

quarters	activities
2012-13-Q2	Number of Clinical mentoring at district hospital (8), CHCs (5), PHC clinics (6)
2012-13-Q3	Number of Clinical mentoring at district hospital (9), CHCs(7), PHC clinics (4)
2012-13-Q4	Number of Clinical mentoring at district hospital (12), CHCs (9), PHC clinics (5)
2013-14-Q1	Number of Clinical mentoring at district hospital (12), CHCs (9), PHC clinics (6)
2013-14-Q2	Number of Clinical mentoring at district hospital (12), CHCs (7), PHC clinics (4)
2013-14-Q3	Number of Clinical mentoring at district hospital (9), CHCs (6), PHC clinics (4)
2013-14-Q4	Number of Clinical mentoring at district hospital (8), CHCs (7), PHC clinics (5)
2014-15-Q1	Number of Clinical mentoring at district hospital (8), CHCs (5), PHC clinics (7)
2014-15-Q2	Number of Clinical mentoring at district hospital (12)l, CHCs (6) and PHC clinics (5)
2014-15-Q3	Number of Clinical mentoring at district hospital (14), CHCs (6) and PHC clinics (5)
2014-15-Q4	Number of Clinical mentoring at district hospital (12), CHCs (8) and PHC clinics (7)
2015-16-Q1	Number of Clinical mentoring at district hospital (10), CHCs (8) and PHC clinics (7)
2015-16-Q2	Number of Clinical mentoring at district hospital (14)l, CHCs (8) and PHC clinics (15)
2015-16-Q3	Number of Clinical mentoring at district hospital (16), CHCs (8) and PHC clinics (18)
2015-16-Q4	Number of Clinical mentoring at district hospital (13), CHCs (8) and PHC clinics (20)
2016-17-Q1	Number of Clinical mentoring at district hospital (16), CHCs (8) and PHC clinics (20)
2016-17-Q2	Number of Clinical mentoring at district hospital (14), CHCs (8) and PHC clinics (20)
2016-17-Q3	Number of Clinical mentoring at district hospital (12), CHCs (8) and PHC clinics (20)
2016-17-Q4	Number of Clinical mentoring at district hospital (14)l, CHCs (8) and PHC clinics (13)
2017-18-Q1	Number of Clinical mentoring at district hospital (12)l, CHCs (8) and PHC clinics (14)
2017-18-Q2	Number of Clinical mentoring at district hospital (13), CHCs (8) and PHC clinics (10)
2017-18-Q3	Number of Clinical mentoring at district hospital (12), CHCs (8) and PHC clinics (12)
2017-18-Q4	Number of Clinical mentoring at district hospital (12), CHCs (8) and PHC clinics (14)
2018-19-Q1	Number of Clinical mentoring at district hospital (9), CHCs (8) and PHC clinics (9)
2018-19-Q2	Number of Clinical mentoring at district hospital (10)l, CHCs (8) and PHC clinics (12)
2018-19-Q3	Number of Clinical mentoring at district hospital (8), CHCs (8) and PHC clinics (8)
2018-19-Q4	Number of Clinical mentoring at district hospital (11)l, CHCs (8) and PHC clinics (11)
2019-20-Q1	Number of Clinical mentoring at district hospital (17), CHCs (10) and PHC clinics (9)
2019-20-Q2	Number of Clinical mentoring at district hospital (15), CHCs (9) and PHC clinics (13)
2019-20-Q3	Number of Clinical mentoring at district hospital (12), CHCs (10) and PHC clinics (12)
2019-20-Q4	Number of Clinical mentoring at district hospital (12), CHCs (13) and PHC clinics (9)

APPENDIX J2: CLINICAL AUDIT OF MATERNITY RECORDS

quarters	Description of activities
2012-13-Q2	ANC cards (30); Partograms (30); Intrapartum case records (30)
2012-13-Q3	ANC cards (35); Partograms (15); Intrapartum case records (15)
2012-13-Q4	ANC cards (50); Partograms (30); Intrapartum case records (30)
2013-14-Q1	ANC cards (35); Partograms (30); Intrapartum case records (30)
2013-14-Q2	ANC cards (50); Partograms (30); Intrapartum case records (30)
2013-14-Q3	ANC cards (40); Partograms (30); Intrapartum case records (30)
2013-14-Q4	ANC cards (40); Partograms (30); Intrapartum case records (30)
2014-15-Q1	ANC cards (135); Partograms: (45); Intrapartum case records (45)
2014-15-Q2	ANC cards:(87) Intrapartum case records: (75)
2014-15-Q3	ANC cards (50); Partograms (45); Intrapartum case records (45)
2014-15-Q4	ANC cards (38); Partograms (45); Intrapartum case records (45)
2015-16-Q1	ANC cards (80); Partogram (40); intrapartum case records: (40)
2015-16-Q2	ANC cards (60); Partogram (45); Intrapartum case records (45)
2015-16-Q3	ANC cards (90); Partograms (45); Intrapartum case records (45)
2015-16-Q4	ANC cards (90); Partograms (50); Intrapartum case records (50)
2016-17-Q1	ANC service (100); Partograms (45); Intrapartum case records (45)
2016-17-Q2	ANC service (120); Partograms (120); Intrapartum case records (120)
2016-17-Q3	ANC service (130); Partogram (100); Intrapartum case records (100);
2016-17-Q4	ANC service (90); Partogram (60); Intrapartum case records (60);
2017-18-Q1	ANC service (90); Partogram (60); Intrapartum Case records (60);
2017-18-Q2	ANC service (100); Partograms (100); Intrapartum case records (100);
2017-18-Q3	ANC service (110); Partograms (70); Intrapartum case records (70);
2017-18-Q4	ANC service (110); Partograms (50); Intrapartum case records (50);
2018-19-Q1	ANC service (90); Partograms (50); Intrapartum case records (50);
2018-19-Q2	ANC service (100); Partograms (55); Intrapartum case records (55);
2018-19-Q3	ANC service (120); Partograms (50); Intrapartum case records (50);
2018-19-Q4	ANC service (120); Partograms (60); Intrapartum case records (60);
2019-20-Q1	Antenatal service (90), Partogram (75), Intrapartum records (75)
2019-20-Q2	Antenatal service (100), Partogram (90), Intrapartum records (90)
2019-20-Q3	Antenatal service (60), Partogram (80), Intrapartum records (80)
2019-20-Q4	Antenatal service (90), Partogram (100), Intrapartum records (100)

Overview of Ekurhuleni South sub-district Antenatal clinics

Ekurhuleni District Clinical Specialist Team

**Presenter : Dr Jayati Basu (Obstetrician &
Gynecologist)**

**Family Medicine Quarterly Review Meeting
22nd November 2013**

APPENDIX J4.1: TEMPLATE FOR PATIENT SAFETY INCIDENCE COMMITTEE AGENDA



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

EKURHULENI HEALTH DISTRICT DISTRICT CLINICAL SPECIALIST TEAM

PHOLA PARK MOU INCIDENTS

DATE: 10 May 2019

VENUE: Phola Park MOU

TIME: 08h00 - 10h00

AGENDA

Time	ITEM	RESPONSIBLE PERSON
08h00 - 08h05	Opening and Welcome	Sr Moepya
08h05 - 08h10	Introduction	All
08h10 - 08h20	Purpose of the meeting	Ms. M. Tlhabadira
08h20 - 09h10	Presentation of Cases	Dr Basu
09h10 - 09h35	Discussions	All
09h35- 09h55	Way forward	Ms. M. Tlhabadira
09h55 - 10h00	Closure	Sr Kubheka

APPENDIX J4.2: TEMPLATE FOR PATIENT SAFETY INCIDENCE COMMITTEE ATTENDANCE REGISTER



Patient Safety Incidence Committee meeting: Attendance register

Facility:
Date:
Time:
Venue:

ATTENDANCE REGISTER

Initial and Surname	Department	EXT/ Mobile	email	Signature

APPENDIX J5.1: TEMPLATE FOR FACILITY MATERNAL MORTALITY AND MORBIDITY MEETINGS: AGENDA



Facility Maternal Mortality and Morbidity meeting

Facility:
Date:
Time:
Venue: xxxxxx hospital

Agenda

Items	Presenter
Opening and welcome	
Apologies and credentials	
Previous minutes (corrections and adoption)	
Matters arising	
New matters	
Statistic presentation	
Presentation of maternal death	
General	
Announcements	
Next meeting:	

APPENDIX J5.2: TEMPLATE FOR FACILITY MATERNAL MORTALITY AND MORBIDITY MEETINGS: ATTENDANCE REGISTER



Facility Maternal Mortality and Morbidity meeting: Attendance register

Facility:
Date:
Time:
Venue: XXXX hospital

ATTENDANCE REGISTER

Initial and Surname	Department	EXT/ Mobile	email	Signature

APPENDIX J5.3: FACILITY MATERNAL MORTALITY AND MORBIDITY MEETINGS

quarters	Number of meetings
2012-13-Q2	2
2012-13-Q3	4
2012-13-Q4	11
2013-14-Q1	10
2013-14-Q2	11
2013-14-Q3	10
2013-14-Q4	7
2014-15-Q1	8
2014-15-Q2	9
2014-15-Q3	8
2014-15-Q4	6
2015-16-Q1	8
2015-16-Q2	10
2015-16-Q3	8
2015-16-Q4	7
2016-17-Q1	12
2016-17-Q2	14
2016-17-Q3	11
2016-17-Q4	10
2017-18-Q1	16
2017-18-Q2	14
2017-18-Q3	12
2017-18-Q4	10
2018-19-Q1	13
2018-19-Q2	12
2018-19-Q3	10
2018-19-Q4	13
2019-20-Q1	11
2019-20-Q2	9
2019-20-Q3	10
2019-20-Q4	7

APPENDIX J6: TEMPLATE FOR EKURHULENI DISTRICT QUARTERLY MATERNAL MORTALITY AND MORBIDITY MEETING AGENDA



EKURHULENI DISTRICT MATERNAL MORTALITY AND MORBIDITY MEETING

Date:
Venue:
Time:
Chairperson:

AGENDA

TIME		ITEM	RESPONSIBLE
09h00-09h10	(10min)	Opening and Welcoming	
09h10-09h20	(10min)	Purpose and Background	
		Apologies	
		New matters: Presentations	
09h20-09h30	(10min)	Causes of Maternal Deaths in the District	
09h30-09h35	(5min)	Discussions/ Questions	ALL
		HOSPITALS AND MOUs REPORTS	
09h35-09h50	(15min)	Far East Rand Regional Hospital Phillip Moyo MOU	ALL
09h50-10h10	(20min)	Pholosong Regional Hospital Nokuthela Ngwenya MOU KwaThema MOU	
10h10-10h20	(10min)	EMS response Discussions/ Questions	
10h20-10h30	(10min)	HEALTH BREAK	ALL
10h30-10h45	(15min)	Bertha Gxowa District Hospital Ramokonopi MOU	
10h45-11h05	(20min)	Thelle Mogoerane Regional Hospital J. Dumane Phola Park	
11h05-11h15	(10min)	EMS response Discussions/ Questions	ALL
11h15-11h25	(10min)	Tambo Memorial Regional Hospital	
11h25-11h40	(20min)	Tembisa Tertiary Hospital Ethafeni MOU Esangweni MOU	
11h40-11h50	(10min)	EMS response Discussions/ Questions	ALL
11h50-12h00	(10min)	Way forward Announcements & Closure	

APPENDIX J7: TEMPLATE FOR CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL CLUSTER MATERNAL MORTALITY AND MORBIDITY MEETING AGENDA



CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL CLUSTER M & M		
DATE :	TIME :	VENUE : CMJAH O&G seminar room

AGENDA

1. Welcome and Apologies
2. Introductions and circulation of Attendance Register
3. Review of previous minutes/ Action plans
4. Hospital Presentations:- **(10 minutes per presentation)**
 - CMJAH
 - Rahima Moosa hospital
 - Pholosong
 - Edenvale hospital
 - Tambo Memorial hospital
 - Leratong hospital
 - Far East rand hospital
 - South rand
 - Bertha Gxowa
 - Carletonville
 - Yusuf Dadoo
5. District specialist team (deaths at MOUs)
 - Maternal death summary
 - Ekurhuleni
 - Johannesburg
 - West Rand
6. Summary of key issues/action plans
7. Way forward & closure

APPENDIX J8: TEMPLATE FOR MATERNAL MORTALITY AND MORBIDITY MEETINGS PRESENTATION FOR FACILITIES

HOSPITAL MMR MONTHLY DATA INPUT Month (Year) Presented by: 	 DELIVERY IN FACILITY <table border="1"> <tr><td>Under 18 years</td><td></td></tr> <tr><td>18-34 years</td><td></td></tr> <tr><td>35 years and older</td><td></td></tr> <tr><td>Total</td><td></td></tr> <tr><td>Normal vertex deliveries</td><td></td></tr> <tr><td>Vaginal breech</td><td></td></tr> <tr><td>Assisted delivery forceps and or vacuum</td><td></td></tr> <tr><td>Caesarean section (EM – 123, EL – 62)</td><td></td></tr> <tr><td>Total Deliveries</td><td></td></tr> </table>	Under 18 years		18-34 years		35 years and older		Total		Normal vertex deliveries		Vaginal breech		Assisted delivery forceps and or vacuum		Caesarean section (EM – 123, EL – 62)		Total Deliveries															
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BIRTH IN FACILITY					
Weight Category	Still-Births			Live Births	Total Births
	Fresh	Macerated	Total Still - Birth		
500-999g					
1000-1499g					
1500-1999g					
2000-2499g					
2500g and above					
Total					
NB Set of twins = triplets = 1 live birth in facility under 3500g =					

INPATIENT DEATH- EARLY NEONATAL		
Weight Category	Total early neonatal deaths (under 8 days)	Total late neonatal deaths (8-28 days)
500-999g		
1000-1499g		
1500-1999g		
2000-2499g		
2500g and above		
Total		

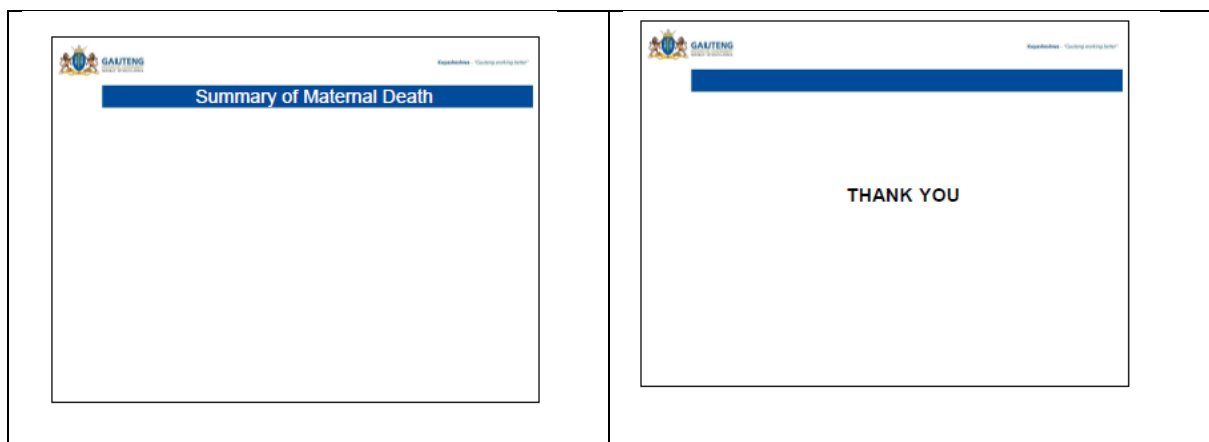
INDICATORS		
	500g or more	1000g or more
Low Birth Weight Rate		
Stillbirth Rate (per1000)		
Early Neonatal Death Rate (per 1000)		
Perinatal Mortality Rate (per 1000)		
Perinatal Care Index		
Caesarean rate (%)		
MMR (per 100 000)		

MATERNAL DEATHS		
ANTENATAL		
INTRAPARTUM		
POSTPARTUM		
MMR (per 100 000)		

BIRTH DEFECT CASES				
	HIV status	TLD	TLD date started	
Mothers under 18 years				
Mothers between 18 and 35				
Mothers 35 years and older				
Child with common priority Defect				

INDICATION FOR CAESAREAN SECTION: TOP 4	

 GAUTENG HEALTH SERVICES Report/Review - "Working working better" ANC DATA ELEMENT <table border="1"> <tr> <td>TOTAL SEEN</td> <td></td> </tr> <tr> <td>Referral in for Antenatal care</td> <td></td> </tr> <tr> <td>Referral out for Antenatal care clinic</td> <td></td> </tr> <tr> <td>Clients screened for TB</td> <td></td> </tr> <tr> <td>Antenatal follow-up visits</td> <td></td> </tr> <tr> <td>Postnatal care - Mothers</td> <td></td> </tr> <tr> <td>- babies</td> <td></td> </tr> <tr> <td>Wound care</td> <td></td> </tr> </table>	TOTAL SEEN		Referral in for Antenatal care		Referral out for Antenatal care clinic		Clients screened for TB		Antenatal follow-up visits		Postnatal care - Mothers		- babies		Wound care		 GAUTENG HEALTH SERVICES Report/Review - "Working working better" POSTNATAL WARD <table border="1"> <tr> <td>Direct admissions (BBA's)</td> <td></td> </tr> <tr> <td>Inpatient transfer-in</td> <td></td> </tr> <tr> <td>Transfer-out</td> <td></td> </tr> </table>	Direct admissions (BBA's)		Inpatient transfer-in		Transfer-out																									
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APPENDIX J9.1: TEMPLATE FOR EMERGENCY OBSTETRICS SIMULATION PROGRAMME (FIRE-DRILL) FORM

ESMOE-EOST

Module 8: Partogram and obstructed labour: Cases 1-3 Version 1.2



PARTOGRAM Cases 1-3

MATERIALS TO BE READY AND AVAILABLE BEFORE STARTING THE SESSION:

- Blank partograms (3 for each participant)
- Flip charts Module 8

The following cases will be discussed. Participants must enter the relevant information on the blank partograms provided.

CASE 1

Kerry, a 20 year old primigravida, presented to the labour ward with a 2 hour history of contractions at 38+ weeks gestation. She was booked and her antenatal course had been uneventful.

Next exam @ 13:00

Contractions: 3 in 10 minutes lasting 35 seconds, HAB: 3/5, FHR: 144, ROM @ 10:00 – clear liquor draining

Vitals: BP 120/70, pulse 88/min, temp 37°C, PV: Cx 4cm dilated.

Next exam @ 15:00

FHR 146/min, liquor clear, Cx 8cm dilated, HAB 2/5, Contractions 3/10 min lasting 50 seconds Bp 120/70 mmHg, Pulse 85/min, 100 ml urine

CASE 2

Julia is a 19 year old primigravida at term who has experienced contractions for 2 hours. Her antenatal course was uneventful.

TIME	CX cm	CONTRACT	FHR	LIQUOR	HAB	MOULD	CAPUT
06:00	5	3/10 35s	140	Intact	4/5	0	0
08:00	5	3/10 35s	146	Clear	3/5	0	0
10:00	5	3/10 25s	140	Clear	3/5	0	+

CASE 3

Helen, a 34 year old G4P3 at term has been in labour at home for 6 hours. Maternal vital signs remain normal.

TIME	CX cm	CONTRACT	FHR	LIQUOR	HAB	MOULD	CAPUT
10:00	4	3/10 35s	150	Clear	3/5	+	+
14:00	6	4/10 45s	156	Blood stained	3/5	++	++
16:00	6	4/10 45s	164	Meconium	3/5	+++	+++

Date: Name of health facility:

Name(s) of facilitator(s):

Signature(s):

.....

.....

.....

.....

Cases discussed:

1

2

3

NOTES AND FOLLOW-UP (General or per case)

ATTENDANCE

	Name	Rank	Ward	Signature
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

APPENDIX J9.2: NUMBER OF EOST TRAINING SESSIONS PER QUARTER

quarters	Total	East	North	South
2012-13-Q4	3	1	1	1
2013-14-Q1	2	0	1	1
2013-14-Q2	5	1	2	2
2013-14-Q3	3	0	2	1
2013-14-Q4	6	1	2	3
2014-15-Q1	10	3	3	4
2014-15-Q2	10	2	3	5
2014-15-Q3	9	2	3	4
2014-15-Q4	10	2	4	4
2015-16-Q1	11	3	4	4
2015-16-Q2	13	3	5	5
2015-16-Q3	9	2	3	4
2015-16-Q4	12	4	2	6
2016-17-Q1	18	6	4	8
2016-17-Q2	14	4	5	5
2016-17-Q3	12	3	5	4
2016-17-Q4	9	3	3	3
2017-18-Q1	10	3	3	4
2017-18-Q2	10	3	3	4
2017-18-Q3	7	2	0	5
2017-18-Q4	8	1	2	5
2018-19-Q1	3	1	1	1
2018-19-Q2	13	5	3	5
2018-19-Q3	3	1	1	1
2018-19-Q4	8	2	2	4
2019-20-Q1	13	4	3	6
2019-20-Q2	7	2	2	3
2019-20-Q3	12	3	4	5
2019-20-Q4	4	2	0	2
Total	254	69	76	109

APPENDIX J9.3: NUMBER OF PARTICIPANTS FOR EOST TRAINING SESSIONS PER QUARTER

quarters	Total	East	North	South
2012-13-Q4	16	5	6	5
2013-14-Q1	11	0	5	6
2013-14-Q2	26	5	10	11
2013-14-Q3	15	0	9	6
2013-14-Q4	29	5	10	14
2014-15-Q1	54	17	19	18
2014-15-Q2	56	11	18	27
2014-15-Q3	49	9	17	23
2014-15-Q4	56	12	24	20
2015-16-Q1	61	16	22	23
2015-16-Q2	73	15	24	34
2015-16-Q3	51	8	20	23
2015-16-Q4	67	18	11	38
2016-17-Q1	102	25	30	47
2016-17-Q2	76	19	30	27
2016-17-Q3	65	15	27	23
2016-17-Q4	55	15	22	18
2017-18-Q1	57	14	17	26
2017-18-Q2	62	15	17	30
2017-18-Q3	37	11	0	26
2017-18-Q4	46	6	12	28
2018-19-Q1	21	7	7	7
2018-19-Q2	71	25	16	30
2018-19-Q3	17	4	6	7
2018-19-Q4	49	11	13	25
2019-20-Q1	69	19	16	34
2019-20-Q2	24	8	7	9
2019-20-Q3	58	14	18	26
2019-20-Q4	21	9	0	12
Total	1394	338	433	623

APPENDIX J9.4: POST-TEST SCORE OF PARTICIPANTS FOR EOST TRAINING SESSIONS PER QUARTER

quarters	East score	North score	South score
2012-13-Q4	80	88	78
2013-14-Q1	90	83	90
2013-14-Q2	87	78	82
2013-14-Q3	82	83	79
2013-14-Q4	85	88	75
2014-15-Q1	80	83	75
2014-15-Q2	85	82	92
2014-15-Q3	78	85	76
2014-15-Q4	93	92	84
2015-16-Q1	88	86	87
2015-16-Q2	89	92	93
2015-16-Q3	89	94	80
2015-16-Q4	92	90	81
2016-17-Q1	96	88	92
2016-17-Q2	84	78	91
2016-17-Q3	85	79	87
2016-17-Q4	90	85	80
2017-18-Q1	75	72	70
2017-18-Q2	64	74	63
2017-18-Q3	85	87	76
2017-18-Q4	94	73	78
2018-19-Q1	62	94	63
2018-19-Q2	88	69	77
2018-19-Q3	78	71	80
2018-19-Q4	84	87	78
2019-20-Q1	88	86	85
2019-20-Q2	92	88	86
2019-20-Q3	87	94	91
2019-20-Q4	91	92	90

APPENDIX J10: TEMPLATE FOR FACILITIES REPORTING TO SUB DISTRICT



GAUTENG PROVINCE
REPUBLIC OF SOUTH AFRICA

Enquiries: Dr .N. Khumalo
Tel no: 011 999 -1571
Cell: 083 256 1750
Email : Nonhlanhla.khumalo@mail.com

AGENDA FOR THE SOUTH MULTIDISCIPLINARY TEAM MEETING 22/07/2019

No	ITEM
1.	Opening and Welcoming
2.	Apologies
3.	Adoption of Agenda
4.	Corrections of Minutes/Action plan
5.	Feedback from the Masterclass presentation
NEW MATTERS	
1.	HAST Indicators per facility: important for facility managers in the South to attend to assist with the discussion and action plan
2.	IMT Issues
3.	Schedule for SMDT for the year
4.	General discussion
5.	Conclusion/Next meeting

APPENDIX J11: TEMPLATE FOR FACILITIES REPORTING TO TEMBISA SUB-CLUSTER



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

TEMBISA PROVINCIAL TERTIARY HOSPITAL

Sub-Cluster Meeting

Date: 22 February 2018

Venue: Executive Boardroom

Time: 09:00

AGENDA

1. Opening and Welcome
2. Present and Apologies
3. Reading and correction of previous minutes of the Sub-Cluster Meeting
4. Working Group Report Back
5. New Matters arising
6. Announcements
7. Date of next Meeting

APPENDIX J12: TOPICS OF TRAINING FOR CONTINUOUS PROFESSIONAL DEVELOPMENT

quarters	Topics of training				
	Antenatal (No)	Intranatal (No)	Postnatal	Reproductive health and Family planning	Others
2012-13-Q2	STI (1) Anemia in pregnancy (2) BANC (11) Postdates (1)	Partogram (1) CTG (1)		New Contraceptive and Fertility Planning Policy (1) Termination of pregnancy (1)	
2012-13-Q3	BANC (3)	Introduction of early warning charts (8)	Postnatal care (1)		
2012-13-Q4	BANC (3)	Introduction of early warning charts (10) Latent phase of labour (1) Partogram (1) CTG (1)			
2013-14-Q1	BANC (4) Antepartum haemorrhage (1) Hypertension in pregnancy (2) Anaemia in pregnancy	Partogram (1) CTG (1)	Postnatal (2)	Master trainers for IUCD awaiting accreditation	
2013-14-Q2	BANC Master training (1) Anaemia in pregnancy (2) Hypertension in pregnancy (3) Postdates (3)	Partogram (1) CTG (1)	Postnatal (4)	Contraceptive and fertility planning policy (1)	
2013-14-Q3	BANC (3) Maternal death (2) PPH (1) Hypertension in pregnancy (1) Anemia in pregnancy (1) Rh negative in pregnancy (1)			New contraceptives policy and guidelines (1): 35.	CARMMA (3): 79
2013-14-Q4	BANC (5) Hypertension in pregnancy (2) Basic SONAR in pregnancy (2)	Early warning charts & SBAR charts (1) CTG Partogram		New contraceptives policy and guidelines (1): 35	
2014-15-Q1	Antenatal Workshops (1) SONAR training (6) Hypertension in pregnancy (3) Anaemia in pregnancy (3) BANC (4) Postdates (1)	Partogram (1) CTG(1)		Implanon (2)	Mom-Connect (1)
2014-15-Q2	ANC card workshop (3) Anaemia in pregnancy (1)	Partogram (1) CTG(1)	PNC card (3)	New contraception and fertility policy for doctors (1) IUD insertions (1) Implanon (1)	
2014-15-Q3	ANC card workshop (3)	Partogram (1) CTG(1)	PNC (3)		
2014-15-Q4	Hypertension in pregnancy (1)	Partogram (1) CTG(1)		Implanon insertion & removal trainings (6)	

quarters	Topics of training				
	Antenatal (No)	Intranatal (No)	Postnatal	Reproductive health and Family planning	Others
2015-16-Q1	ANC card (1) BANC (2) Hypertension in pregnancy (2)	Partogram (1) CTG(1)		Implanon (1) Reproductive health (1)	Mom connect (1)
2015-16-Q2	ANC workshop (3) Anemia in pregnancy (5) Epilepsy in pregnancy (1) Diabetes in pregnancy (1) Obstetrics Hemorrhage (3) Obstetrics emergencies (1)	Partogram (1) CTG (1)	PNC (1)	IUD insertions (1) New contraception and fertility policy for doctors (1) Abnormal uterine bleeding (1) Family planning (1)	
2015-16-Q3	ANC card (3) ANC workshop (3) SONAR training Mom connect (1)	CTG (2) Partogram (9)	Implanon: (3)		
2015-16-Q4	ANC card (15) ANC workshop (3) SONAR training (1)	Partogram (9) CTG (1)		Implanon (1)	
2016-17-Q1	ANC workshop (3) BANC (1) SONAR training (3) Blood transfusion in pregnancy (2) Anemia in pregnancy (1) Diabetes in pregnancy (1)) Hypertension in pregnancy (1)	Partogram (9) CTG (1)		Implanon (1)	Mom connect (1)
2016-17-Q2	BANC plus (3) Obstetrics emergencis (1) Hypertension in pregnancy (1)	Partogram (3)		PCR (6) Liquid based cytology (1) Abnormal uterine bleeding (1)	Mom connect (3)
2016-17-Q3	ANC workshops (3)	CTG (1) Partogram (1)			
2016-17-Q4	BANC plus (3)	Partogram (1) CTG (1)			
2017-18-Q1	BANC Plus (1) ANC routine care (1) Rh negative in pregnancy (1) Diabetes in pregnancy (1)			Implanon Implant insertions/removal (1)	
2017-18-Q2	BANC Plus (4) ANC workshop (3) Hypertension in pregnancy (3) HIV in pregnancy (1) Postnatal care (1) Obstetrics emergencies (2)	Partogram (1) CTG (1)		Implanon Implant insertions/removal (1) Abnormal uterine bleeding (2) Liquid based cytology(1)	
2017-18-Q3	BANC Plus (1) ANC routine care (1) Hypertension in pregnancy (1) HIV in pregnancy (1)			Implanon Implant insertions/removal (1)	
2017-18-Q4	BANC Plus (1) ANC routine care (1) HIV in pregnancy (1)	Partogram (1) CTG (1)		Implanon Implant insertions/removal (1)	
2018-19-	BANC plus (1)	Partogram (1)	PNC care	Implanon Insertion and	

quarters	Topics of training				
	Antenatal (No)	Intranatal (No)	Postnatal	Reproductive health and Family planning	Others
Q1	Hypertension in Pregnancy(1)	CTG (1)	(1)	removal (1)	
2018-19-Q2	BANC plus (1) Hypertension in Pregnancy (1) ANC routine care (8)	Partogram (1) CTG (1)	PNC care (1)	Implanon Insertion and removal (1)	
2018-19-Q3	BANC plus (1) Hypertension in Pregnancy (1) ANC routine care (6)	Partogram (1) CTG (1)	PNC care (1)	Implanon Insertion and removal (1)	
2018-19-Q4	BANC plus (1) Hypertension in Pregnancy (1) ANC routine care (1)	Partogram (1) CTG (1)	PNC care (1)	Family planning (1)	
2019-20-Q1	Hypertension in Pregnancy (1) BANC plus (1) Diabetes in pregnancy (1) HIV in pregnancy (1)	Partogram (1) CTG (1)	PNC care(1)		
2019-20-Q2	BANC plus (1) Diabetes in pregnancy (1)	Partogram (1) CTG (1)		Family planning (1)	
2019-20-Q3	BANC plus (1) Obesity in pregnancy (1) Syphilis in pregnancy (1) HIV in pregnancy (1)	Partogram (1) CTG (1)			
2019-20-Q4	ANC workshop (1)	Partogram (1) CTG (1)	PNC care (1)		

APPENDIX J13.1: NUMBER OF ESMOE TRAINING SESSIONS

quarters	Number of sessions
2012-13-Q4	1
2013-14-Q1	1
2013-14-Q2	1
2013-14-Q3	1
2013-14-Q4	1
2014-15-Q1	1
2014-15-Q2	0
2014-15-Q3	1
2014-15-Q4	1
2015-16-Q1	1
2015-16-Q2	1
2015-16-Q3	1
2015-16-Q4	1
2016-17-Q1	1
2016-17-Q2	1
2016-17-Q3	1
2016-17-Q4	1
2017-18-Q1	0
2017-18-Q2	1
2017-18-Q3	1
2017-18-Q4	1
2018-19-Q1	1
2018-19-Q2	1
2018-19-Q3	1
2018-19-Q4	1
2019-20-Q1	1
2019-20-Q2	1
2019-20-Q3	1
2019-20-Q4	1
Total	27

APPENDIX J13.2 NUMBER OF PARTICIPANTS PER ESMOE TRAINING SESSIONS

quarters	Number of participants			
	Total	East	North	South
2012-13-Q4	25	14	8	3
2013-14-Q1	38	11	14	13
2013-14-Q2	25	9	9	7
2013-14-Q3	26	9	8	9
2013-14-Q4	45	16	15	14
2014-15-Q1	38	10	15	13
2014-15-Q2				
2014-15-Q3	53	16	21	16
2014-15-Q4	10	0	0	10
2015-16-Q1	27	12	8	7
2015-16-Q2	36	8	10	18
2015-16-Q3	15	8	6	1
2015-16-Q4	34	12	15	7
2016-17-Q1	54	6	27	21
2016-17-Q2	49	20	16	13
2016-17-Q3	63	16	20	27
2016-17-Q4	51	8	36	7
2017-18-Q1				
2017-18-Q2	55	12	12	31
2017-18-Q3	36	8	6	22
2017-18-Q4	66	13	43	10
2018-19-Q1	39	11	13	15
2018-19-Q2	41	12	10	19
2018-19-Q3	43	12	14	17
2018-19-Q4	68	9	28	31
2019-20-Q1	33	7	18	8
2019-20-Q2	59	25	15	19
2019-20-Q3	52	20	8	24
2019-20-Q4	79	16	27	36
Total	1160	320	422	418

APPENDIX J14: POST-TRAINING CUSTOMER SURVEY FORM

 GAUTENG PROVINCE HEALTH REPUBLIC OF SOUTH AFRICA	EKURHULENI HEALTH DISTRICT CLINICAL SPECIALIST TEAM UNIT
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ESMOE TRAINING EVALUATION FORM DATE.....

Which session you liked most (tick your response)	Why did you like it most (explain)
Day 1: _____ • HIV • CTG • Partogram Cs skills training	
Day 2: _____ • Pre-eclampsia • Breech & Twins • Obstetrics Haemorrhage • Maternal resuscitation	
Day 3: _____ • Paediatrics session	
Day 4: _____ • Shoulder dystocia/cord prolapse/ assisted delivery • Miscarriage & sepsis • Surgical skill training	
Which session/s you did not like (tick your response)	Why did not you like it (explain)
Day 1: _____ • HIV • CTG • Partogram Cs skills training	
Day 2: _____ • Pre-eclampsia • Breech & Twins • Obstetrics Haemorrhage • Maternal resuscitation	
Day 3: _____ • Paediatrics session	
Day 4: _____ • Shoulder dystocia/cord prolapse/ assisted delivery • Miscarriage & sepsis • Surgical skill training	

Thank you for your evaluation

APPENDIX J15: SAMPLE OF A CLINICAL PROTOCOL DEVELOPED BY DCST FOR HCWs AT MOUs AND CLINICS

SHOULDER DYSTOCIA		
Call for help Summon at least two assistants		 Mc Roberts position IMPORTANT Always explain the shoulder dystocia manoeuvres to the woman – her assistance is vital for a successful delivery
Move the woman to the edge of the bed Put the woman in the McRoberts position Apply suprapubic pressure Do not stretch the baby's neck Support the baby's head and deliver		
Feel for the baby's posterior arm Cut an episiotomy if necessary Extract the posterior arm by sweeping it in front of the baby's chest Support the baby's head and deliver		
Turn the woman into the all-fours positions Extract the posterior arm as above Support the baby's head and deliver		
Extract the posterior arm using a suction tube or urine bag pipe as a sling in the axilla Try a rotation manoeuvre to bring the posterior shoulder to the anterior position		
Do not attempt destructive procedures Do not injure the woman further Offer counselling and sedation Call or transfer for specialist help		
Signature: <u>Jayali Bana</u> Signature: <u>Shamoon</u> Date: <u>24th Jan 2016</u> Review Date: <u>27 Jan 2016</u>		

APPENDIX J16.1: TEMPLATE FOR EKURHULENI DISTRICT NEONATAL AND OBSTETRICS PROJECT MEETING AGENDA



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

To be the best provider of quality health care services to the people of Gauteng

EKURHULENI HEALTH DISTRICT

DISTRICT NEONATAL AND OBSTETRIC PROJECT MEETING

Date: 18th September 2019

Time: 07:00 – 09:00

Venue: Tambo Memorial Hospital – Clinical Department

PROPOSED AGENDA

1. Welcome
2. Apologies
3. Reading of minutes, corrections and adoption of minutes
4. Matters arising from minutes
5. NEW ITEMS
 - 5.1 Hospital Neonatal and Obstetric status report for the 18th September 2019
 - 5.2 Presentation: Hospital progress report: Bertha Gxowa, Far East Rand, Pholosong, Tambo Memorial, Thelle Mogoerane
 - 5.3 Consolidated report: Dr. R. Kellerman
 - 5.4 Dr. N. Makgana: SOP for down referral of NVD's (Pholosong Hospital)
6. Announcements
7. Date of next meeting
8. Closure

APPENDIX J16.2: SAMPLE OF A DOWN-REFERRAL MEMO CREATED BY DCST FOR REFERRAL FROM HOSPITAL TO MOUs

 GAUTENG PROVINCE HEALTH REPUBLIC OF SOUTH AFRICA	EKURHULENI HEALTH DISTRICT CLINICAL SPECIALIST TEAM UNIT
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Ekurhuleni District Downreferral criteria for patients in labour

NAME: DATE: TIME:

REASON FOR ARRIVAL AT HOSPITAL:

TICK

- Age is more than 15 and less than 40 years
- Parity is less than 5
- She is not a primagravida of age 35 years or more
- There are no previous perinatal deaths (stillbirths, early neonatal deaths)
- There are not more than two miscarriages
- There is no previous caesarian section, or surgery to the uterus or cervix
- There is no previous vacuum or forceps delivery
- There is no previous baby with birth defects or birth trauma
- There is no history of previous postpartum haemorrhage requiring transfusion
- There is no heart disease, diabetes, kidney disease, thyroid disease or epilepsy
- There is no current tuberculosis or uncontrolled asthma
- There is no history of mental illness
- There is no obvious spinal, pelvic or lower limb deformity
- The pregnancy is more than 33 and less than 42 weeks by best estimate
- There is no history of antepartum haemorrhage
- Fetal movements are felt and normal
- The last antenatal haemoglobin level was 10 g/dL or more
- There is no evidence of Rhesus isoimmunisation (Rh negative with antibodies)
- The level of consciousness is normal
- The height is 150 cm or more
- The weight is less than 120 kg
- The blood pressure is normal (reading.....)
- The heart rate is normal (.....)
- The symphysis-fundal measurement is between 29 and 40 cm
- The presentation is cephalic
- There is one fetus – by palpation or ultrasound
- The fetal heart rate before and after contractions is between 110 and 160 bpm
- There are no large obstructive vulval warts
- There is no evidence of an old third- degree tear
- No fresh blood or clots are observed on vaginal examination
- The cervix is less than 6 cm dilated (.....)
- If membranes have ruptured, there is no meconium stained or offensive liquor

Signed: Name:

APPENDIX J16.3: SAMPLE OF A MEMO CREATED BY DCST FOR REFERRAL FROM MOUs TO HOSPITALS

1



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

Enquiries: Mr. T. Magoro
Tel: 011 878 8503

TO: HEAD OF DEPARTMENT – CITY OF EKURHULENI
CEO'S AT EKURHULENI HEALTH DISTRICT
EMS AND PHC MANAGERS
CC: MS. M. LERUTLA – CHIEF DIRECTOR FOR DISTRICT HEALTH SERVICE
FROM: MR. M.T MAGORO – CHIEF DIRECTOR
DATE: 5 NOVEMBER 2020

Dear Sir/ Madam

Re: UPDATE ON EKURHULENI NEONATAL AND OBSTETRIC REFERRALS

1. **Purpose:** To inform hospitals, all facilities, MOU's, EMS and managers about the agreed district referral routes for regional hospitals and Tembisa Tertiary Hospital, especially when hospitals are on divert. This is to ensure communication is enhanced, referrals are not delayed and patient coordination efforts are improved.
2. **Background:** Since the discontinued use of Ramokonopi MOU roster on 09 October 2020, a subsequent district neonatal and obstetric meeting was held in Thelle Mogoerane Hospital on 14 October 2020 and revised district neonatal and obstetric referrals as indicated below.

3. Discussion

3.1 Ramokonopi MOU and feeder clinics

- o Thelle receives all referrals from Ramokonopi MOU and feeder clinics except three (3) below. So, when Thelle is on divert, it means the hospital cannot take more patients, except possibly walk-ins. Hence, Ramokonopi MOU and feeder clinics should transfer high-risk patients to **Tambo Memorial, Pholosong, Far East Rand or Tembisa Tertiary Hospital in that order of preference** when Thelle is on divert.
- o Below are Google map estimates of travel times between different sites to support the decision:

Hospital	Distance from Thelle	Distance from Ramokonopi CHC	Distance from Phola Park CHC	Distance from J Dumane CHC
Tambo Memorial	24- 27 mins	31 – 33 mins	33 – 37 mins	27 – 30 mins
Pholosong	26 – 32 mins	39 – 45 mins	39 – 45 mins	28 - 35 mins
Far East Rand	33 – 37 mins	41 – 44 mins	44 – 50 mins	35 – 39 mins
Tembisa Hospital	46 – 56 mins	49 – 58 mins	47– 56 mins	46– 58 mins

1

3.2 Ramokonopi MOU feeder clinics which should refer high-risk antenatal patients to Tambo:

- These clinics were reduced from six (6) to three (3) in September 2020 and status remains. This was done to allow Tambo to manage better chronic challenges on neonatal and obstetric beds. We urge Tambo Memorial to observe this intervention. These clinics are:
 - Katlehong North
 - Tamaho
 - Motsamai

4. Esangweni MOU and Ethafeni MOU and feeder clinics

4.1 Referral routes for Tembisa Tertiary Hospital surrounding CHCs when the hospital is on divert:

- The above means that Tembisa Tertiary cannot take more patients, except possibly walk-ins.
- Hence, Esangweni MOU, Ethafeni MOU and feeder clinics should transfer high-risk patients to **Tambo Memorial, Far East Rand, Thelle Mogoerane or Pholosong Regional Hospitals in that order of preference**, when Tembisa is on divert.
- Below are Google map estimates of travel times between different sites to support the decision:

Hospital	Distance from Tembisa Hospital	Distance from Esangweni CHC	Distance from Ethafeni CHC
Tambo Memorial	31 - 44 mins	34 – 35 mins	33 – 40 mins
Far East Rand	43 – 45 mins	47 – 48 mins	44 – 46 mins
Thelle Mogoerane	45 – 56 mins	44 – 50 mins	46 – 57 mins
Pholosong	51 –59 mins	54 – 60 mins	53 –61 mins

5. Horizontal referral routes from high delivering CHCs to low delivering CHCs in low-risk mothers:

CHCs	Priority transfer	Second option	Third option	Fourth option
Ethafeni	Esangweni (06 min)	Phillip Moyo (38 mins)	J Dumane (46 mins)	Phola Park (46 mins)
Ramokonopi	J Dumane (16 min)	Phola Park (09 min)	Nokuthela Ngwenya (39 mins)	Esangweni (46 mins)
Phillip Moyo	Nokuthela (33 mins)	KwaThema (30 mins)	Esangweni (41 mins)	J Dumane (45 mins)

6. **Conclusion:** The above arrangement will be assessed on a monthly basis to determine its effect on district neonatal and obstetric beds. Both Department of Health (DoH) and City of Ekurhuleni (CoE) clinics must follow the above manner of handling such referrals, especially during diverts.

Regards


MR. T. MAGORO
CHIEF DIRECTOR

Date:

10/11/20

APPENDIX J17: CONSUMERS LIAISON ACTIVITIES

quarters	Community dialogues	Field visits	Meeting with health care workers
2011-12-Q1	Women's health (1)		
2011-12-Q2	Women's health (3)		
2011-12-Q3	Women's health (3)		
2011-12-Q4	Women's health (24): 30,899; Healthy lifestyle (3): 7526; Chronic diseases (16): 4053; HAST (31): 8805; <u>IEC materials:</u> Healthy lifestyles (736); HAST(282,213); Non communicable (1860); Women (14,880); Medico Legal (201); Mental Health (10); Service standards/ patient's rights (28)		Traditional healers and community health workers (72): 205
2012-13-Q1	Women's health (3)	Healthy lifestyles campaign	
2012-13-Q2	Women's health (3)		
2012-13-Q3	Women's health (2)	Outreach programmes covering limited areas	
2012-13-Q4	Women's health (2)		
2013-14-Q1	Women's health (3)		
2013-14-Q2	Women's health (3)		
2013-14-Q3	Women's health (2)		WBOT team leaders trained (1): 5
2013-14-Q4	Women's health (2)		WBOT team leaders trained (1): 5
2014-15-Q1	Women's health (3)		
2014-15-Q2	Women's health (2)	Participated in cervical cancer screening campaign in the district (3). Participated in Mentor mother training Household visits with CHW developed a better understanding of issue in the community Inter-institution benchmarking.	Support inclusion of Maternal and Child Health component in WBOTs induction
2014-15-Q3	Women's health (2)		
2014-15-Q4	Women's health (2)		
2015-16-Q1		Support visits with School Health teams (1)	Developed a Support Programme with School Health team according to their identified needs and the first training conducted (1): 40 school health nurses
2015-16-Q2	Participated in community dialogue in the South Sub district Supported Nigerian Department of Health visit to MOU. Assisted MRC visits to	Cervical cancer screening campaign in the district (3). Mentor mother training Household visit with community health workers	Conduct in-service training of CHW based on their findings in the community Developed a Support Programme with School Health according to their

quarters	Community dialogues	Field visits	Meeting with health care workers
	hospitals & CHCs.	•	identified needs. (training the school health nurses).
2015-16-Q3	Women's health (1)		School health workshop (1): 63
2015-16-Q4	Women's health (1)		School health workshop (1)
2016-17-Q1	Women's health (1)	Household visit with community health workers	Participated in planning for community dialogue at the East sub-district
2016-17-Q2	Women's health (1)		Integration of WBOTs with CPF from local government, to encourage working together within the community School health nurse training (1): 1
2016-17-Q3	MCWH team with community activities		AiTA project which uses cell phones as data collection tool , which started in Tshwane is being rolled out in Ekurhuleni
2016-17-Q4	MCWH team with community activities		
2017-18-Q1	Women's health (1)		Attended Aita Workshop for WBOTs on the introduction of Cell phones to submit health information to the clinic supervisor
2017-18-Q2	Women's health (1)		
2017-18-Q3	Women's health (1)		
2017-18-Q4	Women's health (1)		
2018-19-Q1	Women's health (1)		
2018-19-Q2	Women's health (1)		
2018-19-Q3	Women's health (1)		
2018-19-Q4	Women's health (1)		
2019-20-Q1	Women's health (1)		
2019-20-Q2	Women's health (1)		
2019-20-Q3	Women's health (1)		
2019-20-Q4	Women's health (1)		

**APPENDIX J18.1: LIST OF DISTRICT MANAGEMENT COMMITTEE MEETING
ATTENDED BY DCST**

	Date of District Management Committee meetings		
2012-13-Q2	27/07/2012	31/08/2012	28/09/2012
2012-13-Q3	26/10/2012	30/11/2012	
2012-13-Q4	25/01/2013	22/02/2013	29/03/2012
2013-14-Q1	26/04/2013	31/05/2013	28/06/2013
2013-14-Q2	26/07/2013	30/08/2013	27/09/2013
2013-14-Q3	25/10/2013	29/11/2013	
2013-14-Q4	31/01/2014	28/02/2014	28/03/2014
2014-15-Q1	25/04/2014	30/05/2014	27/06/2014
2014-15-Q2	25/07/2014	29/08/2014	26/09/2014
2014-15-Q3	31/10/2014	28/11/2014	
2014-15-Q4	30/01/2015	27/02/2015	27/03/2015
2015-16-Q1	24/04/2015	29/05/2015	26/06/2015
2015-16-Q2	31/07/2015	30/08/2015	25/09/2015
2015-16-Q3	30/10/2015	27/11/2015	
2015-16-Q4	29/01/2016	26/02/2016	25/03/2016
2016-17-Q1	29/04/2016	27/05/2016	24/06/2016
2016-17-Q2	29/07/2016	26/08/2016	30/09/2016
2016-17-Q3	28/10/2016	25/11/2016	
2016-17-Q4	27/01/2017	24/02/2017	31/03/2017
2017-18-Q1	28/04/2017	26/05/2017	30/06/2017
2017-18-Q2	28/07/2017	25/08/2017	29/09/2017
2017-18-Q3	27/10/2017	24/11/2017	
2017-18-Q4	26/01/2018	23/02/2018	30/03/2018
2018-19-Q1	27/04/2018	25/05/2018	29/06/2018
2018-19-Q2	27/07/2018	31/08/2018	28/09/2018
2018-19-Q3	26/10/2018	30/11/2018	
2018-19-Q4	25/01/2019	22/02/2019	29/03/2019
2019-20-Q1	26/04/2019	31/05/2019	28/06/2019
2019-20-Q2	26/07/2019	30/08/2019	27/09/2019
2019-20-Q3	25/10/2019	29/11/2019	
2019-20-Q4	31/01/2019	28/02/2019	27/03/2019

Last Friday of each month (27th July, 31st August & 28th September)

**APPENDIX J18.2 TEMPLATE FOR MONTHLY REPORTING TO EKURHULENI DISTRICT
HEALTH MANAGEMENT TEAM**



**EKURHULENI HEALTH DISTRICT
DISTRICT CLINICAL SPECIALIST TEAM**

DISTRICT HEALTH MANAGEMENT TEAM MEETING REPORT: MONTH/ YEAR

DISTRICT CLINICAL SPECIALIST TEAM

1. Training & supervision conducted

Activities	Target	Actual (no of participants)	Impact on indicators	Impact on non-indicators	Reasons for not achieving target
				•	

2. Audit/Research/Data analysis

Activities	Target	Actual	Impact on indicators	Impact on non-indicators	Reasons for not reaching target

3. Clinical Governance

Activities	Target	Actual	Impact on indicators	Impact on non-indicators	Reasons for not reaching target

4. Risk management & legal activities

Complaints/cases	Activity	Impact on indicators	Impact on non-indicators

5. Meetings/Workshops

Name	No	Activity (presented/ participated)	Agenda	Conducting authority	Impact on indicators	Impact on non-indicators

6. CHALLENGES

Challenges	Interventions done	Outcomes

7. MITIGATION STRATEGIES

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APPENDIX J19: TEMPLATE of EKURHULENI DISTRICT HEALTH COUNCIL TECHNICAL COMMITTEE MEETING AGENDA



EKURHULENI HEALTH DISTRICT



AGENDA

DISTRICT HEALTH COUNCIL TECHNICAL COMMITTEE (DHCTC) MEETING TO BE HELD ON THE 8th APRIL 2019 AT THE CHIEF DIRECTORS BOARDROOM

NO.	ITEM	RESPONSIBLE
1.	OPENING AND WELCOMING	
2.	ATTENDANCE REGISTER	All Member
2.1	ATTENDANCE	
2.2	APOLOGIES: Ms. M. Semanya.	
3.	ANNOUNCEMENTS	All Members
4.	CONFIRMATION OF THE AGENDA	All Members
5.	ADOPTION OF THE PREVIOUS MEETING HELD 11 3 2019	All Members
6.	MATTERS ARISING FROM PREVIOUS MINUTES	
6.1	Matters arising from previous minutes dated 11 3 2019	All Members
7.	PRESENTATIONS	
7.1		
7.2		
8.	TASK TEAM REPORTS / PRESENTATIONS ON TERMS AND REFERENCE	
8.1	Audit & Information	
8.2	Pharmaceutical Task Team	Mr M Mashigo & Ms T. Burisch
8.3	Human Resource and Finance Report	Mr T. Kruger & Mr D. Nkosi
8.4	Training Report	Mr T. Kruger
8.5	District Service Delivery Task Team	Ms L. Motihale / Ms E. Mashigo
8.6	J.M.T Report s for Sub-District	(N) Ms L Nhleko / (E) Ms F Joubert / (S) Ms E Stegman
8.7	EMS	Ms D. Barnard / Ms Lelaka
8.8	District Specialist Team	Dr J. Basu / Dr Bapela
9.	STANDARD ITEMS	
9.1	Ward Based Outreach Team (WBOT)	Dr L. Thomas
9.2	Ideal Clinics	Ms E. Mashego
9.3	National Core Standards	Ms B. Peloagae
9.4	Ntirhlsano	Mr. C. Modise / Ms L. Motihale
10.	NEW MATTERS	
11.	DATE AND TIME OF NEXT MEETING	All Members
	The next meeting 13 th May 2019.	
12.	CLOSURE	All Members

APPENDIX J20: LIST OF DISTRICT QUARTERLY REVIEW MEETINGS ATTENDED BY DCST

quarter	Date of District Quarterly Review Meeting
2012-13-Q2	
2012-13-Q3	22/02/2013
2012-13-Q4	None
2013-14-Q1	02/08/2013
2013-14-Q2	15/11/2013
2013-14-Q3	24/01/2014
2013-14-Q4	26/05/2014
2014-15-Q1	None
2014-15-Q2	24/11/2014
2014-15-Q3	None
2014-15-Q4	15/07/2015
2015-16-Q1	11/09/2015
2015-16-Q2	03/12/2015
2015-16-Q3	25/02/2016
2015-16-Q4	23/05/2016
2016-17-Q1	06/07/2016
2016-17-Q2	19/09/2016
2016-17-Q3	15/11/2016
2016-17-Q4	31/05/2017
2017-18-Q1	30/08/2017
2017-18-Q2	29/11/2017
2017-18-Q3	11/05/2018
2017-18-Q4	18/07/2018
2018-19-Q1	03/08/2019
2018-19-Q2	12/12/2018
2018-19-Q3	14/03/2019
2018-19-Q4	19/06/2019
2019-20-Q1	None
2019-20-Q2	None
2019-20-Q3	25/10/2019
2019-20-Q4	None

*District quarterly review meetings were not regular

APPENDIX J21: LIST OF PROVINCIAL QUARTERLY REVIEW MEETINGS ATTENDED BY DCST

quarter	Date of Provincial Quarterly Review Meeting*
2012-13-Q2	12/11/2012–14/11/2012 (provincial induction)
2012-13-Q3	13/02/2013–15/02/2013
2012-13-Q4	05/06/2013–07/06/2013
2013-14-Q1	None
2013-14-Q2	14/10/2013-16/10/2013
2013-14-Q3	None
2013-14-Q4	05/03/2014 – 07/03/2014
2014-15-Q1	None
2014-15-Q2	None
2014-15-Q3	None
2014-15-Q4	30/03/2015
2015-16-Q1	27/07/2015
2015-16-Q2	06/11/2015
2015-16-Q3	None
2015-16-Q4	23/05/2016
2016-17-Q1	07/04/2016
2016-17-Q2	29/08/2016
2016-17-Q3	21/11/2016
2016-17-Q4	09/03/2017
2017-18-Q1	31/05/2017
2017-18-Q2	30/08/2017
2017-18-Q3	29/11/2017
2017-18-Q4	None
2018-19-Q1	30/05/2018
2018-19-Q2	29/08/2018
2018-19-Q3	28/11/2018
2018-19-Q4	12/12/2018
2019-20-Q1	None
2019-20-Q2	16/08/2019
2019-20-Q3	13/11/2019
2019-20-Q4	12/02/2020

*Provincial meetings were conducted by province and was not regular

APPENDIX J22: SAMPLE OF ENGAGEMENT WITH NATIONAL DEPARTMENT OF HEALTH

Agenda

Chair: Dr Y Pillay, DDG HIV, TB and MNCWH&N, NDOH

Date/Time: 16 October, 2015; 10am-12pm

Venue: CIVITAS Building NP118

Meeting between the National Department of Health's DCST teams and the South African Society of Anaesthesiologists (SASA)

Time	Activity	Person
10:00-10:10	Welcome, Introductions and Apologies	Dr Y Pillay
10:10-10:20	Purpose of the Meeting ¹	Dr Y Pillay
10:20-10:30	Introduction to SASA and its objectives	Dr N Zimmerman
10:30-10:50	Understanding the current provision of anaesthesia services in the Districts	Dr Zane Farina SASA-NCEMD
10:50-11:20	What information do we still need and how do we achieve this?	Dr. Hyla Kluyts
	-What is currently captured	Discussions (all provinces)
	-What additional information should be gathered/measured	Discussions (all provinces)
	-Introduction to SASA's Anaesthetic Network of South Africa and SASA's Manpower survey	Discussions (all provinces)
11:20-11:45	Issues currently of concern	Dr Z Farina (Prof C Lundgren)
	-Provincial specific resources (Limpopo and Northern Cape)	Discussions (all provinces)
	-Communication and access to resources	Discussions (all provinces)
11:45-11:55	Way Forward	Dr Y Pillay
11:55-12:00	Closure and next meeting	Dr Y Pillay

¹ Purpose of the meeting would be understanding the provision of anaesthesia services within South Africa, specifically within the less urbanised areas and within the public sector; developing ways to work together to gain greater understanding of the situation, resources and issues; looking at areas of greatest need; identifying ways in which SASA may be able to assist in those areas of greatest need; establishing a stronger access to SASA and its resources for the DCST teams; establishing communication channels; and agreeing the overall way forward.

APPENDIX J23: SUMMARY OF DCST INTERVENTIONS FOR IMPROVEMENT OF CLINICAL INDICATORS

Challenges	DCST interventions
Family planning and Reproductive health	
Low Couple year protection rate still a challenge.	- Onsite mentoring - Whatsapp consultation - Advocated for more stock for injectable contraceptives
Not all FP Methods in place; Inadequate staff to implement family planning adequately as same staff provide multiple services; Poor infrastructure at PHC clinics	- Advocated for improved staff complement - Excessive removal of Implanon: motivation & patients counselling to continue.
	Elective Tubal ligation improving but continue to be motivated
IUCD insertion rate almost zero	- Advocate and support to improve IUCD use - For IUCD - MCWH manager (COE) agreed to procure instruments for COE clinics. - Training for some of Province clinics conducted, clinicians still being mentored for IUCD insertions . - TPTH, TMRH and BGH inserting IUDs already.
Long term contraceptives (IUCD/ Implanon) not well accepted among clients.	Advocated for improved staff complement
Family Planning records not used (Still out of stock in the district.	Advocated for more stock
Although there's at least one trained Prof. Nurse in each clinic on the Implanon implant insertions/removals, some clinics still report zero insertions/removals in other months. Hospitals are still receiving referrals from clinics to remove implants.	Audits to be conducted in all clinics on the number of staff trained on Implanon implant insertions/removals so that clinics are assessed on why the service is not offered.
Family planning implemented in MOUs and hospitals post-delivery; High volume voluntary sterilization service unavailable	Obstetrician in the specialist team to look at speeding up the implementation of the high volume voluntary female sterilization service
Only 5 facilities are implementing 1st trimester TOP services; 2nd trimester TOP services not available;	Ekurhuleni Hospitals to assist with 2nd Trimester TOP services
TOP service very limited (higher level managers sometimes are the block; conscientious objection)	- Advocated for improved staff complement - TOP services should be re-initiated at the facilities where it was functioning previously.
First trimester CTOP done in 4-5 facilities out of 13, No 2nd trimester services.	- TOP services should be re-initiated at the facilities where it was functioning previously. - Province to assist in advocating for second trimester service in hospital
Antenatal	
Low uptake of antenatal care before 20 weeks.	Advocate and support campaigns to improve early ANC bookings
- High risk antenatal patients referred back to clinics for management. - No Dedicated doctor at ANC at the District hospital is a concern.	- Support the district hospital in Maternal and child health care - Hospitals should see high risk patients up to 6weeks. - To motivate for a dedicated ANC doctor at the District hospital.
ANC not everyday, first visits not	Advocated for improved staff complement

Challenges	DCST interventions
everyday (South and Eastern sub-district).	First visit should be available everyday for advanced pregnancy & high risk pregnancy.
- Rotation of staff still affecting quality of care in ANC. - ANC not available every day at the PHCs. - Some facilities still not implementing recommendations after auditing of patient's records.	- Advocated for improved staff complement and norms and retention of skilled staff (clinics, MOUs & Hospitals). - PHC Clinics should seek assistance from DCST for clinical matters on a regular basis. - PHC clinics are empowered by regular in-service trainings & assisted by regular telephonic consultation with DCSTs regarding clinical issues. Proper management & reducing unnecessary referral to the hospitals. - Hospital Clinical Managers to support DCST to implement recommendations.
ANC 1st visits not done every day, in some clinics.	- Antenatal care workshop. - ANC to be run daily not on booking and first visit for advanced pregnancy and high risk pregnancy. - Doctors to review ANC patients at least once in their pregnancy as according to the guideline.
Syphilis testing in the clinics is done but there's delay in getting results for ANC clients. Many go into labour without syphilis results.	Point of care syphilis testing to be procured for the PHC clinics
- Kick chart are not used in the ANC service-resulting in fresh stillbirths. - Mothers Blood group not done at ANC only RH bloods done and ABO also needs to be done to identify high risk babies due to high rate of Babies with severe Jaundice	- Antenatal care workshop. - Doctors to review ANC patients at-least once in their pregnancy as according to the guidelines. - Early warning charts are used in all MOUs. - Sonar is done in MOUs for ANC clients, referring clinic refer pregnant women for Sonar at MOUs. - PHC clinics are empowered by regular in-service trainings & assisted by regular telephonic consultation with DCSTs regarding clinical issues. Proper management & reducing unnecessary referral to the hospitals. - Most of the hospitals have reducing trend of maternal deaths. - Algorithms were developed for emergency obstetrics management for PHC clinics and MOUs - Point of care syphilis testing a challenge for ANC clients
- Despite multiple trainings on Antenatal care for nurses the quality of ANC is still not meeting the standards in many facilities. High Still Birth rates esp. Macerated Stillbirths. - High staff turnover and staff rotation impacting on skilled attendants at point of care.	- Strengthen antenatal care through ANC training and auditing. - Strengthen adherence to protocols in PHC clinics. - Advocate for improved staffing and non –rotation of staff (Newborn care). - Collaboration in interventions at primary level of MCWH EMM and Province with the support of DCST
- Some clinics still provide ANC first visits on a booking system - PHC clinics not attending the ANC training. - Syphilis testing in the clinics is done but there's delay in getting results for ANC clients. Many go into labour without syphilis results.	- Staff shortage should be dealt as a priority at the facilities. - ANC clinics & first ANC visit should be done everyday (Ideal clinic system might be the solution). - ANC card, Partogram to be filled up by maternity staff for all patients. - Point of care test for Syphilis to be implemented to get results early.
Viral load results not written on maternity case records when referring MOU and Hospital for delivery	- Viral load must be checked - Support clinics to improve Viral load recording during ANC in collaboration with HAST and sub-

Challenges	DCST interventions
	- district coordinators - HIV related bloods to be done as per protocol for ANC clinics
Some clinics still provide ANC first visits on a booking system	ANC clinics & first ANC visit should be done everyday (Ideal clinic system might be the solution).
ANC improving in providing daily first visits, some still booking. This work in progress	MOU are assisted for fire-drills
Syphilis treatment a challenge due to lack of Bicillin injection	- DCST intervened with the Pharmacy - ANC improving in providing daily first visits, some still booking. This work in progress
Daily ANC 1st visit still a challenge .	Advocated for improved staff complement
ANC <20 weeks visit is improving although target is not met.	Advocated for improved staff complement
First visit rate (steadily improving although target not met)	- ANC workshop - Onsite mentoring - Whatsapp consultation - Risk management
Low ANC visits before 20 weeks rate (65%)	- ANC workshops to continue - Clinical on-site mentoring - Regular supervision visits at clinics - All time WhatsApp consultation
Intranatal	
The majority of MOUs not meeting the target of 5 deliveries per day;	MOUs to put more effort in increasing the number of deliveries to reach the target
- Some MOUs having a very low delivery rate (costly) resulting in mal-distribution of staff at the MOUs. - Delivery services in TMRH (previously called NH) & PH still a major challenge.	Onsite mentoring
Fire drills (EOST) are not done in hospitals	- Regular ESMOE trainings conducted. Most of the hospitals have reducing trend of maternal deaths. - Hospitals to do fire drills at least one once a month - MOUs to conduct fire drills with the assistance of DCST.
Total deliveries in MOUs increased except Kwa-Thema MOU.	Planned interventions: On-site clinical mentoring
- Poor implementation of guidelines and protocols in some facilities - Low delivery rate in some of the MOUs (Kwa-Thema and Nokuthela MOUs) - Staff shortage	- ANC workshop - Onsite mentoring - Whatsapp consultation
- TMH having large number of deliveries which is a challenge for their inadequate infrastructure. - Staff shortage at TMH, PH & BGH. - Four MOUs have low delivery rates - Total deliveries in MOUs increased except Kwa-Thema MOU.	- Onsite mentoring - Whatsapp consultation
Postnatal	
PNC not done in PHC clinics and where it is done its not recorded.	- Special risk post-natal patients to be seen at hospitals - Service level agreement to include PNC visits of 3 to 6 days babies for Primary health Care clinics
Postnatal visits rate (steadily improving although target not met)	- Postnatal workshop - Onsite mentoring - Whatsapp consultation
Mother PNC visit within 6 days dropped	Onsite mentoring

Challenges	DCST interventions
after it was moved to PHC facilities	Whatsapp consultation
Outcome	
- Maternal mortality increasing - Neonatal mortality: High in PH (Chronically short-staffed and high staff turnover rate, lack of Neonatal beds) - Neonatal Mortality in TMRH increasing	- Regular On-site clinical mentoring in MOUs, PHC Clinics & Hospitals. - Scaling up ESMOE, EOST drills
Maternal Mortality increase due to 2 big hospitals not having HODs in November and December	Support two hospitals
- Maternal Mortality increased: root cause analysis done which showed: - increased numbers of deaths on arrivals at CHCs. Suspected foul play at home. - TMRH increasing number of maternal deaths. - District hospital having increased number of maternal deaths.	MOUs & hospitals are assisted for fire-drills. - Quality improvement cycles on maternity case records - Planned interventions: On-site clinical mentoring and Fire-drills
- increased due to DOAs increasing and Postmortems not done as cause is unknown, and Maternal deaths in the South increased. - Increased maternal deaths in BGH. Poor service delivery issues & irregular MMR meetings.	Planned interventions: On-site clinical mentoring and Fire-drills
- Stillbirth rate is still a challenge. - Maternal mortality is going up with TPTH and TMRH the highest.	- Fire-drills-to be continued in hospitals and MOU's. - Trainings designated to reduce Maternal and Child Mortality to be prioritised. - Neonatal Strategic Plan and HHAPI-NeSS to be implemented to reduce Neonatal Mortality.
- District hospital: No maternal deaths since last 8 months - CHCs maternal deaths: only 1 death on arrival	- Regular clinical work & mentoring - ESMOE Firedrills - MMR meetings - Risk management - Monitoring & Evaluation
- HIGH MMR (116) - Non-attendance of clinic managers at mortality meeting to address avoidable factors. - Lack of training material: emergency Triaging and treatment training cannot be implemented . - Clinic managers/sisters should attend maternal mortality meetings at the referral hospital.	- TMRH referral chain needs to be modified. - TMRH needs more staff. - PH needs 1 more specialist Obstetrician. - Recurrent death on arrival at CHCs needs to be assisted by community involvement & WBOT involvement in East & North sub-district. - To improve clinical communication with DCST by the facilities.
- Maternal mortality rate has increased in Q2 - Maternal mortality still a challenge in TMRH (highest) - Stillbirth rate has improved.	- Onsite mentoring - Whatsapp consultation
- MMR still a challenge but met the target in 3rd quarter. - TMRH still having high MMR. - Stillbirth rate declining persistently.	- Onsite mentoring - Whatsapp consultation
analysed maternal deaths focussing on causes. (2013-14-Q4)	To collaborate with MCWH re analysing Maternal Deaths and reporting. Proper Surveillance of Maternal Deaths.

Challenges	DCST interventions
• Poor data management at facilities. Motivating & assisting the health facilities to improve data management. Poor record storage space at health facilities need to be addressed	Health Information staff to work with DCST to ascertain that data that is send from facilities is checked before it is send to Province and National.
Monitoring and evaluation	
• Hospitals not cooperative when recommendations are done esp. regional hospitals in taking responsibility for their data.	HIS employed HIS Officer to assist Hospitals with their data after recommendations from DCST Recommendation done after audits of patients records not implemented. 2014-15-Q1
• DHIS- DATA not verified. • Poor data management DCST data not correlating with DHIS (Maternal Mortality) 2014-15-Q2	To support to Hospitals and PHC with data quality
• Some facilities still not implementing recommendations after auditing of patient's records. 2014-15-Q4	To continue M & E annually.
• Hospitals not cooperative when recommendations are done esp. regional hospitals in taking responsibility for their data.	DCST assisted in collecting their data and entering in the District office because they are reluctant to do their data even after training has been done 2015-16-Q3
• Mother PNC visit within 6 days dropped after it was moved to PHC facilities. Challenges in capturing the data at DHIS.	Workshops done with the PHC clinics and hospitals
• Confusion to interpret the indicator "delivery under 18 years of age".	Workshops done with the PHC clinics and hospitals
Human resources	
• High staff turnover and rotation affecting quality of ANC, labour ward, (clinics & hospitals). • Shortage of Doctors and Nurses junior staff taking responsibility for complicated patients. • Sessional doctors at the district hospital is a matter of concern. They do not attend MMR meetings to address challenges concerning patient care.	• Advocate for improved staff complement and retention of skilled staff (clinics, MOUs) & especially in Hospitals (Newborn care). •
▪ 5Hs not well implemented; Shortage of staff to implement all 5Hs at all health facilities; Poor infrastructure to implement 5Hs adequately •	▪ District & Regional hospitals are working as a MOUs on a regular basis which need to be changed in order to implement 5Hs. ▪ Advocated for improved staff complement and infrastructure and equipment at health facilities in order to implement 5 Hs adequately.
• PHC supervisory visits not done	• PHC supervisory tool to be used to audit • PHC services by sub district coordinators and facility managers.

APPENDIX J24: CLINICAL WORK AT DISTRICT HEALTH FACILITIES

quarters	activities
2012-13-Q2	Labour Ward round & antenatal ward round at district hospital (weekly), ANC at MOU (4), ANC at PHC clinic (4)
2012-13-Q3	Labour Ward round & antenatal ward round at district hospital (weekly), ANC at MOU (4), ANC at PHC clinic (2)
2012-13-Q4	Gynae ward round at district hospital (weekly), ANC at MOU (3), ANC at PHC clinic (3)
2013-14-Q1	Labour Ward round & antenatal ward round at district hospital (weekly), IUCD insertion at PHC clinics (10), cervical cancer screening at CHC/PHC clinics (15)
2013-14-Q2	Gynae Ward round & antenatal ward round at district hospital (weekly); Clinical services rendered at PHC clinics for implementation of BANC (8), cervical cancer screening (4)
2013-14-Q3	Labour Ward round & antenatal ward round at district hospital (weekly, ANC at MOU (4), ANC at PHC clinic (4))
2013-14-Q4	Labour Ward round & antenatal ward round at district hospital (weekly), Clinical services rendered at PHC clinics for implementation of BANC (6), Implanon insertion (5), cervical cancer screening (4)
2014-15-Q1	Gynae Ward round at district hospital (weekly), ANC at MOU (3), ANC at PHC clinic (3), cervical cancer screening (3)
2014-15-Q2	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (2) (periodically), tertiary hospital (1) as necessary.
2014-15-Q3	Labour Ward round & antenatal ward round at district hospital (weekly), Ward round at regional hospitals (2), ANC at MoUs (3); and telephonic consultation
2014-15-Q4	Labour Ward round & antenatal ward round at district hospital (weekly), ANC at regional hospital (1), ANC at MoUs (2) and telephonic consultation
2015-16-Q1	Gynae Ward round at district hospital (weekly), ANC at MoUs (3) and telephonic consultation
2015-16-Q2	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (4) (periodically), ANC at MOU (3), ANC at PHC clinic (2), tertiary hospital (1) as necessary.
2015-16-Q3	Labour Ward round & antenatal ward round at district hospital (weekly), ANC at MoUs (3), ANC at PHC clinic (2), and telephonic consultation
2015-16-Q4	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (4) (periodically), tertiary hospital (1) as necessary, provide telephonic clinical assistance as & when necessary.
2016-17-Q1	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (4) (periodically), tertiary hospital (1) as necessary; provide telephonic clinical assistance as & when necessary.
2016-17-Q2	Gynae Ward round at district hospital (weekly), TOP clinic at district hospital, ANC at regional hospital (1), ANC at MOU (2), ANC at PHC clinic (3), provide telephonic clinical assistance as & when necessary.
2016-17-Q3	Labour Ward round & antenatal ward round at district hospital (weekly), TOP clinic at district hospital regional hospitals (2) (periodically), provide telephonic clinical assistance as & when necessary.
2016-17-Q4	Gynae Ward round at district hospital (weekly), regional hospitals (2) (periodically), tertiary hospital (1) as necessary; provide clinical assistance through telephone and WhatsApp as & when necessary.
2017-18-Q1	Labour Ward round & antenatal ward round at district hospital (weekly), ANC at regional hospital (1), ANC at MOU (3), ANC at PHC clinic (3), provide clinical assistance through telephone and WhatsApp as & when necessary.
2017-18-Q2	Gynae Ward round at district hospital (weekly), regional hospitals (2) (periodically), Provide clinical assistance through telephone and WhatsApp as & when necessary.
2017-18-Q3	Gynae Ward round at district hospital (weekly), regional hospitals (1) (periodically), ANC at MOU (3), ANC at PHC clinic (3), provide clinical assistance through telephone and WhatsApp as & when necessary.
2017-18-Q4	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (3) (periodically), ANC at MOU (4), ANC at PHC clinic (4), provide clinical

quarters	activities
	assistance through telephone and WhatsApp as & when necessary.
2018-19-Q1	Gynae Ward round at district hospital (weekly), regional hospitals (1) (periodically), provide clinical assistance through telephone and WhatsApp as & when necessary.
2018-19-Q2	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (2) (periodically), tertiary hospital (1) as necessary; ANC at MOU (4), ANC at PHC clinic (4), provide clinical assistance through telephone and WhatsApp as & when necessary.
2018-19-Q1	Gynae Ward round at district hospital (weekly), regional hospitals (3) (periodically), provide clinical assistance through telephone and WhatsApp as & when necessary.
2018-19-Q2	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (2) (periodically), ANC at MOU (3), ANC at PHC clinic (5), provide clinical assistance through telephone and WhatsApp as & when necessary.
2018-19-Q3	Labour Ward round & antenatal ward round at district hospital (weekly), TOP clinic, regional hospitals (1) (periodically), tertiary hospital (1) as necessary; Provide clinical assistance through telephone and WhatsApp as & when necessary.
2018-19-Q4	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (1) (periodically), ANC at MOU (2), ANC at PHC clinic (2), provide clinical assistance through telephone and WhatsApp as & when necessary.
2019-20-Q1	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (2) (periodically), ANC at MOU (3), ANC at PHC clinic (2), provide clinical assistance through telephone and WhatsApp as & when necessary.
2019-20-Q2	Antenatal ward round at district hospital (weekly), regional hospitals (2) (periodically), tertiary hospital (1) as necessary; ANC at MOU (2), ANC at PHC clinic (4), provide clinical assistance through telephone and WhatsApp as & when necessary.
2019-20-Q3	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (2) (periodically), ANC at MOU (2), ANC at PHC clinic (3), provide clinical assistance through telephone and WhatsApp as & when necessary.
2019-20-Q4	Labour Ward round & antenatal ward round at district hospital (weekly), regional hospitals (1) (periodically), ANC at MOU (2), ANC at PHC clinic (3), provide clinical assistance through telephone and WhatsApp as & when necessary.

APPENDIX K: OBJECTIVE 4: DATA COLLECTION TOOLS

APPENDIX K1: INDEPTH INTERVIEW GUIDE FOR DISTRICT/SUB-DISTRICT MANAGERS

Study no: _____ Date: _____

Demographic Characteristics:

The participant's demographic characteristics such as professional background, and experiences in maternal health services and Ekurhuleni District will be enquired

Position: _____

No of years working with maternal health services _____

No of years working at the Ekurhuleni District _____

No of years working in present position _____

Questionnaire interview guiding questions on Ekurhuleni District Clinical Specialist Team for District/Sub-district Managers

Question: Could you share with me about your views about maternal health services in the Ekurhuleni District?

Probes:

1. How is your District/ Sub-district performing in terms of maternal health services?
2. Please tell me about challenges/ barriers you face in the delivery of maternal health services. How do you deal with them?

Question: Could you please share with me some information about your working experience with District Clinical Specialist Team?

Probes:

1. Can you tell me what you know about the District Clinical Specialist Team at the Ekurhuleni District?
2. Elaborate the role of this team at the district
3. Discuss the role of each team member separately of this team. Please explain
4. How do you feel about their effectiveness In the District?
5. In your view, what are the factors that might affect the functionalities of DCST in your District?

Any other comments would you like make about the DCST at the Ekurhuleni district.

APPENDIX K2: INDEPTH INTERVIEW GUIDE FOR FACILITY LEVEL MANAGERS AND CHIEF EXECUTIVE OFFICERS OF THE HOSPITALS AND HEALTH PROFESSIONALS WORKING IN THESE FACILITIES

Study no: _____ Date: _____

DEMOGRAPHIC CHARACTERISTICS

The participant's demographic characteristics such as professional background, and experiences in maternal health services and Ekurhuleni District will be enquired

Position: _____

No of years working as a maternal health services manager/ health professionals _____

No of years working at this facility/hospital _____

No of years working in present position _____

Questionnaire interview guiding questions on Ekurhuleni District Clinical Specialist Team- CHC maternal health services operational managers, Chief Executive Officer of the Hospitals and health professionals working in these facilities

Question: Could you share with me about your views about maternal health services in the Ekurhuleni District?

Probes:

- How is your District/ Sub-district performing in terms of maternal health services?
- Please tell me about challenges/ barriers you face in the delivery of maternal health services. How do you deal with them?

Question: Could you please share with me some information about your working experience with District Clinical Specialist Team?

Probes:

- Can you tell me what you know about the District Clinical Specialist Team at the Ekurhuleni District?
- Elaborate the role of this team at the district
- Discuss the role of each team member separately of this team. Please explain.
- How do you feel about their effectiveness In the District?
- In your view, what are the factors that might affect the functionalities of DCST in your District?

Any other comments would you like make about the DCST at the Ekurhuleni district.

APPENDIX K3: INFORMATION SHEET

Dear Participant

Re: Invitation to participate in a research study

Good morning. Hope you are well. My name is _____. I am a researcher in the School of Clinical Medicine of the University of the Witwatersrand and am doing a research study. I am inviting you to be part of this study to evaluate the effect of district clinical specialist teams on the maternal and women's health services at the Ekurhuleni District.

If you agree to participate, I will interview you about your knowledge and perception of the DCST and their possible effects on maternal health indicators in the District and this interview will be recorded (audio-taped). The interview will take about 30-45 minutes, and will be performed privately here at your office, away from anyone that may overhear us.

Your participation in this study is completely voluntary. There will be no negative consequences if you do not want to participate and you can withdraw your participation at any time. There will also be no direct benefit to you if you participate in this study however.

All the information collected from you will be anonymous and we will not be able to identify individuals by name. I will endeavour to keep all information confidential. Organizations such as the Human Research Ethics Committee (medical) of the University of the Witwatersrand may inspect our research records for quality assurance purposes. Ethical approval for this study will be obtained from the University of the Witwatersrand Human Research Ethics Committee (medical) and also from the Ekurhuleni District Research Ethics Committee.

If you have any further questions, you can contact the investigators whose details are listed below.

Prof A Stewart (supervisor)
University of the Witwatersrand
Tel:
Email: Aimee.stewart@wits.ac.za

Dr JK Basu (researcher)
University of Witwatersrand
Tel: (011) 878 8622
Email: Jayati.Basu@wits.ac.za

You can also contact the chairman of the University of the Witwatersrand Human Research Ethics Committee (Medical) Professor P Cleaton-Jones who is responsible for overseeing the ethical aspects of this study on (011) 717-1234.

Thank you for taking your time to read and consider this.

Yours sincerely

APPENDIX K4: CONSENT FOR SEMI-STRUCTURED INTERVIEW

Study no: _____ Date: _____

I hereby declare that I have been given and read the information sheet on the study titled;

Evaluation of the effect of district clinical specialist team on the maternal and women's health services at the Ekurhuleni District

I confirm that the researcher has explained to me in clear language and that I have read and understood the following from the information sheet;

- The study is about the evaluation of the effect of the district clinical specialist team on the maternal and women's health services at the Ekurhuleni District.
- I understand that the researchers will make every effort to ensure confidentiality, and that my name will not be used in the study, and that comments or views that I make will not be reported back to anybody at the hospital.
- I know that my participation is voluntary and I can withdraw from the study at any time without any negative consequences
- My participation will not affect my work or professional relationships in my workplace in any way.
- My participation in this study will not benefit to me personally

If you would like to participate in this study, please sign below;

Participant's signature: _____ Date: _____ Place: _____

Witness: _____ Date: _____ Place: _____

I hereby agree to participate in the study. Participant's signature: _____

APPENDIX K5: CONSENT FOR AUDIO-RECORDING DURING IN-DEPTH INTERVIEWS

Study no: _____

Date: _____

I hereby declare that I have been given and read the information sheet on the study titled;

Evaluation of the effect of district clinical specialist team on the maternal and women's health services at the Ekurhuleni District

I confirm that the researcher has explained to me in clear language and that I have read and understood the following from the information sheet;

- The study is about evaluation of the effect of district clinical specialist team on the maternal and women's health services at the Ekurhuleni District.
- I understand that the researchers will make every effort to ensure confidentiality, and that my name will not be used in the study, and that comments or views that I make will not be reported back to anybody at the hospital.
- I know that my participation is voluntary and I can withdraw from the study at any time without any negative consequences.
- My participation will not affect my work or professional relationships in my workplace any way.
- Participation requires me to participate in an audio-recorded interview.
- My participation in this study will not benefit to me personally.

Please be aware that all recordings of this interview will be destroyed six years after publication of the results of the study. Where publication has not occurred, recordings will be destroyed 10 years after conclusion of the study.

I hereby agree that to be audio-recorded during my participation in this study:

Participant's signature: _____

Date: _____

Place: _____

Researcher: _____

Date: _____

Place: _____

APPENDIX L: OBJECTIVE 4: RESULTS

APPENDIX L1: CODING SHEET

THEME/ CONCEPT 1: CLINICAL EFFECTIVENESS

- **Category: Maintaining Clinical standard**
 - **Sub-category: Clinical support**
 - Code: support visit
 - Code: availability
 - Code: collaboration with MCWH
 - Code: reflection
 - Code: Integration of care
 - **Sub-category: Clinical support through mobile medicine**
 - Code: Telephonic and WhatsApp consultation
 - Code: Feed-back loop
 - **Sub-category: Availability of the skilled health worker at the point of service delivery**
 - Code: onsite/ in service training
 - Code: mentoring
 - **Sub-category: Accessibility**
 - Code: accessibility
 - Code: lack of public health facilities
 - **Sub-category: Referral**
 - Code: assist in referral
 - Code: assist in up-referral
 - Code: assist in down-referral
 - Code: establish referral route
 - **Sub-category: Effective patient transport systems**
 - Code: shortage of ambulance
- **Category: Clinical audit**
 - **Sub-category: Review of clinical records**
 - Code: review clinical records
 - Code: guideline implementation
 - **Sub-category: Operational research**
 - Code: operational research

THEME/ CONCEPT 2: CLINICAL RISK MANAGEMENT

- **Category: Risk to patients**
 - Code: Risk identification
 - Code: Risk management
- **Category: Maternal Mortality and Morbidity meeting**
 - Code: M&M meeting [organization](#)
 - Code: Support after M&M
- **Category: Risk to organization**
 - Code: Quality improvement plan Visit to facilities

THEME/ CONCEPT 3: PROFESSIONAL DEVELOPMENT

- **Category: In-service training**
 - Code: Topics covered during the in-service training
 - Code: Effects of in-service training
 - Code: Challenges associated with in-service training
- **Category: Competency standard**
 - Code: M&M meeting [organization](#)
 - Code: Support after M&M
- **Category: ESMOE**
 - Code: ESMOE training
 - Code: Effect of ESMOE training
- **Category: EOST**

- Code: EOST training
- Code: Effect of EOST
- **Category: On site staff mentoring**
 - Code: mentoring
- **Category: Identify opportunities and needs for formal education**
 - Code: introduction of new health technology

THEME/ CONCEPT 4: ACCOUNTABILITY FOR MATERNAL AND CHILD HEALTH

- **Category: Accountability to community**
 - **Sub-category: Community dialogue**
 - Code: patient compliance
 - Code: Liaison with health promoters
 - Code: Liaison with ward based outreach team
- **Category: Accountability to district management**
 - **Sub-category: Engagement with district management**
 - Code: Engagement with DHMTs and program managers
 - **Sub-category: Resource mobilization**
 - **Sub-category: Equipment, medication and consumables**
 - Code: Medical equipment and medication
 - Code: Other equipment and consumables
 - **Sub-category: Space**
 - Code: lack of space
 - **Sub-category: Human resources**
 - Code: lack of human resources

THEME/ CONCEPT 5: CLINICAL WORK

- **Category: Clinical responsibility**
 - Code: Clinical responsibility
- **Category: Clinical work at PHC clinics and hospitals**
 - Code: PHC clinics
 - Code: Hospitals

THEME/ CONCEPT 6: MONITORING AND EVALUATION

- **Category: Indicator (general)**
 - Code: DHIS
 - Code: APP
- **Category: MCWH Indicator**
 - **Sub-category: reproductive**
 - Code: cervical cancer
 - **Sub-category: Reproductive**
 - Code: couple year protection rate
 - **Sub-category: Antenatal**
 - Code: Antenatal booking
 - Code: Teenage pregnancy
 - **Sub-category: Intranatal**
 - Code: Delivery in facility

APPENDIX L2: THEMES AND CATEGORIES

THEME/ CONCEPT 1: CLINICAL EFFECTIVENESS

Categories	Codes	Quotes
Maintaining Clinical standard		
clinical support	support visit	P06 Midwife also support the midwife at the level of the clinic and the MOU. Paediatrician also & family physicians they come and cement here & there.
	support visit	P03: In fact, the DCST team, they supporting the programme very well, like in terms of if you find that there's a facility that is battling with one of the indicators, when you call them, they actually come and assist us on a time to time basis.
	support visit	P09: And also having <i>DCST-O&G</i> coordinating that our feeder hospital also assists because <i>O&G-HOU</i> comes sometimes for outreach to assist the clinics if we have challenges.
	support visit	P12: They offer that support, mostly they come and listen to our challenges and they try to deal with it, like they improved the way we working. They are there for consultation like <i>DCST-O&G</i> is always available.
	support visit	P12: They must not come only if there is case. If they can just come for moral support and that support can boost us and they must just come not only if we have a problem. We need a lot of support from them.
	support visit	P01: They go to the hospitals and they are not supposed to tell them when going, they come unannounced but that does not sit well with the 04's like they are invading and it's not correct, because they are there to support the hospitals and also the place, the facilities
	clinical support visit	P01: Isn't it the main role is that they were appointed to do clinical governance that's no 1 that is the main role and also technical support to the clinicians in facilities, both the PHC facilities and the hospitals.
	support visit	P01: More especially the dyads maybe it's because I'm working in closely with <i>DCST-O&G</i> and that advanced mid wife because if there's something like shortage that advance mid wife in the district clinical specialist team will go and work in the hospital, making sure that things are running smoothly.
	support visit	P18: I think the DCST team should be coming to the clinic more often especially when we are unable to go to them and for moral support. it would be good for me & my self- esteem as well when we have to meet down here to see if I am doing palpation the way I should be doing & actually seeing them practically with me. <i>DCST-O&G</i> P19: I think the one thing that we need is for them at least visit us every month, or even bi-monthly and checking

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	support visit	us in the facilities, the challenges and whatever we get, because sometimes you find that due to commitments we don't go to our monthly meetings.
	support visit	P19: but I think they should just put more effort in terms of their support visits , checking us like more often like individual facilities besides talking to us in the meetings. Let them come, follow us, they should just come and check us, we feel a little bit empowered. When they come, we know we are supported. We do need their support very much.
	support visit	P08: I would like to say that they must be more visible to us like managers because they come to our clinic and they are there, they are working,
	support visit	P08: Yes, yes, I do think they are effective. But like I said they are working like they go I don't even know that they are going, I am not even aware that today they would be visiting that facility that can, may be improved, like a roster to say that we are going. But that they are making a difference, I am always sure that they are making a difference.
	support visit outreach	P07: I think, you know, for me, main thing for us is that outreach , all of us need to go back. But its quite difficult. Its normally supposed to be done really. But most of the time for us to go the district to see what is happening. But we having this shortage, we cant really go.
	support visit	P14: Yes, not maybe, because what I've noticed we see them maybe twice a month, if it was possible that we see them maybe twice in a one week, you understand, that will be better.
	support visit	P15: In terms of support if they can have planned visit to the facilities as a team . I know like some of them come, especially the ones that are specifically for the maternal health.
	support visit	P16: Yea. Not much. They are visiting us yes but it is difficult for them to visit, so at least ones a month because mostly when they are coming, they are coming for a meeting or when we are having a challenge if there is a maternal death. If they can improve in visiting us , I would love that, though I know that sometimes it's difficult, but if they can come and check even if there is nothing and not only when there is a meeting.
	support visits	P09: I've found them to be very helpful, very assisting in helping out and although it is difficult sometimes to get, because they are all over but u- DCST-O&G who has made ukuthi just leave a WhatsApp then will answer, even to the lower categories. So I think everyone including myself are very comfortable to work with i-district in specialist , they've had impact, even though people might not see but they are good. P19: With the advanced midwife, I think we just need support in terms of managing the patients in the clinic , in terms of coming in for support visits and then maybe just checking if we are indeed in the right path so that if

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	support visits	ever there is a problem they don't come in later and say "but why didn't you do 1.2.3" whereas I will be thinking that I'm doing it right. And then with the one who's doing family planning for that one my expectation is for her to fulfil the implanon because if they can stand up as the district to say we are advocating for the implanon because of the advantages they have, the efficiency and whatever I think that one will be very much better for us as nurses. The PHC one, that one because she's not really doing the method for my side, I don't have much expectations for her. The challenges with that one I'm not sure of them so I can't really necessary say I'm expecting 1.2.3 from her.
	availability	P14: What I am saying is that they are overworked, they are here they will be calling them in a meeting somewhere. Sometimes they knock-off late. Sometimes you want them, they are in a meeting and sometimes they are doing this ESMOE and I think they really need to be more than one
	availability	P12: If you have got a patient that gives you problem and you see it's a challenge, you can just call her and ask some other things on the phone and she will advise you. Some of them they are user friendly I would say that.
	availability	P13: She (<i>DCST-O&G</i>) supports us. She's always available on the phone and when you have a problem she is always there, even if we have a problem in transfer, we tried everything we involve her. Then we have <i>DCST-PNURSE</i> for pediatrics, when we have problems she comes to training for neonatal resuscitation. <i>DCST-PAED</i>, she does come and also does PPIP. She's the one who comes and help us and then, because now they are busy even with the machine, we are using the wrong machines which was supposed to be used in hospitals. so now they are just helping us to, to not to make a mistake with the other one. Then we have <i>DCST-FMN</i> for reproductive system, IUCD. We call them. Some other times we don't care that this one is for what we just call them & get help. What I've realized that Ekurhuleni we are far better when you look at like COJ other clinics are coming this side.
	availability	P18: I know of <i>DCST-O&G</i>, I know of advanced mid-wife, that's the only people that I know. With <i>DCST-O&G</i> you call her now, she gives you what you need to be doing when you are dealing with a patient.
	availability	P19: For me I think we do need them. looking at the fact that we got those challenges that I've mentioned and most of the time they do try their best to address them. As much as at times when we are at the facility level, you can't get hold of any of them, it is frustrating
	availability	P15: I appreciate them. I will just appreciate all of them. <i>DCST-O&G</i>, they are making time for us, I know they have busy schedule. Just for them to be there for us, anytime when we have problems, they are within our reach. There is no day that I wanted <i>DCST_O&G</i> & I did not get her. There is no day that I wanted <i>DCST-AM</i>, I did not find her. They are always there. So they are always available. They are always willing to help us in the facilities. Yes sometimes it might be us that we don't know how they can help us. But when we have something, we come to them. We seeking for help, they are there, they are available, they are helpful, so I want to appreciate them

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		very much for that.
	support to the mcwh department	P01: They are working hand in hand with our maternal MCWH manager from this unit and also MCWH manager from local government. When they do the visits, they do them jointly.
	reflection	P01: And they also do what do we call it? The one you do investigation after the reflect, like for example people are going to reflect, where did we go wrong? If maybe there's somebody, maybe there's a mother who's passed on then they sit without maybe harassing the people that were there but supporting to say this must not happen again, they are doing that. So with me really I'm really impressed with the team.
	integration of care	P07: Yes mostly, because yah I think they are assisting because last time, yes, we had a maternal death here, I said let me just because it was coming from one of the level one hospital, I had to go there and see what was happening really. Sometimes we don't see really what they are doing but I was quite surprised really when I see what level 1 hospital was doing really. Most of the time we sit here & think that they are not doing quite much. But I was there really. This impression we had in past but that day when I went there, myself, I saw they are doing quite a lot. They are doing quite a lot to relieve the pressure what we are having here. But if you just sit here you won't know what is going on. So even myself I went to that hospital, I did sit with the sisters, doctors, since that day my impression changed. I told my Mo if those people need to send patients, don't refuse the patients, if they are stuck. I think, for me really, they are assisting a lot really. If you just sit here, you never realise. You don't visit those place really you never realise, those people are doing a lot. You never notice it if you just sit here.
Clinical support through mobile medicine	access	P19: Communication, we've got access. They gave us access. They've given us their phone numbers and we've got a WhatsApp group where we can ask whatever we need to ask.
	access	P14: In Ekurhuleni from my side, I won't talk for other people. I think they are giving me most support that I need. I don't feel alone. I have people around me that are helping me whenever I need help. It is not easy for a person who has got a family to wake up at 01:00 am just like as I do because we having problem with transferring, and the staff will be phoning me and saying we are struggling to get a space at whatever hospital. I would wake up and call <i>DCST-PAED</i> or <i>DCST-O&G</i> or whoever <i>DCST-AM</i> or <i>MCWH-AD (P02)</i> . I would be calling them and the most people I would be worrying is <i>DCST-O&G</i> and <i>DCST-PAED</i> . And I never had a problem in them not answering the phone, if they don't answer the phone the first call, the second call they will be answering. On my side, they are doing very well to me. But I don't know about other MOU's
	access	P17: Ok, this is team that is helping us a lot because they are accessible even in their private phone when we are having challenges. Midwives here, they know that I am having a challenge here, MOU manager is not here, they can phone <i>DCST-O&G</i> direct, they can phone <i>DCST-AM</i> direct, they can also phone <i>DCST-PNURSE</i> that is

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		doing neonatal directly. We are getting their support
	communication	P06: there would be sort of current word in the WhatsApp group so that they can facilitate if there is a problem.
	communication	P18: I have an open line. So we are able to communicate each & every time I get to her and as for <i>DCST-AM</i> , not so much.
	communication	P08: They support a lot. If there are queries from the managers and the staff and you know they try to address that.
	telephonic consultation	P19: The district team according to my understanding, is there to support us in terms all maternal things, your family planning, EPI, your IMCI, your antenatal care . So mostly they are there just to help us in terms of when I need help, managing a patient, a particular patient, they do help us a lot with that one. We communicate telephonically. We communicate via WhatsApp. We also ask when we go to our monthly maternity meeting as to, if I've got this challenge what can I do, so what I understand is just they are there to support us in term of all the challenges that we need in the district.
	WhatsApp	P20: They must just continue what they are doing and they do have passion for what they are doing. More frequent visit to us to see how we are coping. I communicate with DCST-O&G, even its at night , she says even if something you remember during the day, whatsapp me at night . I am not going back to you right now, but eventually I will get back to you. And it's a group yarona kamo west. They have group chat where we talk about our cases .
	WhatsApp	P05 Even if it did not happen to me, but I learn from the group discussion what to do for future patients.
	feedback loop	P14: In terms of the district, they are more effective. They are more effective in such a way that even this organisation of symposium and whatever, I think they are also included. Some of this things before there was the district specialist, we were not attending them. Since they are there, wherever they go, they want us to be there. Sometimes we complaining & say we are clinic based, they must attend & will get feedback from them. But they just include us in everything. They want us to have full information. So I don't think that the government has made any mistake to make this team. The way I get the support & I am sure that is why I am working so hard.
	feedback loop	P08: but we, as managers never get a sort of report to say I work today at Nokuthela Ngwenya, and this and this is what I. They give it to the sister in charge there. But the sister in charge is giving it to her staff but I would like the AD that is the manager on top of Nokuthela Ngwenya, she would love one of them come to her and say that today I visited your facility and this and this and this I picked up, I have already given feedback to your

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		operational manager, but I think you as the AD should also know this. I think they are under the impression that, that supervisor, the ops manager will come & feedback. But they are so busy in themselves. You know, they are starting to bring that message whether good or bad. I mean we need to know good and we need to know bad. So we as the overall managers, can know there is a problem, may be in Simunye clinic. That is what I think, I personally think, they are doing a lot of good work , but its not always bringing to our attention . It would be nice. I know also that when they are in the meetings, they do presentation, they say this and this and this, but I would love to hear something more from my subdistrict, to say, in that clinic we are worried about this issue, so that me & the manager from COE, because most of the clinics belongs to COE, it's a few that belongs to me. So we as a team, need to work together to raise those issues. But I know its communicated to mother & child coordinators . Its not that they don't communicate those issues to them. But I would have loved them to also may be, you know, even a monthly report to say we visited these few clinics & this is what we found in that. That would have also helped us. But that's just my view. And others can go benchmark. I need to know. If I do a supervisor visit or something. I must be on the alert for that because if I don't know because that is my style. If I hear something I won't tell them I would just go there and also go and verify myself. Make sure and say if that now, How can we do it better and right there is so that is.
availability of the skilled health worker at the point of service delivery	onsite/ in-service training	P03: We will go there and do the site visits and actually on-site training, in service training. They are actually very supportive. And will go together to some facilities, they come they are always on board. They are really supporting the district very well. we really commend their activity that they are doing for us.
	training	P01: And also for cervical cancer screening, they volunteer to say they are going to train people on that. And also they make sure that we are together when we are procuring equipment like the introducer, the one that we use when we put IUCD.
	training	P08: In the team I know <i>DCST-O&G</i> is the obstetrician, the Gynae. Her role mainly when she goes to the MOUs to do audit of maternal files, check you know, what she can find there. She immediately tries to in service training to the staff that is there and also do ESMOE training when she goes to the facilities, also fire-drills . Those are the main things that she and the maternal sister, let me call her sister, a team member because they are most teams working with the maternal whatever, So the two of them usually work together that is what they do.
	training	P08: Those are mainly whatever that are assisting and also training, in service training, when they come to the facility and they see something they immediately correct and try to do the in-service there . Support, also with ICSM, the new ICSM guideline that is complementing the ideal clinic, they also assisting with that to see if are we in the guidelines, are we following those.
	training	P10: Well, I would say there were more in training, emphasizing guidelines, ensuring people were following

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	training	guidelines P17: We can't do without them, really because maternal and child health is the core business. Without the good support system in the maternal and child health we won't be having babies, we will be having babies that are not normal, the mothers will be dying. With help of the DCST, I think Ekurhuleni managed to reduce the maternal death because <i>DCST-O&G</i> is also supporting the hospitals and helping them on how to manage their caesarean section and everything. And with us also, we referring on time because of the DCST team that instilled in us stating that you don't sit with the problem, when you are having a problem you have to refer to the hospital. So their support is very important in the maternal and child health. We won't be able to work without their support because this is one of the core business for health
	supervision support	P06: If one is the most significant one, the doctor to patient ratio, nurses to patient ratio. There are high number of patients and less personnel, midwife and nurses are few and doctors are few. The worse the specialist now to a patient ratio currently and deciding there is one full time. I am the only one full time, so there is a burden to be able to supervise the juniors and in the hospital when you are alone and be the different area, be in the clinic you are expected to have special clinic, be in theatre, be in maternity and when you are alone its difficult.
	capacitate clinicians	P01: They will be going into facilities and ensuring that they check and also capacitate the clinicians. They go & capacitate the clinicians.....
	mentoring	P18: I don't know how to answer that question but I think their reason for not coming here is that personally as a facility we don't really have much challenges that will need DCST to come all the way down here so whenever I do go to them I come back with enough information to be able to function in the facility and am able to reach <i>DCST-O&G</i> whenever I need help. So I don't really feel that they are not present, they are present when we need them.
Access to health system	accessibility	P17: Please tell me about challenges/ barriers you face in the delivery of maternal health services. How do you deal with them? The only thing that we are having not the district per say, per facility. Nokuthula and kwathema we are servicing one community, so it's us here the Nokuthela and Kwathema for deliveries, we are not reaching the target of 150 delivery per month. Because we are servicing one community Kwatsaduza area, hence we are not reaching the target and with Nokuthela its worse, maybe as you came you saw it's a mini-suburb so the accessibility of it, it is a problem, hence people are not reaching our place, we are having a lot of antenatal that are attending with us, we introduce them and show them the place and motivate them to come and deliver with us, unfortunately we can't meet that indicator, so it's a challenge with us with the deliveries.
	accessibility	P17: So they choose to go to Kwathema because it's close by? Not even Kwathema, they go to the hospital, I think it's the socialisation of the people, people want to go where there is doctor, when you tell them that we are

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	accessibility	midwives, we are doing the deliveries, they don't come to us and what you will add more, the accessibility. In the likes of Philip Moyo or Ethafeni, their deliveries are high because they are in the within the vicinity. Like here in Nokuthula, when you ask them how much people charge you to come here, it's a lot of money, hence they end up going to the hospital with an ambulance. P01: other challenges is that we've got MOU's that are not, that are underutilised especially in the east. <i>They are underutilised but we're engaged with the hospitals to do the down referrals that is not happening. And were not even sure now, even checking the population maybe it's the aged population that is there, that is why they are not getting the deliveries or maybe people are going to private hospitals and private clinics. They are not coming. Underutilised facilities, Nokuthela ngwenya is no 1 followed by Kwa-Thema. At least Phillip Moyo is trying in Daveyton in Etwatwa. But then when you come to the south, J Dumane is underutilised in Vooslorus. Why? because patients will prefer to go to the hospital. It's about 1 and a half kilometre. And then Ramokonopi is well utilised and then Phola park. Due to the transport to the area to the clinic, people are just going straight to the hospital or go to Ramokonopi. And then in the north, Esangweni and Ethafeni, they are well utilised.</i>
	accessibility	P16: As I was in Tembisa Hospital, without an MOU, before the district was there. I think there is a change nyana, because in Tembisa, it was always packed and now that we are dealing with the normal deliveries, it's a bit relief for Tembisa hospital. The district is doing its own things though we are doing the same things but they are taking other part. So I think it is good for them to be there because if we can be packed in one place and Tembisa, it is the only hospital around us and there can be a chaos.
	accessibility	P15: What I know is that the facilities are performing, like as MOUs, we are expected to have 150 deliveries per month, that is the target for the MOUs, so with us in the south, Ekurhuleni, we also having south, east and north. The MOUs that are performing above the target consistently is the North and in the South there are those that are reaching the target and there are those that are not reaching the target, like our facilities, one of them not doing well in reaching the target. East as well, their facilities are not performing well in reaching the target.
	accessibility	P04: If you go back even more than 20 years, you will find that population of Gauteng and of course that of Ekurhuleni have grown tremendously. But when you look at the number of facilities, you know that facilities have not been increased at the same rate at which the population is grown, specially the hospitals. And that's a serious challenge. I mean you look at all the hospitals in our district. They are overflown with patients, all categories, not only the mother and child, to an extent, you know it has been determined that we need more of facilities for us to be able to handle the kind of population that we have. That's factual. I mean using the norm, it has been determined that we need more of hospital facilities in the district than we have currently. That's a major challenge because you find that there are patients that are seen, who need hospital admission but for one reason or another they are not able to access that kind of service because of shortage of beds. So there is also influx, you know, apart from the normal population growth. There are patients who come from other provinces,
	lack of public health facilities	

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		there are those who come from other countries, might be neighbouring countries and also from abroad.
referral system	assist in referral	P17: They are really our support and our pillar because if a person is accessible at any time, then it is a strong support system because <i>DCST-O&G</i> even at night we are able to phone him, to phone her to say I am having this patient, patient, what can I do, can I send to hospital or should I keep a bit then she'll give the necessary advice so it really help. she's also working with the hospital that we are transferring so when we write the notes, when we mention her name, they know that we have contacted the right person. And with us also, we referring on time because of the <i>DCST</i> team that instilled in us stating that you don't sit with the problem, when you are having a problem you have to refer to the hospital.
	assist in referral	P07: Yes, I do, myself I interact a lot with <i>DCST-O&G</i> . She phones me a lot really when there is a problem really like this or there is a problem of referring patient that my MO, they are giving a problem always, she phones me directly really, maybe I have that personal relation. But I don't know with the others really and the rest of the team. I go along very well with her really. Anytime if there is a problem really, most of the time we are talking about referral. If there is a problem of referral or some patients were refused, she will call me late in my cellphone, asking whats happening, whats happening, whats happening, I cant get success. Then I can always intervene.
	assist in referral	P10: So I think in terms of that there is still that challenges, in terms of because when you are in a hospital then when the referrals, cause of still access, like when I was in the Germiston hospital, because there it was a district hospital because there was no community health centres around, so we ended up seeing patient that actually should have been seen at the lower level of care, If it was there so all of the more or less access in the service.
	assist in referral	P10: And they won't send back those patients and they would still see them Most of them, some of them are booked or we end up having appointment. We are only one doctor with 150 patients , you can only see so much and then if obviously is that challenge that those patients might be missed because we are booking. <i>There was more or less a triage, a triage of some sort, triaging patients and maybe let us start with the, but sometimes you know patient when you give them appointment they might not come back on that date. Then we end up having patients that are booking late, and you are doing it because of despite the fact, they present early but the resources are not enough.</i>
	assist in up-referral	P06: when we track the problem down you know the district is the team, is able to go through their channel to go to primary health care to the clinic to say this is the problem that you are referring to the hospital. The patient you refer to hospital this is the outcome and for us to mitigate this problem this what we need to do and they are able to encourage us.
	assist in up-referral	P13: But again in north (this side) sub-district we are not doing well. I think the other thing is that we are having a tertiary hospital and 2 MOUs. we don't have other, like a regional hospital to refer to. So other patients access to

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	assist in up-referral	MOU is too far. They end up going to Tembisa late or some other. They are doing well I think. And when you compare with the number, the state of the community, there's lot that is happening.
	assist in up-referral	P01: So that was the barrier more especially Thelle Mogorane. It was so prominent. Thelle Mogorane was always complaining. <i>DCST-O&G</i> will go. <i>DCST-PAED</i> would go. <i>DCST-PAED</i> was going because SAM cases were very high, so she had to go and making sure she teaches them how to calculate the separations and what's not. But they were aloof.
	assist in up-referral	P10: Now may be more or less some facilities lacking behind, but now overall, and also some buying from facilities in terms of not seeing certain maternal conditions as such hospital patients in terms of seeing. They see that can be done at any level of care. You know people bring us everything in the clinic, it was just push, push, so now certain things they are able to know, manage, then refer to appropriate level where its necessary. So I think there has been an improvement in management and referral. But in certain areas, there are some challenges because when you compare how it was previously.
	assist in up-referral	P16: As I already mentioned that it is not only obstetrician, it is obstetricians who is able to communicate with our referring hospital , like if we are having a challenge with our referring hospital, maybe if its full they are able to communicate with other districts and hospital like Steve Biko and other Pretoria ones, just to make it easy for us to transfer the patients. Even the if we are having a difficult patient we do call, "can you please assist we are having a difficult patient, how best can we handle this" . P17: They are really our support and our pillar because if a person is accessible at any time, then it is a strong support system because DCST-O&G even at night we are able to phone him, to phone her to say I am having this patient, patient, what can I do, can I send to hospital or should I keep a bit then she'll give the necessary advice so it really help. she's also working with the hospital that we are transferring so when we write the notes, when we mention her name, they know that we have contacted the right person.
	assist in down-referral	P17: Presently with the challenges, with Nokuthela & Kwathema, not reaching the target, we have been engaging with the hospitals that we are referring so that they can do the down-referral. They are part of that team that is looking at how best can the hospital help in down-referring the low risk that can deliver at MOU. We are almost in last stage of this down-referral system. So I think they are part of us. They are helping us. To them also, It is not nice that we are reporting less than expected and they do understand that the patients we transfer from MOU, they are genuine transfer.
	establish referral route	P02: They have also managed to establish their referral routes & criteria for the district which is also very important. To say, the facilities need to refer to the MOUs & the MOUs to refer to the hospitals, according to the condition of the patient. MOUs are getting these patients but only the low risk cases to deliver at the MOUs and

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	establish referral route establish referral route establish referral route	from the MOUs if there's complications, high risk and intermediate risk, they send them to the hospital. P09: The challenges is that we're still going to be referred to hospital. So the patients now prefer, rather than going to, they would rather come here. So it's one of our biggest challenges in the district ukuthi we've got low delivery, very, very, very low. The accessibility it's perceive, perception of yabantu ukuthi ispedlele is better than MOU, so I think we still need to improve on that. And were trying to do I-down referrals system like they did in Bara where normal vaginal that are found, that are checked at Pholosong. can be delivered here. P18: The other issue would be mis-communication between us & the hospital. We are not speaking the same language. Sisters at the hospitals are not speaking the same language themselves. We get this information today & different information following day, so you end up not knowing what to do in that instance. P19: Normally with the doctors we expect her to help us especially in terms of our referral. Sometimes you find that we want to refer a patient for example we want to transfer a patient to Thelle Mogoerane and then the doctors there are giving you hard time to accept the patient. So most of the time when we communicate with her, she will make sure she communicates with the HOD to make sure that the person is accepted and then with her I will also expect, my expectation for her to also maybe fix the issue of referral system in terms of the EMS, us and the hospital because when the EMS comes they want to take the patients to Thelle Mogoerane of which for us we are referring to Tambo Memorial hospital. That is why at some of the patients, they will give us hard time to take them at Thelle Mogoerane. Then we don't have any option but to refer the patients to them especially when you find that when we communicate with her, she's not available to communicate. Then it becomes a hazard for the facility to refer to the hospital. So in term of that one, maybe I may recommend for them to just look into that one, the referral system and the other one is the advanced midwife.
effective patient transport systems	shortage of ambulance shortage of ambulanc shortage of ambulance	P19: My expectation for her to also maybe fix the issue of referral system in terms of the EMS, us and the hospital because when the EMS comes, they want to take the patients to Thelle Mogoerane of which for us we are referring to Tambo Memorial hospital. That is why at some of the patients, they will give us hard time to take them at Thelle Mogoerane. P01: And also the ambulance services Its still a problem. We were hoping that we get to the onsite ambulances in all the CHCs, but because of this shortages of ambulance, we are unable to get and you find that sometimes for the patients to be taken to the hospitals, it takes longer by the time they reach the hospital, some have complications and because of this ambulance that is not available. P09: Obstetrics Ambulances, sometimes we have a patient, then it would take time to come, it is better if they stationed here and also instead of ama-ambulances instead of taking to CHCs, they take them to the hospitals. So that we have tried to address it but it's still happening.

Categories	Codes	Quotes
	shortage of ambulance	P07: Transport is quite a big problem there in terms of the referral of the patient. Transport, really a big problem.
	shortage of ambulance	P14: I think these are the two main things, the space and the ambulance.
Clinical audit		
clinical audit	clinical audit	P08: Then the PHC team, it will be <i>DCST-FM</i> , usually she is a family medicine doctor that works with primary health care nurse and they also visit facilities and they check files and look into see if policies are followed and see if the guidelines are followed and see if they comply. Same with the maternity guidelines, they look and see if they adhere to it, see If they implement new changes that are coming, maybe implement, see if whatever they the ideal clinic they are now into the three streams. See If those three streams they follow the guidelines according to the streams.
	clinical audit	P13: It Is the audit, it will be nice if they can audit us more frequently, because I can be bias to myself on how I'm doing so if they can just maybe audit us quarterly, when we have MMR meeting they give a feedback on how we are doing records wise or everything, it will just even make us go stronger even more because you know there's someone who is watching. And there will be more staff improvement because the more they don't do it we relax and concentrate on other things Wa-understand, but otherwise P05 I'm happy because they think we are far better than lot of DCST team in other district, I don't want to say stories but a lot of things are improved and municipality clinics are little bit suffering because I know the concentration has to be us province.
	clinical audit	P01: 2nd one was the buying in of the hospitals . The hospitals were not accepting the district clinical specialist team, like for example a member of the district clinical specialist team will go to the hospital and according to the minister, she or he is not supposed to announce that I'm coming, go and audit files and then come back, report. Then they say you cannot come in my house and do whatever. There was a lot of resistance when we started. So we had to maybe address those challenges, involve the 04. They need to know these people are part of us.
	guideline implementation	P10: Well, I would say there were more in training, emphasizing guidelines, ensuring people were following guidelines
	guideline implementation	P18: DCST team role is to assist us in facilities, giving us information about the obstetric and guiding us in terms of protocols and what is new, what is out-dated, supporting us down here and whenever we need anything from them we are able to reach them.
	guideline	P18: DCST team role is to assist us in facilities, giving us information about the obstetric and guiding us in terms

Categories	Codes	Quotes
	implementation	of protocols and what is new, what is out-dated, supporting us down here and whenever we need anything from them we are able to reach them.
review of clinical records	review clinical records	P08: Then the PHC team, it will be DCST-FM, usually she is a family medicine doctor that works with primary health care nurse and they also visit facilities and they check files.
	completing new ANC book	P20: Another challenge is the target issue . The new issue maternity record, it's a lot of work especially when you are alone. You find that you have booked 15/20 patient for that day, that's follow ups. And then the first visit patients just pop in and you cannot say no, go back, come back tomorrow. You have to attend that patient and still there is a line for your follow ups and then 60 something pages of this new book . Its too much.
Operational research	operational research	P08: The deliveries are not, I must be honest, to Kwathema & Nokuthela Ngwenya, the deliveries are not what we would like there to be and we have been having research to see what is the reason & what could be the cause of it. DCST-O&G and the DCST's was also involved in that. But we have not improved. We do not know where is the problem. Most of deliveries goes to the hospital. But all in all we are trying our outmost best.
	operational research	P17: We did a study to see what is the reason most of the time these woman, they don't reach the place of delivery early because they are not sure of their pains though we educate them .
	operational research	P08: Kwathema & Nokuthela Ngwenya low deliveries: You know that research , we really tried to ask all the question and one of it, it was the it's closer to the, it's closer, some of the hospitals are closer to them, because you know, like the Tsakane area is very far for them to come here. It's the hospital is just across the street. They will definitely go there
Promote the use of early warning charts		None

CONCEPT 2: CLINICAL RISK MANAGEMENT

Categories	Codes	Quotes
Risk associated with patients		
Risk to patients	risk identification	P13: So we what I like is their relationship does not end up and when they have problems we have a WhatsApp group so they are forever available and it doesn't matter who we get but there's always a way to help them. So it has helped a lot. Before there was DCST team there was a lot of stories so mara-after they came there's too much improvement.

Categories	Codes	Quotes
	risk management risk management risk management	P19: Yeah, they do support us. They arrange meetings almost every month and they do workshops for us to help us manage better the patients, especially in term of the problematic condition in the antenatal side as well, especially because I'm doing antenatal. They mostly help us with the management of hypertension. They mostly help us to categorise the patients so that we don't manage the patient that should be in the hospital. So in terms of that one, they are very good. P06: They have reduced maternal deaths. The rates of birth asphyxia has gone down. They have reduced the waiting time in terms of surgery. Those are the few. P18: I wouldn't know what role they do when they come to the facility because they never been here. The only time I received a visit was when I think I mismanaged a patient and they were here to support me on how should I, the patient that I, it was a patient that has recurrent leucocytes in the urine and I was still fresh then. The parents, was it the mother, I think the baby was born with the septicaemia and they thought it was from the recurrent leucocyte. And they came and taught me on how should I be managing but I really yah, they've never been here. The only time I get to see them is when I attend the meetings.
maternal mortality and morbidity meeting	MMM meeting leading from the front	P02: The coordinators, the sub-district coordinators that is where we discuss all the cases, the total deliveries per MOU and the total deliveries in hospital and if there's any morbidity or mortality cases, we discuss the avoidable factors if there's any substandard care and recommendations and to make sure that going back to the facilities or the MOUs, they implement the recommendations. And also at the MOUs, there's quarterly MMM meetings that are happening whereby MOUs meet with their feeder clinics to discuss the challenges or the mortalities. P02: DCST attends to all these meetings, in fact they lead those M&M meetings and then even at the MOUs they also attend
	MMM meeting organization MMM meeting organization MMM meeting organization	P07: We meet them almost always at the M&M, but its not quite enough really. We don't have enough time really. P17: So they are part of us, even in the MMR, they are there. They help us. They motivate us to do better. P08: They are attending all the MMR meetings at the hospitals, at the clinics. So looking at the indicators, trying to see, that they work together with the mother and child programme to improve all the mother and child indicators. I must be honest, I think at many of our hospitals, the MMR meetings was not held as it should have been held. You know by looking at all the cases and I think, with their intervention, I can really see there is a difference. We are achieving goals. We are working towards a goal to say this is what we need to do and not to just

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		come and meet and it is like that, but specifically report format so that we can identify all our problems there. P02: So on a monthly basis what I am talking about this relationship between the hospitals and the clinics and the MOUs, there's what we call maternal mortality and morbidity meetings that are happening in all these 6 hospitals and then the clinics also attend those meetings. P17: Really there was even in the local because we are two sectors, GPG and City of Ekurhuleni, those people were not doing thing the correct way. So since the DCST team, we are doing the MMR meeting with local clinic, we are taking our colleague to the next level for them to understand that at the end of the day they are doing the antenatal, at the end they come here having a problem. So with the help of DCST team, they do attend our MMR meeting. It helps us to enrich our counter-parts the one that are from City of Ekurhuleni. So it's making a progress in the Ekurhuleni district. Now they are at, they are buying our story. Remember COE was working in their own way & GPG, but now they know we are at par, they even phone us, they inform Nokuthela, this is the patient can we bring them to you or should we take them because now they are at par with us. So there is a lot of changes that happened after the DCST took over. P10: obvious there will be mortality mobility meeting where by especially, I know with <i>DCST-O&G</i>, when there is a maternal death, she would be part of that. Even <i>DCST-PAED</i> when the Paeds for the child, maternal meeting would be part of the mortality and morbidity meetings. P06: It's a team of obstetrician family physician, physician and paediatrician, midwife who are in the district, work in the support primary health care, primarily needs and also district and hospital, But I have seen that they also give support when we need them and if we have M&M for example, to participate and their contribution and questions that they help us to answer P01:and also the MMR meetings are held with all the 04'S and also the clinicians from the clinics. And they are also discussing like for example if there are serious advert events or maternal deaths then that case will be discussed on the MMR with the assistance of the district clinical specialist team. They also support the hospitals. We managed to reduce the maternal mortality rate but unfortunately the neonatal mortality rate is going up but <i>DCST-PAED</i> who's the paediatrician is trying her level best capacitating the managers of what not or what's not. P09: Then when it comes to maternal mortality, which we know largely subdistrict based, last year we improved. We were less than 100 per 100,000 which is very good. This year we had minor challenges. But it was through us working as a team, like district specialist with Obstetrician at Pholosong with family physician and with the midwives. We know that maternal mortality is one of the very big indicator that shows the health of whole nation. So I must
	MMM meeting organization	
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Categories	Codes	Quotes
	maternal death notification role in reducing mortality	say I am very happy with what we are having. The only challenge is that she is one. If we could have an obstetrician in each sub-district, I think then things will be better. Because then they will have more time to spend & we would improve even more. P16: when there is a maternal death we do inform them within 24 hours and they also assist in progressing in the program of reporting, because it is supposed to be reported to the province as well. P06: the fact that we see the results of those indicators improving you know they have got a role to play.
	support after MMM meeting support after MMM meeting support after MMM meeting	P06: It's a team of obstetrician family physician, physician and paediatrician, midwife who are in the district, work in the support primary health care, primarily needs and also district and hospital, But I have seen that they also give support when we need them and if we have M&M for example, to participate and their contribution and questions that they help us to answer P15: When we are having the MMR meeting, we do invite them, DCST-AM they do come when they don't have any other commitments. When we do the MMR meetings, they also do the in-service training for the people that will be attending. They also do tell us to say that if we have any challenges may be something we need to help or be it training or whatsoever, we must forward to them so they can help. So even if every month we attend a meeting like the MMR meeting at Thelle Mogoerane. So they are so supportive. Sometimes if they don't see us, they call to ask "where are you" to tell there's a meeting today. So they are so supportive. P14: But since they started, the will go, they will give support there, they will teach us more because if they experience that Ekurhuleni has got so many maternal death and whatever and macerated stillbirth, they change their teaching in-service. They will concentrate on what is the problem now and then they will give us more information on educating the woman on the safe and whatever
Risk associated with health professionals		
EOST	EOST	P14: I think the experience that we have before our government started to introduce the district specialist, we were having problem. But since they started coming to us doing this drills and giving us more information, at least we are doing much, much, much better if not 100% because there were no people that were giving us information. We were not having that faith yokuthi there are people that are looking after us. But since the drills started and the courses started and they are around. They are coming to us. we've got less neonatal death

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		and whatever.
	EOST	P15: With experience, we are having a good relationship with them as you can see that DCST-O&G comes to help us with the ESMOE drills .
	EOST	P16: They are coming to the facilities, as I have mentioned they do trainings and they do fire drills
	EOST	P17: In a month, they can come twice, to just come re-educate us with the fire drills so that we can be at par with what is happening. And when if there are changes, they inform us.
	EOST	P09: We are working with clinicians then we are able to ukuthi sibe nama trainings. We have drills and we are able to get even the lower levels health educators , teach them so that they can be our voice out there.
	EOST	P13: Specially DCST-O&G do comes a lot to do drills . Here we are doing ESMOE from ANC upto the whole maternity. Other side when you are at ANC, you are never trained. So it has created a gap, there are a lot of mistakes we identified the other side.
	EOST	P01: EOST, Resuscitation, helping baby to breathe , all those fire drills for the emergencies. People are doing that but we are still struggling in our hospitals. The fire drills are not done . Not to say the district clinical specialist team are not doing their work, they are trying their level best. And we work hand in glove, there's no them. We are one
	EOST effect	P12: I think they need to give us those visits and supports more. They used to come and do us the fire drills , by doing that it makes our work so easier like we can able to minimize the maternal deaths.
Risk associated with organization		
Risk management	risk management	P14: what we also have noticed is that they do this MMR. They come when there are deaths. They come, we discuss the files and then they will come the avoidable, we discuss, all of us. So it's something that was not happening before they were introduced. <i>They are concerned with the decrease of maternal deaths and neonatal death. What I've noticed is that they visit all the institutions where there is a death and then they would go to that institution and see what was the reason for the death. That was not there before because there ama-, we wouldn't even know ukuthi what</i>

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	risk management	<i>we are supposed to be doing..</i> P02: They implement the recommendations and also at the MOUs there's quarterly MMM meetings that are happening whereby MOUs meet with their figure clinics to discuss the challenges or the mortalities.
resource sharing	resource sharing resource sharing resource distribution resource distribution	P04: Then I think as far as that is concerned, they have to enhance their pace and also to manage the relationships within the facilities because the natural tendency is to protect your own turf, you know, that needs to be attended to, to say guys, yes, we are separate entities as the facilities but there is a bigger picture there. You know we are serving the same community and we need to develop our programme in such a way that talk to that. We discourage working in silos. Like we are talking about the other time, P04: you may find that in a particular hospital, there is a department that has experienced resignations or whatever and you find it very difficult for other departments in other hospitals to come on board and assist that particular hospital. to an extent that you may find that their call roster is full of gaps, meanwhile there are other doctors from other facilities who could have easily come in and fill in those gaps. So the result thereof is that on the days where there are gaps, P04: patients have to be shifted out of the district to other facilities like bush, Bara, Charlottee Maxeke and so on which bring an element of inconvenience to the patients meanwhile if we are working nicely together it should be possible for DCST to be able to influence that movement of resources human and other ones to be able to cover gaps when they develop. P04: They have this advantage that they are not supposed to be doing a lot of clinical work so they have to at all times focus on the overall performance of the district, identify loopholes and possible areas of improvement. Always have this in mind they have to do what is best for the district, not for a particular facility or things like that. They should be a better place also to influence distribution of resources within the district. I mean you are able to look at your stats and see in which sub-district do you have may be the highest number of deliveries and which sub-district do you have lowest and you are able to influence the movement of resources from one area to another.
equipment	medical equipment medical equipment	P17: <i>DCST-PAED</i> is one doctor that motivated the district to purchase for us the uniform resuscitation trolley for the baby. P11: <i>I think to me the biggest problem is the MOU's are not well resourced. In terms of equipment's and even expertise at times that is why the hospital is being overloaded, overburdened because every little thing, you have to transfer to the hospital. Let me give an example, like years back when I was a registrar, once working in the MOU, we have CTG, it's there and you have a woman that's fully diluted and she can't push. She had no Caesar</i>

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		<i>before, so the risk of rupture is very low. So before we used to augment, very low dose and apply this vaccum, so now it's not done. So once the woman is weak, she can't push even if she's got no fetal distress, she's fully dilated, she has to go to the hospital. And you know that's something, I actually discussed that. Why is it actually like this? I was told that no ways please play it safe. But if the MOU's are well resourced, I mean those are the things that should be, fully dilated, apply a vacuum or just some augmentation, do risk assessment but everything now has to go to the hospital. So that's one area I think it needs improvement. It's not well resourced in terms of equipment & personal. And it's true that they don't want to take risk. But if someone who's knowledgeable on the ground, those are things and when I was there, I mean we actually delivered many because if you are experienced, if you have been doing it in the hospital, you know, you accept the risk. If its a multigravida, you don't augment, you don't go that way. But a young lady, she is just tired you know and we see the head, normal size, she just needs more power. But she cant do that.</i>
	medical equipment	P11: Resources , that's the thing. The resources in terms of equipment like I've mentioned earlier that if the primary care is well resourced you know and as 1 of the problem, is Thelle. I mean they are receiving. I mean they are receiving referrals from so many clinics. So if you have facilities that are well not equipped they should still be able to deal with some cases or problems. If its ending to challenge, straight to hospital. It will seem as if their effective is not visible because of the resources. They are trying working their best having their, even as humanly possible. They are putting everything into practices. But when the resources and equipment maybe is not on ground so everything you'll fight. And that's not the essence, you know. Because I think they've been employed, even myself as a family physician, I've been employed to make sure that we don't refer every patient to the hospital but if I have the skill, I have the knowledge, resources are not there, I don't have a choice but to refer and that's the problem.
	medical equipment	P01: Equipment no (problem)
	medical equipment	P18: They are not challenges that necessarily concern the DCST team. It will be the challenges of not having Hb , I am making the example of Hb because so far it is the only challenge and we were supposed to be doing it three times but we do it two times because of the funds and the lab staff. So in my point of view, we don't have any operational challenge that they have to fix it now.
	medical equipment	P10: In terms of equipment , I know they were instrumental, a lot of things they were getting. The certain instrument, that we might have struggle to get, when you are more or less going via them, it was more or less easy to get and
	medical equipment	P16: Sometimes we had to, when we are having something like shortage of equipment like it takes, we do have the budget but sometimes although the budget, its short and then when we need some of the things we don't get them on very same time because we are supposed to make an order and hand it over to them and they are also

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		supposed to take it to the central office of which it will wait for some signatures before it gets to us. And but mostly things are not as bad as before. So we are able to get and they are able to organize, like we do have a WhatsApp group so if we are having a problem we just contact them or put the message on the group so they can organize from other sites or from other districts like Jo'burg and Sedibeng.
	medical equipment	P16: we can also tell her (DCST-PAED) if we are running sort of other equipment's like baby warmers . She is the one who is combining. They are the ones combining with the procurement to order for stock for us, medical equipment's, like CTG machine, BP machine, all the medical equipment that we are in need of. And then on the same day when they are delivered, we call them to come and assist in training with the supplier.
	medical equipment	P14: No in this unit. because if ama-equipment, I've got 4-5 CTGs. I've got so many things that I don't really have the problem. The only problem that I would change if I would have time it is because the structure wasn't meant for maternity, I would change the oxygen cylinder thing because we are using this moving system to oxygen cylinders, if at least they were fixed because now I'm having a problem, the company does not have the oxygen since Friday. If the oxygen that we have can get finished, I would be having a problem but it is the problem for the first time. I think before the end of the day, it will be sorted out.
	medical equipment	P14: The paediatrician doctor is concerned about us having all the equipment's necessary for babies and newborn's, equipment's like incubators and neonatal resuscitator and whatever and they are always concerned about how we work and the communication too.
	medical equipment	P15: Then now when coming to the medical equipment , the department is trying to make sure that we are having at least the basic equipment that we are supposed to have, although it is not enough because sometimes you lack somethings that we make use of on a daily basis, like find that we don't have the Doppler . Sometimes we don't have the incubator but now currently they tried, the incubators are there but there are other equipment that are not there like the Doppler's that we need to have.
	medication	P20: That's that & then there is shortage of medication , usually we have shortage of calcium, but now we are fine.
	medication	P10: you find there is still struggle for certain medication. There is no availability of certain medications . We still need to refer patients even though you might have to skip to do certain things and I think also there, human resource themselves, we do not have enough to support small clinics. Sometimes we go to a small clinic, there is nothing much you can do. We are also like a messenger referring.
	dry dispensary	P03: It's lack of resources , I might say. In terms of probably transport and also in terms of resources in terms of dry dispensary , only to find like for instance you wanted some surgery, you wanted to go do an insertion an implant or removal of implant, and you found out the facility doesn't have the dry dispensary, the requirements in

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		terms of that of that, now you only found out that DCTS (DCST) teams are, actually there with them but the facility doesn't have those things they have to wait for long time consumes sometimes.
	other equipment	P20: I don't think they are short of equipment . They are going to be on presentation, they have always been on power point slides and everything. The only thing, they don't have food for us, they just serve us tea and we have to sit from 11:30 until 15:00 and we don't have lunch and otherwise they are doing well. it's only catering. Their equipment and everything is on point.
	other equipment	P15: Then again with the resources that we need to be using, most of the time you find that we don't have the cartridge , when we transfer the patient. But you find no photocopy machine, no cartridge to print whatsoever. So when coming to resources we are really struggling.
	other equipment	P15: The things that affect most of us is the resource. We have minimum resources because for them to come down they need a car , to perform some duties need cartridges, computers and whatsoever . So I think that is those are the challenges they will face as well as on their part of the team, they are looking at 90 something facilities so it will be a challenge to meet all of us.
	other equipment	P03: Only to say that sometimes we lack some resources, training resources so when they come to train we need to organize them probably overhead projector, lighting, lamps, as well as the extension cords, which they don't have. Probably 1 is training in the other sub-district and this one we need to organize for them. If we can actually get them more of the resources in terms of over the projector, the training material,
	other equipment	P19: The only thing is resources that's the only thing that we have problem with, in terms for examples, glass, a simple <i>glass</i> (GLOVES), you find that we end up using the sterile <i>glass</i> (GLOVES) due to the unavailability of the non-sterile of which it may cause a problem and also stationary is also a problem so if also they can sort that one I think we will be ok.
	other equipment	P19: we still have challenges that here and there, especially in human resource and stock shortages , but generally I can say we are trying our level best to perform to the level of our abilities.
	catering	P15: <i>The challenges that we are having is with the MOUs when it comes to patient's food, our patients as we admit them like when they are delivering they stay for six hours if it's during the day then after six hours we discharge them home, but this is if the six hours is will elapse during the night so the patient have to sleep over and go the following day, sometimes you find that the patient is admitted while still early, maybe admitted at night or admitted by the day staff so that patient will stay longer, now the problem our patients don't have food, we don't have food to give to them. Initially Thelle Mogoerane was giving us bread and milk, like Monday, Wednesday and Friday to give to our patients, but not anymore so now we are struggling to give food to our patients.</i>

Categories	Codes	Quotes
	transport	P15: The things that affect most of us is the resource. We have minimum resources because for them to come down they need a car ,
	transport	P03: It's lack of resources , I might say. In terms of probably transport
Space	space	P12: In terms of structure, first of all the structure is not conducive but we trying to rendering service towards the community. When you look, this room its multi-purpose room like on Thursdays we booking sonar patients, doctor is doing sonar and I'm sitting here in one room seeing patients. Even ANC room is very busy because there is another Sr who's looking that side, so we got 1 st visit patients and subsequently. You know 1st visit needs a privacy as we want private information from patients. Actually there no privacy and our rooms are too busy. The structure is a challenge and resources are challenge as sometime we need things that we don't have and we need to improvise and shortage of staff that one it always a problem. If you can go to labour room, we got only two midwives who's doing the work of four or five midwives on a day cos they admit patients and deliver patients and swap the mothers who delivered at postnatal and bring those babies for three days check-up to our facility.
	space	P10: I think speak for my experience, because I was more based because for here. I think also number one; I would talk of access here . Like here it's a big clinic, we see a month around 13000, 12000 patients, headcount. We see pregnant patient, but we don't deliver because we don't have a MOU. But we still need to refer to another facility which is also overcrowded , which is not like far away from here, which is one of the facility that deliver the most already, more than 250 a month. We are adding the load, then In terms of access, of a big facilities , they should have long more or less seen the need for a MOU to be available here and the two, as much as you can have the availability of doctors in the facilities...
	space	P14: The 1 st problem that we have is space . <i>They introduced these services where they were not supposed to be like, this was an ordinary CHC which was not having the maternity service included and then when the decision just came. It was just coming from head office that the service of the maternity must be started and what we would love is to have our private space where it is maternity only because now we are having a small space. we don't have the rooms that are enough, the delivery rooms are only 2 and patients are 200 and above, and even the beds for post-natal and assessment. Assessment rooms are only 2 for 200+ patients, so we do have a problem of space. The 2nd problem that we have is still ambulances. Ambulances are not arriving as fast or as quick as we would love. The 3rd challenge will be, no, the equipment I do have and I do have enough staff.</i>
	space	P13: You know the first one is the staff , I don't know its a national problem and something we know it's not going to get improved anytime soon and now our MOU has become smaller. Sometimes they deliver in an admission room instead of labour ward because maybe if it is 4 that side they just have to, because sometimes you find that

Categories	Codes	Quotes
	HR transfer	P09: So those are the most challenges that we have and when we also have a change of i-staffing , you'll find mangithi mhlambe kuwenziwa some rotation or whatever, you'll find that there'll be new midwife's that are not very skilled. So sometimes we do have that and shortage of staff sometimes. So those are just a little tedious things that we have.
	HR lack	P02: Shortage of staff in the facilities. that is what they always refer, for instance if it's a maternal mortality, we sit down and look at the avoidable factors and you find that the avoidable factor of this shortage of staff almost always come as a fact.
	HR lack	P13: You know the first one is the staff , I don't know its a national problem and something we know it's not going to get improved anytime soon and now our MOU has become smaller. Sometimes they deliver in an admission room instead of labour ward because maybe if it is 4 that side they just have to, because sometimes you find that we have 4 deliveries in 1 hour so we are busy and is congested right now we have 10 patients in admission with four beds, patients are just seated in the chairs and they don't get that much attention, they are just having 3 sisters there who needs to monitor them during like admission, during progress and delivery. One sister in post-natal discharging and the other one who is in 3 days will go and help the one in post-natal. So even the space is not good enough to give these women and also food. And other one is that I only have 1 permanent clerk so it means after hours, after 4 weekends, the sisters have to do everything of which is overwhelming . We have a lot of litigations and at the end of the day there are too many things to be written, the tick register, the maternity register, the PCR book, the discharge and whatsoever things. So some other times there are a lot of gaps that's what we find in records because of too many things to be done since there's no enough staff and everything, so it's too much. This problem is known. Its worst because right now in the district, Ethafeni is one of the clinics that's having high deliveries, but with least staff upto the whole district. We have MOUs having 50 or 100 deliveries. But they have more staff than us. Now we are also doing ANC. Its known. Its known everywhere. They also get surprised, how are we doing it. Just the only thing to keep on supporting staff, be on their side, keep motivating, because some other times it brings negativity at work.
	HR lack	P01: The 1st one is shortage of staff in facilities and you'll find that you know with ANC, we need to get an experienced mid-wife to do ANC. So our weak point was that the facility
	HR lack	P19: we still have challenges that here and there, especially in human resource and stock shortages , but generally I can say we are trying our level best to perform to the level of our abilities.
	HR lack	P20: Firstly I will say, we all know because ANC has too much work, everywhere you go, you are not going to find a designated sister who is doing ANC alone . You find ANC patient now and the next patient who comes in is a mother and you have to do immunisation. so your concentration is not focused on one thing. You keep on trying to remind yourself that let me do this, I am not on EPI, I am back to ANC. Now they are trying to do in-

Categories	Codes	Quotes
		service training for all those things.
	HR lack	P20: Another problem will be the shortage of staff , that's why the district is calling us, you find working at the clinic, say I don't want to do ANC. Then there is a workshop somewhere, I have to go and attend . I cant go because there is no other one who is going to do my services.....
	HR lack	P08: I think always especially with our local authority, it will be staff. Everybody is always complaining about staff shortages. That is the 1st thing, if you ask them, what your problem is, they will say staff shortages. I think, it's not always staff shortages, I think it's also sometimes how we organise because what happens in mostly in our COE clinics is that we've got rotation and you know every 3 months people rotate and it's a new person that comes in that .They have to render that maternal service where maybe they were at chronic, so to have a person to orientate that, It's mostly, almost impossible because you've got only 5 nurses.1 is there, another one is there, one is in training, so you put that person there and it's almost rushing to finish. So this is what I think it would this, challenge is the rotation of staff , may be not enough staff, lets also say that.
	HR lack	P08: If I really look at it, I think sometimes staff attitude plays a role . You know the nurse, I don't want to say, because my profession is a nurse, but sometimes our nurses are not that passionate about the service that they render . And it might make an impact on to the services, because I am just here to collect my money at the end of the month, I am not really here to look at my patients wellbeing.
	HR lack	P07: The district is helping us quite a lot. Staffing is quite a problem , shortage of staff, the district is doing everything they can do but staffing is the issue. When talking about indicators, it is quite difficult to talk about Ekurhuleni.when mentioning the first visit and all indicators, the problem is in shortage of staff, is a big problem. For this hospital, normally supposed to have more consultants. But right now I am alone. You can see it is difficult thing to run this department when you are alone, going up and down, up & down. For us really, I am not really happy the way we are dealing those, mostly my antenatal clinic patients. You found a patient coming in the morning and they had to leave very late until 5 in the afternoon. This is more about shortage, having one doctor seeing all those patients. First starting from the anti-natal ward & then go to, it's quite a big problem that we are having. This quite a big problem we are having. District is really doing their best, but this shortage, really.
	HR lack	P15: Yah, there are a lot of challenges: The first one goes to the shortage of staff as you know like, we are supposed to be following what is called the WISN , although it's not like functional for now. As I can say they are the WISN are the ones that should tell us how many midwives are needed in the facility when we are doing a 24 hours services. They are the ones to tell how many midwives, how many enrolled nurse and how many clerks, all those kind of staff. So that's why most of the time you find us saying we are having shortage of staff. They used to say like when we are working in the maternity ward, the days are not the same. There are days where it would be quiet, the nurses are working smoothly and the days where it is like hectic, is busy, that's when

Categories	Codes	Quotes
	HR lack	you see that it is like the staff is not enough. especially when we have to cover the 24 hours service day and night, and the balancing of the staff and the categories as well. So with us mostly, where we find the shortage is with the enrolled nurses and the clerical staff, because as I am talking with the MOUs and this facility. I think it is a challenge for all the MOUs. We don't have admin clerks to cover the 24-hour service and again when you are transferring the patients we are expected to photocopy the file and whatsoever and you find that there is nobody to do that because there are no clerks so that goes to the of staff. P10: you find there is still struggle for certain medication. There is no availability of certain medications. We still need to refer patients even though you might have to skip to do certain things and I think also there, human resource themselves, we do not have enough to support small clinics. Sometimes we go to a small clinic, there is nothing much you can do. We are also like a messenger referring.
	HR lack	P08: And then, but I won't say it's support because there are support. We do have trainings in the sub district that is conducted by our DCST's, by our mother and child but the biggest problem is the rotation and maybe staff attitude, let me also say that.
Quality improvement	quality improvement plan	P03: We've actually supported the facility, together with the DCST to say that ANC's first visit below 20 weeks should actually be done daily. Should attended on a daily basis because there are facilities that we are actually booking this month and we said no they should take them early so that we put those who are to be found positive on treatment immediately.
	quality improvement plan	P20: We are good, especially the retest part. There is QIP. Every first visit is supposed to do HIV test and counselling so in every visit when they come we also re-test them because we've also noticed that before it used to be every 6 weeks and at week 12 they must re-test again. so we noticed gore they convert while we are still waiting for that 3 months period. So we came to conclusion, every visit, our woman are not using protection so we advise them that every visit, they must come and re-test so that we catch them early and put them on treatment and increase the chances of the babies.

ONCEPT 3: PROFESSIONAL DEVELOPMENT AND MANAGEMENT

Categories	Codes	Quotes
Continuing professional development	In service training.	P06: Yes, the DCST as their role and also the fact that they have put much effort in terms of educations and they supporting the clinics and hospitals.
	in service training	P02: and there's trainings, quarterly trainings that are led by DCST and in conjunction with the maternal, the MCWH to train the staff on basic anti-natal care, hypertensive disorder in the big five causes of the maternal mortality but mostly focusing on hypertensive disorders in pregnancy because now they are the leading cause of

Categories	Codes	Quotes
		maternal mortality. So they make sure that those trainings are happening on a quarterly basis and also in the trainings, there's also an interact between the DCST, MCWH and the training unit. If the training unit is training on sexual & reproduction health, DCST is also included to the part of the training to train the nurses and the doctors.
	in service training	P17: There are also some in-service training that they are doing, they will be considered and they are helping baby's breath, the ANC workshop, the banc plus.
	In service training	P03: In fact, what I know in the DCST is that they plan their training, they organize trainings, they come up with programmes, and they tell us in terms of policy changing in the policies and guidelines and protocols. If there are changes in policies they actually distribute such information to various facilities, so we get geared in terms of following protocols and guidelines as we are rendering services in various facilities. They are always on board for the department. They are doing trainings. They organize in-services trainings. They empower our clinicians from time to time.
	in service training	P03: We will go there and do the site visits and actually on-site training, in service training. They are actually very supportive. Also from time to time we got a planned ANC, postnatal trainings. That actually we have got a time table on a monthly basis, it goes to all the district, covering the district as a whole. We actually expecting all sub-districts to bring some participants from theirs, especially clinicians who are dealing with mother and child services. So therefore, they actually come on board from time to time, they are also advisors because some of years we've got challenges, we get some challenges as coordinators, we call them and come and support us. And will go together to some facilities, they come they are always on board. They are really supporting the district very well. we really commend their activity that they are doing for us.
	in service training	P10: Well for me, may be because, I am going to say, we were trained by DCST-O&G, for doing ultrasound for the facilities and also obvious the training they conduct, emergency for mother & the Paediatric one, saving babies. Those trainings were to ensure that the clinicians & doctors were also part of the training. They make provisions for training, specifically targeting for doctors, specifically targeting for nurses and also IMCI training which is more of a pediatric one, not maternal, where we also been involved. I think the relationship is good.
	in service training	P06: My understanding is that they did support in the primary health care and running educational scenario like ESMOE training, antenatal training, family planning training
	in service training	P17: hey are trying to make sure that within a year maybe there are two or three training of re- ESMOE and then the BANC plus, the ANC workshop where we get more information.
	In service training	P14: What I know, they are really focusing in education and giving a support, the support that we get from them is too much and the more information that we get from them and is worse because they do things practically. It's not about theory because we used to get theory, then come they use these dolls and then we see what we are supposed

Categories	Codes	Quotes
	In service training	to be doing straight forward we see it. It is not a matter of you are just told you can do this. They do the drills. They do in-service
	In service training	P08: They are assisting with the trainingBut mostly it is the training , It is their visits and their support visits to the clinics, to see that they can assist us and I think they did
	In service training	P10: <i>I think for me, I would say they were effective in terms of, I would ask them in terms of training. Because they would sit on our necks, please send doctors, please send, ensuring even the new ones, so they say more people are trained.</i>
	In service training	P16: <i>I don't think there is anything else because we do have the trainings are all scheduled on time even if we can nominate whoever, if it is late they always say we are going to start now where are the nominees and are there any other people who are coming, so they are always there.</i>
	In service training effect	P09: I would start with the indicator of below 20 weeks. They have really tried & I think we are getting in my district ESDR, we are improving in that level. Then teaching what is needed, when patient comes to ANC, we do have drills. They assisted us to understand BANC well , among the midwives to be able to get early detection of any complications, will be able to refer to hospital.
	In service training effect	P09: Yah if we have abantu aba the new ones, you'll find instead of delivering everything here, they will refer everything to Pholosong, so that is where the district specialist has to pick up and say let us train, which they do by giving more training, which they do. They are coming for more drills which are not enough I must say ukuthi if we could have more of the trainings and the drills in the facilities then things would be much better.
	in service training effect	P10: Obviously the main focus was more on training . I think in terms of ensuring people that they were adequately trained, in terms of managing obstetrics emergency and also, and obvious, people who are not also trained they have a tendency to just refer because of lack of knowledge, and also, I think in term of things that has been done at primary level. I think, before prior to them coming, we were not doing like sonar in our clinic , it was like for the hospital. I think, because people are used to see things happening. Now it is easy to introduce more, move things like to put IUD in the clinics which is something that we were not doing previously. and also, I think now even the nurses are doing SONARS in certain areas without the doctor . And also the equipment, in facilities are better.
	In service training effect	P10: <i>I think for me, I would say they were effective in terms of, I would ask them in terms of training. They would say the more you train people, obvious you want to create such relationship by whereby even if a lot of people. Because they would sit on our necks, please send doctors, please send, ensuring even the new ones, so they say more people are trained.</i> So in terms of people being aware, at least when someone does something that is wrong, they are aware that this

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	In service training effect	<i>is not what they are supposed to do. That someone does something wrong; because they don't even know so, at last that one, it was easy for us to say. But training was made available and gone. But now we are still doing, so it was making it more effective for us to enforce compliance, so people were aware of what they are supposed to do.</i> P16: <i>I do have an idea because we do have the meetings. We do meet with other sub-districts, as we are the Northern district, there is South and East. So sometime we meet in the district or they just organize another venue, like Alberton. And our trainings as well we also doing well. And we are taking any venue that is available. For the maternity, we sometimes go to Thelle Mogoerane for the training & for the meeting.</i>
	In service training challenges	P12: They are trying, shame, even though they will complain about the funds sometimes you find the training has been cancelled because of funds but they are trying. I can give them 60% out of 100. I think it funds from the Department National. I think if they are getting enough support in funds I think it will be easy for them to do their job.
	In service training	P13: I think they are doing trainings of which is too limited, it doesn't, cause there's a certain number for municipality and there's a certain number for us but again we also contribute a problem because we are just staff shorted on such people. So maybe if it was done they can do sub-district and try to be the ones who comes, they don't centralize it because centralization sometimes they are doing per district so it's not accommodative enough for other clinics and if they can access strengthen their support so they are doing with province they are doing, yeah, maybe if they can strengthen more on the clinics than on the meetings. If they can just make sure maybe monthly, once in a sub-district they show themselves, like we know that they come once a month it can , we really have to take again accountability because some of us we relax and like, they are too many because this week I think I'm here for only 2 days and there are times where I'm not here for the whole week, so I don't know because the other thing that affects it's staff it can never be DCST. We are like short staffed maybe we have 2 people who are not on duty, sick or they have their problems we just say no, no one is going because now we have to be compromising the customer service and the service to the patient and the training that we compromise the training of which again is one thing that needs to benefit us then you stuck with the person who doesn't know anything instead of going and push.
	in service training	P16: I think sometimes they are having difficulty in coming to the facilities every time. <i>I think one of them is the transport. They need to organize the transport sometimes and find that maybe the transport in the district is no there. Sometimes they can delay to come to the facilities due to the transport. Sometimes they will come to us and find us busy, so they are unable to continue with the training or whatever visit they are coming to.</i>
	in service training	P15: The shortage of skills because they are the ones that are helping us with the training the midwives especially on emergencies and other management of the patient, so you find that they are planning the trainings but due to the shortage of staff you find that they have announced that there is training on this day and so, only to find that in the facility you can't release the staff to attend those trainings' due to the shortage of staff.

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	in service training challenges	P13: So in other words there should be more visits you know even the frequency and also look for a bigger space for training because last time in MMR meeting we discussed that can they have more space because you find this rotation thing every year. When we have new staff like ANC they know nothing, so if they spend up to six months it means the gap in the patients is being mismanaged somewhere somehow so I think there they need to do something about it.
	in service training challenges	P11: We work very well and the other thing is I see, some of the things are not optimal. The Paediatrician couldn't offer training for triaging in the clinic of infants and neonates because of lack of resources in the district .
	in service training challenges	P11: I think it balls down to resources also that, you see people go for training. I've been too much training but when you go back to your practice, to where you've been practicing, to where you working, there's no opportunity to implement , to put in use. So just keep on going for trainings, there are no opportunities to practice the skill. You understand, and that's one of the biggest problem, so not that they don't want to but because at times resources are not there. So how can we, is good to employ personnel but you must equip them. Its good the district clinical specialist are there but it must be properly equipped at the same time so that they can be more effective because I believe there's always a room for improvement in every sphere. There are some things that can be put in place that if you, and all over the world, I mean the primary care must be strengthened. If it's strengthened then you won't have to be referred to the hospital because we have people who collapse, people will be blacked out, people will get less passionate. People become less empathetic & all that.
Competency standards	competency standards	P03: They do facility support visits. They also get involved when there is an ideal clinical assessment and NCS national core standard assessment and evaluation . They are always there for the district.
	competency standards	P17: So they are the one who are planning our training so that we can be a par. If they see a need that this training must be done, then they consult us and they give us the schedule then we send people to go and train, right now the thing that have done that we love the most the rapid RPR. We are now doing the rapid RPR. They have motivated. We've got the kits. Now we no longer reporting the RPR that is unknown.
	competency standards	P09: The role of I-DCST team also was to enforce nurses and doctors, health workers, all of them, encourage people ukuthi they must come and they must be booked well and then we start early. As a result in this facility, I see patients that are 12 weeks coming for sonar which is very good and they are referred from clinics because this is a CHC. So it means now people are getting the message and they are coming and then we are encouraging them. That's why it's important because the DCST particularly DCST-O&G has been going around.
	competency	P14: it says something to your antenatal clinic ukuthi how did this woman attend the clinic, was the full information given to her about going to the clinic when she feels she is not okay, attending clinic regularly and reporting whatever

Categories	Codes	Quotes
	standards	that she feels is a risk, so it gives me a challenge that I need to do something about.
ESMOE	ESMOE	P01: Maybe to add also the achievement with the introduction of the district clinical specialist team, our clinicians are being trained on ESMOE ,
	ESMOE capacity building	P02: And the trainings also. They do the trainings, capacity building , they are having a huge impact for ESMOE training on emergency obstetrics conditions.
	ESMOE	P09: That's why I am saying if you have a very good coordinator like DCST-O&G who is always willing to give ESMOE training , that is always available on the phone when you don't know what to do and making sure that communication has really improved, I mean it was one of the best. Last year it was rated as one of the best.
	ESMOE	P06: in education we know they run effective program of ESMOE, good schedule program and when we go to our hospital and say how many we do have and say how many doctors training as mark in our case 100% and will rely on them
	ESMOE	P17 They are supporting us to make sure that our professional nurses are at par with what is happening in the current situation and the other area that helps us a lot even if the person hasn't done advanced midwifery training, the ESMOE training. ESMOE training, it really gives a midwife a confidence of working after they have gone for ESMOE training . So our saturation at the present moment is 98% because I have only a comserve nurse that hasn't gone for ESMOE training and its going to be due very soon, so she is going to attend.
	ESMOE	P09: That's why I am saying if you have a very good coordinator like DCST-O&G who is always willing to give ESMOE training , that is always available on the phone when you don't know what to do and making sure that communication has really improved, I mean it was one of the best. Last year it was rated as one of the best.
	ESMOE outside Ekurhuleni	P13: Now we are requesting for Ekurhuleni to provide training for those clinics for COJ because they are not doing ESMOE and they are affecting us because complications then come to us instead of going to COJ . It plays a very big role and what I have realised when you talk to other districts you realise we are far better. We are doing well. So I don't know how they are doing it but there are something more they are doing.
	ESMOE	P14: We are performing, I think if we are not at 80%, we are 70-80% , but I'm not sure. But if it was like you are asking me about this maternity clinic bengizothi I'm 90-100% because our district specialist they are doing this ESMOE project and this clinic is 100% on ESMOE , because not even a newly qualified employee in general has done the ESMOE . I'm at 100%. This is the clinic even if you could go to the statistic, we are at 100% and with the drills, we are also doing well because DCST-O&G and the team, they always come to coordinate us. They always visit us, all

Categories	Codes	Quotes
	ESMOE	the things that are supposed to be happening and what I liked with their ESMOE, they have included doctors now. They have included all staff members. It was like before we were the only midwife's attending but doctors, also clinical doctors they do attend. They are doing well. P06: My understanding is that they did support in the primary health care and running educational scenario like ESMOE training, antenatal training, family planning training
	ESMOE effect	P13: Something that they do well is emergency obstetrics. We are even excelling, even though other clinics have got problems like maternal deaths and everything. Things that are done in ESMOE with us, DCST-O&G is saying it's not Ethafeni because last time when we had an incident they saw a patient walking with pre-eclampsia and she said no it won't be Ethafeni and later we realized that it was not us. They are just doing well with teaching us most important complications so that's why we hardly have maternal death and neonatal death. Improvements that they need to do is to be more closer. it's like they can come monthly you know the certain gaps that come along so if they can just maybe have sub-district training quarterly not in a district I think it can make things better, I think it's the only thing that we need most.
	ESMOE effect	P11: No they are effective. We've had several trainings, by pediatrician helping babies breathe, by the gynaecologist ESMOE training. I mean maybe two or three times per year and even some resuscitation skills. How to maternal resuscitation that was the modules. That's how they've been quite effective. They've been doing their best.
	ESMOE effect	P15: To add on their role, they plan for trainings, specially ESMOE training, they make sure that everybody especially in the maternity side, that every facility that is dealing with the mother and baby, the staff should be trained, ESMOE training, the management of small & sick babies, only on times of part of training. Again other roles I said they look at the problem and come up with quality improvement plan. They look at the struggling facility, look at the challenges and assist the facility.
on site staff mentoring	mentoring	P01: They are part of PHC engineering and they integrate with all the programs and they also focus move well as the clinics. If there's any mentoring training that is required they are there to assist.
	mentoring	P09: they do ama-workshops together, they then go their separate holes and be specific like maternal mortality, morbidity making sure, that we are decreasing whatever, the levels of ama-hypertension we are having. The hemorrhages, what is happening, going into hospitals to see ukuthi, they've really helped Pholosong. It used to be very bad performing but they went in and they tried to help.
	mentoring	P20: We know about them. They are the ones who are mentoring us. Should we have any problem, we go to them. They update us with any new guidelines and everything and the nice thing about them is they even gave us their phone numbers so if I get stuck ka-patient. Right now I just whatsapp DCST-O&G and she will get back to me so I get to know on what I have to do because you cannot know everything. Even if we have guidelines here, you find that it is complicated but the DCST gives us clarity.

Categories	Codes	Quotes
	mentoring	P20: Their role is to mentor us and to make sure we are at the right track , gives us up to date information about any changes that are happening in the guideline and give us support in everything we do regarding maternal side yah they are just there to support us.
identify opportunities and needs for formal education	updating Health technology	P02: If there's new development for instance, recently we had the RPR test kits that on site RPR test kits, that we have introduced, they have been advocated by the DCST for the district to have those onsite RPR kit , because according to the maternity guideline, the RPR test should be done on site, so they advocated for that and they say to them. But to the external people to come and train, so we have the RPR test kits in the MOUs only, but they are looking at extending it to the clinics as well. And they also integrate in sub-district management teams like if the program is not doing well for instance in the indicator, the anti-natal care first visit because that is the indicator that has a huge impact on maternal mortality. If the patient doesn't attend the clinic early, then they will end up having complications that we will not identify earlier.
	updating health technology	P03: Like yesterday, we had a workshop on antenatal and postnatal care services including RPR rapid test guidelines because we've got a problem in our district of congenital syphilis cases are increasing. But they were actually training and helping as very well on that .
	updating health technology	P12: they brought rapid tests for those mothers who are unbooked, late booker. You can just do them in the house and get the result and transfer the baby in the facility or manage the baby in the facility and the bicillin now are available in our Pharmacy. I think it's something happened last month. They did send us the rapids tests.
	updating health technology	P03: They actually give us information on time and they always come and support, for instance when we introduced from convectional pap-smear, cervical cancer screening to LBCS, they actually came also to training us to say "now we are doing liquid based cytology this is actually how they liase with NHLS lab as well as NICD.

CONCEPT 4: CREATE DEMAND AND IMPROVE ACCOUNTABILITY FOR MCWH

Categories	Codes	Quotes
Accountability to community		
Community dialogue	patient compliance	P18: Another challenge is the patient who comes late and they will tell you about long queues, time frame that they are supposed to be coming for example from 30 weeks if a patient is a previous caesar. we bring them back every two weeks depending on the different condition that they have, some complain why we bringing them too soon and if they come here and the next weeks you want to see them, then they start to complain that you are giving me too little frame time to come back to the clinic, my work bosses are complaining and I don't have time to come to clinic I also

Categories	Codes	Quotes
	patient compliance	have other stuff to do. P19: The other challenge will be the issue of our clients. In terms of the clients, they miss their dates, they don't take their treatment as explained to them. in terms of the danger signs that are being taught to them, and sometimes they will come to the clinic with PV bleeding of which we have explained to them that if you have got PV bleeding, just go straight to the hospital. So they've got a mentality if they don't have a referral letter or argument sake in terms of the PV bleeding they won't be attended. So we have that kind of challenge and there's a lot of moving around where in you find that you started a person here for antenatal and then she decides to go to Limpopo. When she comes back, already the date has long passed and then she has complications.
	teenage pregnancy	P14: Even there I'm using the school health to just talk about it at school because these are mostly the teenagers that are not coming early at clinic because they are also hiding the pregnancies because they are at school
	liaise with health promoters	P16: And also we have meeting like MMR where we talk about whatever the problem. That's what I am saying is ANC programme have improved. We are able to see coming early, knowledge of danger our signs have increased. We know when the first visit we can go, sit with the sisters, they will explain, what you are told, they will tell you once I have bleeding, I must come, I must go to hospital, once I have headache, Once I have, so already they are aware of whatever. They will tell you if caesarean section, they will make sure they understand. They will tell them what they must eat, all of dangers, so that you are aware when you are pregnant this is what not to be presented. That has been a very good impact.
	liaise with WBOTs	P09: Maternal Services are provided from primarily health care level but we have a challenge Yokuthi i-community is still not invaded. We have a challenge of people presenting after 20 weeks of pregnancy of being pregnant in the facilities because we have not yet established a system where we can detect women that are less than 20 weeks. You know they only come to us. It is only places where there are WBOTS and ward Based Outreach Teams that go out that are able to find women that are less than 20 weeks and when we look at the indicators, It is one of the challenges that we have. I think it is specialist team that has been trying to address working with WBOTS to say how do we let the community be involved and be able to understand that you don't have to stay till it shows.
	WBOT	P09: Once you know ukuthi you are pregnant, come to the clinic early so that we can detect whatever abnormality at a very early stage and with the WBOTs that are there they are also trained by the DCST team, You know you find women now that do present. The challenge that we had that was that before maybe for 12 weeks,the nurses will even turn you away and say you will come back when you show. So the challenge that we had was the community. Then when the community comes, do we accept them.
	WBOT	P12: Now we have improved and we got first visit WBOTS and Counsellors, they go outside and tell the patients as soon as you find out you are pregnant then come and book on ANC. So we getting 14 weeks, less 20 weeks they come and we manage to reduce maternal Deaths as soon as you discover that a patient is having a problem and you can

Categories	Codes	Quotes
	WBOT	manage that patient unlike the patient come for booking on that point it's difficult to manage that patient in a good way. P08: I would really think that team should be in one sub-district if we really would want to see a huge impact. They also work with WBOT , I forgot to say specially the PHC team. They work with WBOT and school health. They also support WBOT & school health. Also assisting with training in that area. I think, may be, they are having a lot to do.
	WBOT	P16: I'm also using the health promoters to just go to do campaigns and then they sometimes go with WBOT. There are these organisation WBOT, they do visit homes and they talk about the early antenatal visit before 20 weeks.
engagement with district management teams and program mangers	meeting	P06: DCST-O&G & DCST-AM attend higher meetings they able to be like a channel between the clinics and decision makers.
	meeting	P07: We don't sit in the district meetings . We only have M&M meeting once a month where we meet. Maybe, I don't know, the nurses are meeting, but doctors level, we are not sitting in the district meetings.
	meeting	P15: So we do have meetings where we meet them quarterly. But sometimes you find that they have other commitment, they can't come to those meetings . I think if possible on their side they can have their schedule to say, maybe quarterly they are coming the facility to have support visits as the District Clinical Specialist Team (DCST).
	meeting	P18: As a district I think meeting us down here as a professional nurse. We do have meeting but they are not that many and when we do have those meeting you find that as a facility we are supposed to be rotating and we are not, and it is not everything that is oriented to come to ANC. Sometimes you find that it is difficult to connect with the people above, and you have a case now only if they can find a way to step down to us more often like the support visit. We really need those support visit so the challenge will be the communication between us and them. Sometimes you find something that has been, if I can put it in an aggraded, you only find it when they, how do they call it, only when the litigation comes up, do you learn that.
	meetings	P06: Too many meetings. Monday, Tuesday, wednesday. And again going back to their work, what I understand that there is a certain percentage of their time they are supposed to spend doing a clinical work & other percentage doing office work. But it seems like that there are more meetings , office work & run around than going to sit down to see the patients.

THEME/ CONCEPT 5: CLINICAL WORK

Categories	Codes	Quotes
Clinical	clinical	P01: I was told that 80% of their work supposed to be clinical and 20% admin but that one I cannot attest to say

responsibility	responsibility	they are doing that. But shame they are trying their level best.
	clinical responsibility	P06: if it can be scheduled in such a way they have important time to do the clinic work, be in the MOU, go see, there is midwife, do the sonars for them, run. It will help the patient who are travelling from the clinic to come here for a sonar or hypertension or this or that and if they can have let's say <i>DCST-O&G</i> is coming to Nokuthela Ngwenya, monday from 10:00 to 14:00, and if its known and it is known if can be there, people work better and again another there will be paediatrician who will be visiting this clinic on this fix date and they know in this sector where we are serving poor patient in terms of economic resources. Now they can afford to wait and see the doctor in their area rather than to travel here.
	clinical responsibility	P04: If I were to suggest, may be one day in a week should be dedicated fully to some sort of clinical work and the clinical work should be such that it involves a lot of teaching and skill transfer from them to other medical officers in a particular institution. If for example, I were to make an example of O & G specialist, if we were to say every Wednesday or whatever day of the week, the doctor will be in theatre in a particular hospital on a rotational basis teaching medical officers to perhaps do hysterectomy, for example. I think that might have quite a good impact in terms of improvement of clinical skills within the department and district. So I think they should not have too many restrictions on the clinical work what they have to do
Clinical work at PHC clinics and hospitals	PHC support	P06: Obstetrician would be in charge of the mother and child section who will support the clinic in the antenatal side, would be in touch with the midwife and the clinic and the PHC'S
	PHC support	P17: They are sort of a support for MOUs. Because this is the area where we don't have a stationed doctor. So their role is very important because they are supporting us throughout so that we can we can make informed decision regarding the patient before we can transfer to the next level of care.
	hospital support	P17: Remember our district hospital they are short staffed, so we are trying our best to do what is best for our patient, with the help of the DCST team
	hospital support	P08: And I know that they are also doing the work at hospitals, as commuted overtime . They are also putting hours, especially at the district hospital, Germiston hospital, to see they can improve these.
	hospital support	P04: I am not sure in terms of clinical work to what extent do they go in doing that but my take will be for their own development and for them to be seen as leading from the front and also to be respected by their peers. They should play, you know, quite a significant role in doing a bit more clinical work, especially clinical work which talks to their role as a specialist to sort of come on board and help to empower, you know, the medical officers within the different disciplines to be able to do, over and above, what a normal or an average general practitioner within a department could do. So they should be afforded the opportunity to do clinical work , may be on a regular basis. After all these people are specialists and one would expect that, you know, they should provide that kind of leadership even

		when it comes to clinical work. So may be thats something that has to be looked at as well in as much as their role is more oversight but whenever they are afforded this opportunity to do clinical work, it should talk to skill development within the workforce.
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THEME/ CONCEPT 6: MONITORING AND EVALUATION

Category	Codes	Quotes
Indicator (general)	indicators	P08: But I think, definitely yes, they have made a huge impact that is my personal view. We can also see it in our indicators, I think we can look at it and we can see it our mother and child indicators there is an improvement.
	indicators	P02: if the program is not doing well in terms of certain indicators (for instance the anti-natal care first visit, couple protection rate), they identify facilities that not performing or poorly performing in those indicators; They integrate with MCWH program and initiate to visit the facilities, all the and since we have integrated with them there's an improvement in those indicators because when we are at the facilities we do quality improvement and plans. And they share their best practice with us and also those best practices are also shared with the facilities that are not performing well.
	Indicators	P01: They are here to improve the indicators, the APP indicators.
	Indicators	P01:they are also trained on what DHIS of which is very very good, they are able to go in and take the information and be able to see the underperforming facilities.
MNCWH Indicator		
Reproductive health	cervical cancer	P17: Other indicator, its the CERVICAL SCREENING IN MOTHER and child, we are having these women who are on child bearing age so we can't help that much, we only do the cervical cancer screening to those women who are at risk like HIV positive. So we are not caring the age of 30 and above as it is need in the DHIS system, so mostly the ones that we are doing we rarely get the 30 years old because most of the ones that are delivering are before the age of 30 years, at 35 years they deliver in the hospital, they don't deliver with us.
	cervical cancer	P03: also we look at the cervical cancer screening rate , we are doing very well so far, though there are still numbers of facilities that are still battling but we are still supporting them very well including the DCST on board.
	cervical cancer	P02: even the other one, cervical cancer screening and couple year protection , they integrate with MCWH program and initiate to visit the facilities, all the facilities that not performing or poorly performing in those indicators. And since we have integrated with DCST, there is an improvement in those indicators because when we are at the facilities, we do quality improvement plan together with the staff. We call them all that are involved and together do the quality improvement plan and they share their best practice with us and those best practices are also shared with the facilities that are not performing well.

Category	Codes	Quotes
	cervical cancer	P17: Other indicator, its the CERVICAL SCREENING IN MOTHER and child, we are having these women who are on child bearing age so we can't help that much, we only do the cervical cancer screening to those women who are at risk like HIV positive. So we are not caring the age of 30 and above as it is need in the DHIS system, so mostly the ones that we are doing we rarely get the 30 years old because most of the ones that are delivering are before the age of 30 years, at 35 years they deliver in the hospital, they don't deliver with us. P03: also we look at the cervical cancer screening rate, we are doing very well so far, though there are still numbers of facilities that are still battling but we are still supporting them very well including the DCST on board.
	cervical cancer	P19: With the pap-smears most of the time we do them but you find that the target population is not exactly what the indicators is looking for. But to my understanding, if possible I would suggest to come back to say they can review the age goal, because recently, in the recent years, women are starting to be sexual active early like around the teenagers and then they have kids by 20 years. Some of them are coming for the 2nd, the 3rd baby. So maybe if they can review that one and we do them as a diagnostic and you find that some of them are having problems, then we refer them. But with the pap smears, we are not performing well. I will say generally facilities and the district as well, we are not performing well and also with the other indicators that I would say is not performing well
	cervical cancer	
	cervical cancer	P16: The cervical cancer screening is not good these days but we have tried our best before. Now our challenge is our ordering. the laboratory does not have stock mostly, now as much as they deny us to use the previous test kits, people were using the slides, now they want strictly the liquid base
	CYPR	P17: With DCST-FM and DCST-FMN they are more of on this couple year protection. they do come on quarterly basis to see how are we performing so as a facility last time when they were here, it was not bad, it was climbing. Though it was slow the graph is climbing a bit, we are improving especially with this IUCD. It is giving us more points and then there's also helped because I think we were not calculating couple year protection correctly because with the oral contraceptive we were giving, we were just writing one as an individual instead of writing you have given me 3 tablets. So they helped us in calculating this couple year protection so that we can at least get the correct formula.
	cervical cancer CYPR	P02: even the other one, cervical cancer screening and couple year protection, they integrate with MCWH program and initiate to visit the facilities, all the facilities that not performing or poorly performing in those indicators. And since we have integrated with DCST, there is an improvement in those indicators because when we are at the facilities, we do quality improvement plan together with the staff. We call them all that are involved and together do the quality improvement plan and they share their best practice with us and those best practices are also shared with the facilities that are not performing well.
	cervical cancer CYPR	P01: And then the indicator that we are not performing well in is the cervical cancer screening and also the couple year protection rate under the MCWH, the indicator. P12: The serious problem is pap-smear or implanon, family planning and reproductive, yeah we are not doing well

Category	Codes	Quotes
	CYPR	there. I think there's no much buying in even the staff they concentrate on pushing the line than doing pap-smear and they get a lot of youngsters. Then the chronic patients, they are very much selective so, and also the staff themselves again, yeah there's no buying in. Then comes to number of deliveries we are beyond the normal.
	cervical cancer CYPR	P08: What we are not doing well is cervical screening & couple year protection rate . Those are the two, we are struggling a lot with. But I think I have identified the poor performing clinics to try to work on them, see what it is, you know we can improve the pap-smear . How can we assist and our maternal coordinator is also very active and trying to visit our clinics to see that there's an improvement. Couple year protection rate , it's difficult because you know it's the condoms that is also affecting that and that condoms is not most counted at the facility. It's counted at the PDA site , that is why even if they can give how many condoms from Phillip Moyo, it's already reported at PDA site.
	CYPR	P17: COUPLE YEAR PROTECTION RATE: I think we the couple year protection rate, it include a lot of things, it include the condom distribution, it include the family planning, family planning include oral tablets, the injectable, the implanon and the IUCD. We had a period that we did not have any IUCD in the district, but now we are back, people have been trained and the doctors are helping also to be able to gain that skill, its coming gradually, hence our couple year protection rate is not up to standard but we are getting there because we are starting now. At Nokuthela, we started IUCD, we ordered & other clinics ordered also. But the thing is train the trainer, that was trained, after getting the skill, still you know we are reintroducing it again, the age group that is now they don't know much about it. But health promoters are helping us to advertise it. So we are getting people who are coming to insert it, last month, like last month we only had 2 who had inserted the IUCD. So with the help of our doctors we are getting there, so I think our couple year protection will improve. Because with the injectable, there is no problem, with oral contraceptive there is no problem. Its only when the drug stock-out. The only thing that was drug stock-out in the past month it was Nur-isterate but we are giving them something an alternative of injectable.
	CYPR	P03: couple year protection rate was still battling, we are still behind with the couple year protection rate. But we've got some strategic plan in place, so in terms of action plan and actually as something that has to be done., the protection rate was still battling because it's how we actually collect our data. That's how clinicians collect data and also data verification up to DHIS. There's still a problem, the district coming to couple protection rate, but we're still far, we were not doing well, but as I've said we actually got some action plans in order to improve from that rate. P18: The district in Couple year protection , I don't think we are doing well because most of the people that we are serving, it is really difficult to connect with the partner outside patient and the understanding yama-patient as to why they are supposed to come to clinic which makes it difficult for the district to meet the target because reaching out to the patient is very difficult. You may talk to the actual patient now and when it is time for the partner to step up and step in assisting with the help yaka-mama or umntwana it becomes very difficult plus with the cultural diversity that we have. I think it is more on the community than it is on the department and I am not sure as to how can the department influence

Category	Codes	Quotes
	CYPR	that.
	CYPR	P19: t I would say is not performing well will be the couple year protection. With it as well I think there is a little bit of challenge mostly is, I think it might be the condom distribution because the way we collect and issue out the method of doing it. I think it might be the problem because they record according to where we take them. I think we are taking from Swartkopis. So if there are no condoms from that point and then I need to go and ask from Germiston for instance, there would be a miscalculation of condom distribution from that angle. And then the other thing that we are promoting is the implanon and people are still having misconception about the implanon, mostly because as much as we try to explain how it works and the advantages relating to the implanon, but they are still sceptical in terms of putting it in, because they have this means that it make their arms green, they bleed yeah, all those side effects but if you explain to them, some of them do agree to put it on so with that one I think it should be like all male circumcision wherein they are publicising it in the media so if maybe they can do that, that's where the implanon could have a better view or a better understanding in terms of the implanons. No, so far we don't have cases where you find that people have taken the implanon out. Normally they will just come back and tell you, sister I am having this side effects and you re-counsel. Some of them do agree to control the side effects. Some of them will tell you straight to remove it, so that's it. I think with postnatal, we are still doing well.
	CYPR	P09: We are doing very badly on that. The part of it was that when it comes to statics, we did not get it right. When you go & check ama indicators, you find that we are doing very badly. <i>But the way it was calculated, it was not correct like when we giving ama contraceptives, there is a certain formula that we have to give. And when we are giving to the guy, the denominator sometimes does not agree. So when we talk about physically what we are doing and what we are statistically reporting, then we have challenges. The we are not distributing couple year protection. So for instance like people were not aware when we are putting a loop, we must double or use a certain formula and then ama condoms we had a challenge, but now we are as the district, we are trying. They are out there. We encourage them, we put them in places where people can be in every room. Its been a problem. Part of it was that even the site did not have the stock. Sometimes we cant get a stock here because of no one can pick it up. So those were the challenge and again we know that couple year protection as that, we know we got the female condom. its really not very comfortable. I don't think we are really addressing it. We are giving so much, but is it really comfortable for women to use?? Are we really covering?? What are we expecting to get?? Are we, is our target achievable??</i>
	CYPR	P12: the couple year, but we are not that good, we are trying but is coming there, is not up to scratch yeah, it's not up to scratch.
antenatal	teenager	P09: Our teenagers I forgot that one, another challenge we are having is teenagers and they come late because of stigma. There is a lot that we need to do, HIV is still a challenge were still one of our indicators of a eliminating. I think were supposed to be less than 1 .2. I think were still up there. So we need to work as teams everyone in their corners

Category	Codes	Quotes
		to make it work.
antenatal	ANC booking	P20: It is a fluctuating thing. The first quarter you will see you have improved, checking about nna. Let's talk about ka-clinic yaka, below 20 weeks first visit and then you find that the next quarter you go down from the time. Especially I also, I dropped kabo-festive season so that's when the peak goes down. From my facilities now we are doing fine. We are good but we are not where we are supposed to be. So that's why we are getting this cases tsabo-maternal death. We are improving if I can compare with lets 3 years,4 years ago.
	ANC booking	P02: I'm talking specifically on those four indicators which is the anti-natal care below 20 weeks, before 20 weeks, the cervical cancer screening, the couple protection rate and mother post-natal care within 6 days . So if we are not doing well in the indicators,
	ANC booking Cervical cancer CYPR PN visit	P17: We are having a challenges regarding the bookings before twenty weeks , women are not coming to clinic early, it fluctuates one month you'll be happy and say I have reached the target of 70% and next month there will be a dive, most of the time when we ask these women why are they not attending the clinic, they are having some social problem, they are caring for their old mothers, they can't access the clinic in such a way that we as the district there are facilities that are rendering services in weekends, but the attendance it's not 100% because some of them you will book them to come on Saturday just to give them a chance to come to clinic, others will be having some problems but in that booking, let's say you have booked 10 patient, 8 will honour the appointment, it will be only 2 that won't honour because we want to reach them as much as possible hence we have extended our service to weekend, usually it was a Monday to Friday thing and everyday as first visit day and now we are extending it to as Saturday and Sunday, but Sunday is not yet fully functional. The other indicators in the maternal site the one we are struggling with the baby that should exclusively breast fed at 14 weeks . Remember our community, they don't have permanent jobs, so they are contract workers, you educate them every before they are being discharged from post-natal unit we educate them that they should exclusively breast for 6 months but when they come for 14 weeks immunisation, we find them no longer breast feeding, the reason being I am back at work because I am a contract worker. I can't. I decided to give my baby formula because I need to be at work. I won't get paid if I don't go to work. So that is the challenge that we are having there exclusively breastfed at 14 weeks. Most of the mothers are no longer breast feeding in such a way that I think in last month it was an outlier in the DHIS that we only had 8 out of the 50 that we had that came for 14 weeks in the month of March, only 8 were breast feeding. It is a challenge really because most of them it is genuine reason that they are contract workers and you can't say stay, where will they get the income as our society is poverty stricken so if she's got that contract work, she needs to be at work. But when we educate them, we educate them on both breast and formula in case you decide to go to formula this is how you need to prepare the formula.
	ANC booking	P03: the indicators that we actually look at as a district mainly in the ANC first visit below 20 weeks . We've improved,

Category	Codes	Quotes
		we were not doing well, but since I probably know in the past quarter we've improved. Though I can't mention the percentage now that we are at a particular target but we are close to the target recently in terms of ANC first visit below 20 weeks
	ANC booking	P13: The first 20 weeks of which is the main concern, we are up and down. We are sometimes coming and sometimes we are not. The thing that is making us like we, ama-clinics they are too much over-crowded with limited staff, some of the patients they need to be turned away. Because like yesterday they went home at 19:00 hrs instead of 16:00 hrs because they were many. Then we just told them to stop returning the patients home, just do them, we would do overtime. We cant say burden, but somewhere somehow is one thing which is affecting our indicators. but since we are trying like overtime it makes it improve but it is also a small-nyana problem.
	ANC booking	P01: The indicators we are performing very well as compared to the other districts in Gauteng. ANC 1st visit before 20 weeks it was so low, but now we are sitting at 65.9 and the target is 66. And with ANC coverage as a whole, the target is 80 we are above the coverage, we are sitting at 89. It's more than 80.
	ANC booking	P19 In terms of the indicators, the last time we went to the meeting, they told us we are not performing so well especially with the below 20 weeks first visit and most of the time for some facilities, I may think it is because of the staff shortage as well because if I have 20 patients already coming in and then there's 5 more who wants to do the first visit. Sometime is becoming more impossible to do them the same day but we try by all means to tell them to come, to negotiate with them to come the following day, looking at the fact that the vitals are normal, the patient is not complaining with anything. We just screen them and then negotiate with them as to when can they come for the first visit but we do explain to them that it is very important to start as early as the person is missing period but we need to confirm first if the patient is indeed pregnant before we can do anything.
	ANC booking	P08: I think we are not doing bad. I must be honest with you. Our first visit Antenatal , we have improved, we have been reaching our target, so with that one we are very happy.
	ANC booking	P16: The other indicator is which is the first visit before 20 weeks . We are getting there. We were the best around last year throughout because it was 65% and now we are 70% we can't reach much. I dont know the challenge about the mothers. They are not coming before the 20 weeks mostly and you will find that those are the mothers that have more babies like 3 or 4. They are having that thing that we are having an experience, so we cannot just go to the clinic while we are still on first trimester. So that is our challenge. We are doing our service 12 hours every day, even on Sundays and holidays, we doing that, but mostly out of 20, first visit you will find only 3, like yesterday there were only 3 the below ones, the rest are above 20.
		P14: The other problem that I have is having antenatal patient less than 20 weeks , that's my problem indicators. I really do have a problem on that one, we are 45 of which the indicator says, as I was saying that I l've got a problem with

Category	Codes	Quotes
	ANC booking	my indicator of new visit antenatal less than 20 weeks. I've got a challenge, I'm at 40-45% and I'm supposed to be at 67-70% and that is the indicator that worries me, because women don't come to clinic early. They are having their own issues especially the traditional issue like their beliefs that if you go to clinic early people will be seeing you and then you will get a baby that is not normal and whatever, so they hide pregnancy until such time that they are sure at 6/7 months, they are sure now that they are pregnant so that is my challenge. P15: We have discussed the ANC under 20 weeks, perinatal death, maternal death. Again with us is the delivery targets like MOU targets per month.
	ANC booking	P17: Cervical cancer, exclusive breast feed and booking before 20 weeks are the most challenging, but with vitamin A for babies, we do get the babies that come for vitamin A and we have as a facility, most of the facilities, we doing the outreach campaign. We go to them. We have days when we go outside, go to crèches that's how we manage to get vitamin A & deworming indicators
Intra-natal	Delivery in facility	P16: <i>hey are all different. It is not bad. It is not good as it is but due to some challenges. Ours as the MOU, we are still the best because we are rendering 24 hours' service. We are always beating the target because our target is to deliver 150. So we are always around 200 and something. As we speak, last month we were at 243 in April and May, we were at 273.</i>
	BBA	P08: but what we are experiencing, what we are having is a lot of BBA's that is our biggest problem is these BBA's
post-natal	postnatal visit	P03: And we've got also this PNC, postnatal care within 6 days. Our facilities are actually getting there, we're coming closer to the target, we actually reaching the target in terms of the PNC as well.
	postnatal visit	P02: Talking about mother postnatal care visit, the indicator has been there but the implementation has been recently implemented here in Ekurhuleni before we introduce mother post-natal care within 6 days to be done at the clinics from May 2018. Together with the DCST we managed to implement this mother post-natal care within 6 days effectively, for the mothers to go to their facilities after delivery, to their clinics on 3rd to 6 days postnatal. Before all the mothers used to go back to their MOUs for check-up, you find that there is overcrowding in the MOUs. So instead of them focusing on the deliveries only, on them they have to focus on the check up and it is doing well.
	postnatal visit	P01: Mothers post-natal we were not doing well, we then engaged local government. Remember we've got Ekurhuleni 93 facilities and there are about 10% of those facilities they belong to province but the rest, 90% they belong to local government. Hence we cannot divorce ourselves from working together with local government because if you want to get to your indicator to reach your target, you need to involve them, so we are working together with them. P16: We are always upfront. But then our challenge is one with the post-natal care as one of the indicators, because we are at the border-line of the city of Johannesburg. So now most of my clinics that are referring here are from City of

Category	Codes	Quotes
	postnatal visit	Jo'burg. Now post-natal they are doing their 3 to 6 days post-natal visits and then here we are only left with 7. I can deliver that 279 but then I will only get 120 post-natal visits. So its one of the challenges and I can't do otherwise. So there are things whereby I can't change.
	postnatal visit	P15: The other indicator, I have forgotten some. Three days postnatal, like after the mother delivered they have to come for post-natal check-ups. So yes, some of the facilities especially the local government one, they were having a problem initially because they were not agreeing to do the three days check- up but then after discussion, now they are doing them. So although some of their facilities are not performing well on that indicator but there is a lot of improvement.
maternal and neonatal death	maternal death	P08: I think there is an improvement especially with the maternal deaths . We had a lot of maternal deaths , at our 2 hospitals, Pholosong hospital and Far East-Rand Hospital. But there is definitely an improvement and we are very happy about that. Our maternity unit is the MOU's that we are having. We are having 3. Its Nokuthela Ngwenya, Phillip Moyo & Kwathema. You know, I think, they are always improvement,
	maternal death	P10: There has been some improvement. To be honest, in terms of, I think in terms of maternal deaths. There is a decrease in terms of number or may be the frequency
	maternal death	P14: In our clinic we are at zero maternal death , especially maternal death. We don't have maternal deaths because maternal death is not supposed to be at the clinic.
	maternal death still birth	P14: About neonatal death , we do have most of macerated of which that is my challenge that I need to search about it because once you have a macerated still birth , But I really don't have neonatal and late neonatal. I'm always having more macerated still birth and sometimes I do have ama-fresh still birth, only sometimes, but I can say the clinic is at it according to indicators because we've got one into 100 macerated still birth or one into 100 maybe the fresh still. We are at zero neonatal.
	neonatal death stillbirth	P08:: but what we are experiencing, what we are having is a lot of BBA's that is our biggest problem is these BBA's But with neonatal deaths, still birth also, at a certain time, we had a lot of stillbirths reported at our hospitals as well at our MOU.s. But our mother and child together with the DCST's, we are putting efforts in place with EMS, because you know, all of those factors works together to improve.
	maternal death Infant death	P04: Those that always been the thorn in the flesh, will be the maternal mortality rate & infant mortality rate . Those are the ones basically that we have been closely monitored in terms of our performance. When I say, there has been an improvement , I am referring basically to those. And others are also quite important but the focus mainly has been on those which will actually reflect on the outcome, the district as well as of the country. We know at one stage we had issues regarding impact of HIV/AIDS which actually got a huge role to play in terms of both the indicators that I

Category	Codes	Quotes
	maternal death stillbirth	have given the examples, maternal mortality ratio & infant mortality. There was a time we really struggling because most of these deaths, you know , were attributed to issues pertaining to HIV/AIDs. But once ARV programme started, we got as many as people on board, we managed to then reduce mother to child transmission by very significant percentage to an extent that last time I checked that it was less than 2%. So all that, you know, actually helped to improve the outlook of maternal & infant mortality ratio. P18: Well from the meetings that we've been attending I don't think we are doing well because we are still getting ama-maternal death, we still get ama-stillborn, probably had it from the facility level and together with ama-patient we are not working together because some patients are coming late or not booked at all so our performance is really not that great. We could do better.
	Under 5 Under 5	P01: And also the vitamin A we were performing well, it has gone down now. Hence we are saying we are neglecting the babies and then concentrating on the mothers. P16: <i>And then the other challenge is the other indicator which is very bad, is an EPI from 6 month and above. There are some that we cannot trace because some of people are moving up and down. You will find them registered here for the first two visits, after that they are not coming back, like 10 weeks or 14 weeks, they have already moved to another clinic or to other because of the renting so we cannot avoid that.</i>
Quality manage- ment	QIP QIP	P09: <i>But we had some sort of QIP to try and say how do we increase this couple year & making people, we had ama challenges. People must understand that its not only about STI, but also about pregnancy. And then we also had challenges about baba, we want if women is tested automatically, then they don't want to use condom as they are fine. If the women is ok, then we don't get the men to use condom. So I think we still need to talk more on those issues.</i> P04: But as for their role like I said is to continuously do monitoring and evaluation to ensure that you identify areas of non-performance and you come up with quality improvement plans to be able to address those areas of non-performance and you also have to identify areas, perhaps where we are exposed to things like litigation what is causing that and come up with plans to be able to prevent, to develop prevention strategy and also to identify training needs within the different departments, to see if you need to train more doctors, anaesthesia, then you have to come up with programme to empower these doctors, get them to do Diploma in anasthesia so that your outcomes in terms of anaesthetic deaths actually improves.

THEME/ CONCEPT 7: LEADERSHIP AND GOVERNANCE

Categories	Codes	Quotes
leadership	leading the team	04: I think its doing relatively well except within the team itself there is no leadership like I have already alluded

	leading the team	to. So everybody is shooting in a different direction. You sit down with a paediatrician, that paediatrician might not know what the family physician is doing or what the programme for the family physician for the month or the week. So my worry is in as much as everybody is running with their own peace, so they are not well coordinated. So I think if you do that, you run the risk of duplicating roles and in the process you become wasteful. You are no longer efficient. Meanwhile if there was proper coordination and proper permanent leadership within the structure, this kind of thing will not happen. You will have somebody who will call joint meeting which should happen on a regular basis and somebody who is neutral like I have already alluded to, somebody who will be able to give non-biased direction to the team, you know consolidate, take up their issues and become a link between the district management and the team as a whole. I think they will perform much better if we were to review, you know the way they are running their business. I am not worried about their core functions that they are performing. I am more worried about the admin part of it. I think it can be done little bit better than its now. Otherwise in terms of performance, everybody is trying to play their role and we can see also in the outcome that yes, they do have a positive impact. So I think much more can be achieved if we were to go to the route of adding other categories like I already said to beef up the team because there are issues out there, you know which need other speciality to run. 05: I also have a feeling that their voices within the hospitals specifically where they have their counterpart's specialists, I think it's a bit diluted on one way or other. I am not sure how this can be resolved. My understanding is that when we have a district paediatrician within the district clinical specialist team, that person should be treated with respect and should be able to coordinate services within Paediatrics in all the facilities within the district and they should on a regular basis interact with the HODs from the hospitals and they should actually become a voice of the district when issues of that particular speciality are actually abreast. So you find there is this gap where hospitals autonomous as they are, they are sort of reluctant you know to allow the members of DCST to play that central role in trying to put them together, in trying to influence the agenda. Because that's what they are here for to play overall oversight role. Sometimes I have a sense that they encounter a bit of difficulty when they want to fulfil that. I don't know how this can be enhanced, may be one way to do it is to appoint district specialist team at higher level. At the moment they are at a head of the unit level. Perhaps if they were to be appointed as a head of the department level, then they will be able to exercise this kind of authority over the HOU's who are in the hospitals. At the moment they are at the same level. There might be some silent contestation to say that I mean really I can't be reporting to you while we are same level. I have never heard anybody saying that but from the way things happen you can't have but sort of have that suspicion that the perhaps this is what it's playing without actually anybody vocalising and saying actually this is what the situation is. So perhaps, you know this need to be looked at and they should then should up the level of district clinical specialist so that they are properly positioned to then be the sort of in charge to whoever is in the facilities.
governance	reporting lines	03: Because last time I checked, they were all supposed to report to the chief director. I mean you bring seven people to an organogram which is already overcrowded and you just increase the span of control of chief directorate level that is impossible to handle. So If you are to establish this link then it should be much easier because the clinical manager will easily run with the day to day coordination of the team & report you know directly to the chief director, meanwhile the

		members of the team actually focus on their core business which is to look at their specific areas. But somehow I think they have managed to gel as a team and you know try to do as much as they can.
	centre excellence	of 04: So if you have got somebody at district level who will have a sort of a panoramic view over all the facilities, I am sure they can play a better role to determine perhaps how this services should be rendered to the community.from the six, everybody is doing little bit of something and there are no centres of excellence. Meanwhile worldwide, the trend is to establish centres of excellence, so then you rally around all the resources around those centres so that you actually get the best value for money. So I think the ministry has to be reminded somehow that the team should actually be expanded to improve all other specialities. So that you consolidate and you are able to then have a bigger impact when you consolidated your teams.